

Taxing Robots? From the Emergence of an Electronic Ability to Pay to a Tax on Robots or the Use of Robots

This paper considers that granting a legal personality to robots could lead to the emergence of an electronic ability to pay, which may be recognized for tax purposes. As a consequence of such a development, a specific tax personality would need to be granted to robots. This would require a clear definition of robots, which could be based on the use of artificial intelligence, combined with a sufficient level of autonomy. From the perspective that smart robots may now replace inherent human activities, such as the interaction, learning and decision-making processes, the potential implications of a tax on robots, or on the use of such robots, is considered. The possibility of an income tax on an imputed salary from robots' activities, or on other income, is also considered. Initially, the economic capacity to pay the tax should still be attributed to the employer or owner of the robots. Later, when technology allows, an ability to pay to robots may be recognized. Initial comments on the application of the value added tax on robots' activities (transfer of goods and services), as well as international tax issues (notably tax treaty aspects) are also expressed, but would be the subject of further study from a global and international perspective.

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1. Introduction

The debate about the development of artificial intelligence (AI), and robots in particular, has become a major global issue. Robots are now used in all aspects of our lives, work and entertainment. On the one hand, this development could have positive outcomes because robots would be able to perform difficult, repetitive or even dangerous activities (such as cleaning polluted areas) and they also enhance efficiency. Humans could then concentrate on more interesting and creative activities. On the other hand, new generations of robots are now capable of increasingly sophisticated activities and are equipped with the technical skills to learn and improve their capacities in potentially unlimited ways. Robots are now replacing humans not only in industry sectors (factories, supply chains, cleaning, etc.) but

* Professor at the University of Geneva. The author may be contacted at xoberson@obersonabels.com.

also in services. Robots can become, inter alia, soldiers, journalists, car drivers, doctors, bankers, nurses and even lawyers. For example, ROSS, a new lawyer robot, is capable of analysing thousands of documents in very limited time frame and may eventually replace hundreds of lawyers and/or paralegals in the research process.¹ In Japan, an avatar robot was nominated in the Tokyo Movie Festival of 2015, equating the avatar to human actors.² As a consequence, the scope of human activities that will be impacted by the development of robots has no limits. This raises not only numerous ethical obstacles, but also economic, social, legal and, notably, employment concerns.

As robots are increasingly replacing human activities, often in a more efficient way, the legal issue of granting robots a new sort of legal personality has started to emerge. Back in 2015, Alain Bensoussan and Jérémy Bensoussan already favoured the idea of granting to robots a legal personality.³ On 31 May 2016, the Committee on Legal Affairs of the European Union published a draft report⁴ addressing some recent issues linked to the growing importance of the use of robots in all aspects of modern society, such as in production, commerce, transport, medical care, education and farming. The report clearly takes the view that the development of “autonomous and cognitive features” of robots “has made them more and more similar to agents that interact with their environment and are able to alter it significantly”.⁵ The report was accepted by the EU Parliament on 1 January 2017.⁶ In this context, major changes to the current legal system could be contemplated, such as granting robots a sort of “electronic personality” and the possibility to be liable for actions, not to mention aspects related to privacy, intellectual property or criminal law. This idea remains, of course, quite controversial. Recent commentators tend to favour the idea of granting a legal personality, while others still believe that this is not necessary, or at least not at this stage.⁷

In this paper, the idea of taxing robots or the use of robots through the granting of a tax personality is developed.⁸ It is submitted that a new form of tax capacity (*capacité contributive/Leistungsfähigkeit*) could emerge with the development of robots’ autonomy. This contribution aims to develop this basic idea further and to show some possibilities concerning the taxation of robots, or at least possibilities to tax the use of robots’ capacities.

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1. See A. Budry Carbó, *La révolution des avocats 2.0*, *Le Temps* (2 Dec. 2016), available at <https://www.letemps.ch/economie/2016/12/01/revolution-avocats-20>.
 2. See K. Tada, *Japan Chapter*, in *Comparative Handbook: Robotic Technologies Law* p. 199 (J. Bensoussan & A. Bensoussan eds., Larcier 2016).
 3. A. Bensoussan & J. Bensoussan, *Droit des robots* pp. 41 et seq. and 46 (Larcier 2015). See also S. Beck, *Über Sinn und Unsinn von Statusfragen*, in *Robotik und Gesetzgebung* p. 239 et seq. (Nomos 2013).
 4. See European Parliament, *Committee on Legal Affairs: Draft Report with Recommendations to the Commission on Civil Law Rules on Robotics* (2015/2103 (INL)), Rapporteur M. Delvaux (European Parliament 2016) [hereinafter *Draft EU Report*].
 5. Id., at 5.
 6. See European Parliament, *Report with Recommendations to the Commission on Civil Law Rules on Robotics* (A8-0005/2017) [hereinafter *EU Final Report*].
 7. C. Fanti, *Switzerland Chapter*, in Bensoussan & Bensoussan eds., *supra* n. 2, at 297, favouring this idea, and M.F. Müller, *Roboter und Recht*, 23 *Pratique Juridique Actuelle* (PJA) 5, p. 597 (2014), considering that this should not per se be excluded but is not really necessary under the current rules.
 8. See X. Oberson, *Taxer les robots?*, *Bilan* (25 July 2016). This publication was further complemented in an interview of 17 Oct. 2016 in *Le Temps* where the idea of granting a tax personality to robots, and considering the possibility of raising tax on robots, was suggested. See S. Peca interview with X. Oberson, *On pourrait imaginer qu'un robot refuse de payer ses impôts!*, *Le Temps* (17 Oct. 2016), available at <https://www.letemps.ch/economie/2016/10/16/on-pourrait-imaginer-quun-robot-refuse-payer-impots>. More recently, see X. Oberson, *Für eine Steuer auf Robotern*, *Neue Zürcher Zeitung* (17 Jan. 2017), available at <https://www.nzz.ch/meinung/zukunft-der-arbeit-fuer-eine-steuer-auf-robotern-ld.140036>.

The necessity to consider a new form of tax capacity for robots can be demonstrated by considering the direct and indirect impact of robots on employment. First, robots could, in the long term, replace many, if not most, human activities and therefore have a major impact on employment. This may then result in important tax and social security losses linked to the disappearance of revenues, notably salaries. Second, concurrently the need for additional sources of state revenue would increase to support the growing number of unemployed people. This double loss must also take into account the positive impact arising from the widespread use of robots. Indeed, the development of robots – boosted by innovation – increases efficiency and global growth. This also explains why, until now, states have focused on tax incentives (notably in the form of increased depreciation of assets linked to robotics), instead of taxing robots as such. Yet a potential significant need for additional financing, notably for social security, but also, in the long term, in the form of a minimal income, could emerge. It is submitted that the issue of a tax on robots should be considered now; the developments in this sector are exponential and new concepts, especially in the tax area, need careful consideration from a global perspective.

This article explores the possibilities of taxing robots from a global legal perspective. A tax on robots requires the consideration of several issues. First, a practical definition of robots is required (*see* section 2.). Second, the creation of a new tax personality must be justified, both from an economic and constitutional standpoint (*see* section 3.). Third, the various possibilities of taxing robots should be analysed, either by applying existing taxes or by creating new specific ones (*see* section 4.). Fourth, the global features of a tax on robots should be recognized. Robots, after all, are not made of flesh and blood. They can easily be displaced and act in various places at the same time. It therefore requires a global approach (*see* section 5.).

2. Definition

To be subject to tax, a robot must be clearly determinable from a legal point of view. The concept of “robot” is still not sufficiently delimited today to be adequately defined legally. This task is rather difficult.⁹ After all, robots are part of technological development and are a follow-up of AI. Is it possible to distinguish robots from computers or software? A self-driving car remains a car combined with sophisticated software. But there is a crucial development here in the sense that the robot is able to replace the human in the decision-making and learning processes. Robots now engage in specific and – so far – inherent human activities. In other words, what is new is their capacity to make decisions, their faculty for learning and taking independent decisions, which goes further than just reacting to automation.¹⁰

In the EU Final Report, the EU Parliament suggests that the definition of “smart robots” should be based on the following characteristics:

- the acquisition of autonomy through sensors and/or by exchanging data with its environment (interconnectivity) and the trading and analysis of those data;
- self-learning from experience and by interaction (optional criterion);
- at least a minor physical support;

9. See N. Nevejans, *Les robots : tentative de définition*, in *Les robots, objets scientifiques, objets de droit* p. 81 et seq. (Mare & Martin 2016); *see also* M.F. Müller, *Von vermenschlichten Maschinen und maschinisierten Menschen*, in *Mensch und Maschinen - Symbiose oder Parasitismus?* p. 126 et seq. (Stämpfli 2015).

10. Bensoussan & Bensoussan, *supra* n. 3, at 24 et seq.

- the adaptation of its behaviour and actions to the environment; and
- the absence of life in the biological sense.¹¹

Various organizations have developed standards and definitions in the field of robots and robotics, an example of which is the ISO 8373:2012 standard on robots and robotic devices. This international standard specifies vocabulary used in relation to robots and robotic devices operating in both industrial and non-industrial environments. In general, a robot is an “actuated mechanism programmable in two or more axes with a degree of autonomy, moving within its environment, to perform intended tasks”. The standard further specifies that a robot includes the control system and interface of the control system. The International Federation of Robotics (IFR) uses the same definition as the ISO standard.¹² Nevejans suggests that a legal definition of robots be based on six conditions. In her view, a robot:

- (i) is a physical machine (“*machine matérielle*”);
- (ii) is alimented by energy;
- (iii) has a capacity to act in the real world;
- (iv) can analyse the environment;
- (v) can render decisions; and
- (vi) can learn.¹³

All of these definitions focus on the level of autonomy, the capacity to evolve and learn. They also tend to cover robots as a physical support (EU Final Report), as a physical machine (Nevejans) or at least as a mechanism (ISO).

Trying to develop a specific legal definition of robots would go beyond the scope of this paper. From the proposals that have already been developed internationally, the common thread is that they tend to focus on the autonomy and decision-making process of robots. Contrary to machines, such as automats, trains or cars, the decisive factor appears to rely on the existence of AI, encompassing sufficient autonomy, and a capacity to learn, progress and make decisions. Robots are now able to replace inherent and, so far, unique human activities.

In view of the above, it is possible to give a practical definition of robots. It may, however, be noted that any existing definitions, especially in a legal context, have not been developed with a tax perspective in mind, but more from an ethics and civil liability perspective. From a tax perspective, a rather “form neutral” definition of robots would tend to be favoured for tax purposes. After all, it does not really matter, as long as the work (of the robots) is properly carried out, whether robots are walking in the streets or developing automated tasks embodied in software or a machine within a firm.

3. The Framework of a Legal Tax Capacity

3.1. The concept of legal personality

Introducing a tax on robots, or on their usage, would be the consequence of recognizing a specific tax personality of robots. It could therefore be argued that tax law should grant a legal capacity to robots, introducing a new type of legal personality into tax law. Such an

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11. *EU Final Report*, *supra* n. 6, at 8.
12. *See Fanti*, *supra* n. 7, at 293; *Müller supra* n. 7, at 596 et seq.
13. *See Nevejans supra* n. 9, at 100.

addition is not a new concept. Indeed, more than a century ago, with the development of the capitalist society, the concept of legal person was developed. It is interesting to note that the concept of legal personality was introduced in the United Kingdom to offer a legal remedy against insolvent companies with limited liability. In the famous case of *Salomon v. A Salomon & Co Ltd* (1897), the House of Lords unanimously upheld the doctrine of legal personality, under the UK Companies Act of 1862, and confirmed that creditors could not sue the company's shareholders.¹⁴

There appears to be no universal understanding of the concept of legal personality; in general, it refers to an entity that can own property in its own name, that can sue or be sued and that may also enter into contractual relationships.¹⁵ States have, notably since the time of the *Salomon v. A Salomon & Co Ltd* case, expanded the list of legal entities to include, among others, corporations, cooperatives, associations and foundations.

As a rule, tax legislation refers to the civil law characterization of legal entities, which become subject, in accordance with the tax rules, to a specific tax: the corporation tax. However, tax rules may sometimes not recognize a legal entity and treat it as transparent. This is, for instance, the case under Swiss law in a situation of abuse of law (so-called “*Durchgriff*”, which corresponds, under Swiss law, to piercing the corporate veil), under the conditions defined by case law.¹⁶ A similar treatment may be found in investment funds. For example, since the Swiss tax reform of 2007, investment funds in the form of corporations with variable capital (so-called SICAVs) have legal personality and are treated as transparent for tax purposes.¹⁷ Sometimes, depending on the structure of the entity, some states, such as the United States, even allow election for transparent or entity tax treatment, such as the “check-the-box” regulations.¹⁸ Equally, tax law may impute a specific tax capacity for entities not regarded as legal entities in accordance with civil law rules. For example, under Swiss law, investment funds that directly own real estate are now regarded as legal persons for the purposes of Swiss profit taxes.¹⁹

Such examples demonstrate that the tax legislator does not always follow the legal forms designed by civil law. It follows that the legislator could grant legal personality to robots under civil law. Equally the tax legislator could also design a new specific tax liability for robots based on different tax criteria, as long as robots can be properly defined for tax purposes.

While it is clearly possible to create a new legal basis for a new form of tax subject, it is also necessary to find a proper constitutional justification for such creation.

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14. UK: UKHL, 16 Nov. 1896, *Salomon v. Salomon & Co Ltd*; see K. Blanchard, *The Tax Significance of Legal Personality: A U.S. View*, Colloquium on Tax Policy, 3 Feb. 2015, p. 6 (NYU 2015).
 15. *Id.*, at 8.
 16. See X. Oberson, *Droit fiscal Suisse* p. 68 (4th. ed., Helbing Lichtenhahn 2012); L. Cornu, *Théorie de l'évasion fiscale et interprétation économique* p. 494 et seq. (Schulthess 2014).
 17. See, among others, S. Oesterhelt & S. Schreiber, in *Kommentar zum Schweizerischen Steuerrecht, Bundesgesetz über die direkte Bundessteuer (DBG)* [hereinafter *Kommentar DBG*], n. 16 ad art. 49 DBG [Federal Direct Tax Act] (3rd ed., Helbing Lichtenhahn 2017).
 18. Treas. Regs. §301.7701.
 19. See CH: Bundesgesetz über die direkte Bundessteuer 1990 (DBG) (RS 642.11) [Federal Direct Tax Act], art. 49(2), National Legislation IBFD; Oberson, *supra* n. 16, at 211. This rule was introduced for practical reasons in order to solve the complex problems linked to the allocation rules of taxation in various Swiss cantons for an investment fund sited in one canton but owning real estate in another canton. Similarly, in the United States, under the “check-the-box” regulations, a partnership may opt to be taxed as an entity.

In the past century, the recognition of companies as separate tax subjects was a follow-up to legal personality and, notably, to limited liability. Indeed, this limited liability was regarded as offering specific economic advantages and the legal personality offered the possibility for shareholders to defer taxation of income until distributions of profits. This approach, still highly controversial among scholars, justified the introduction of a profit tax on corporations. Similar activities (for example, rendering services) may be offered either by an individual, subject to income tax, or by a company, subject to profit tax. Similarly, technological developments such as the introduction of machines, trains and cars have transformed labour forces and replaced human capital with tremendous impact. These developments have also increased efficiency, created new jobs and increased growth. Some scholars maintain that developments with robotics should have a similar impact.²⁰ However, robots do not only replace the arms and legs of workers; they are able to “think”, repair other robots, learn from past experiences and improve their capabilities. Following this reasoning, robots can now perform the same activities (usually more efficiently) than humans. They have the capacity to produce, develop and learn, just like humans. They replace human workers in their working activities (for example, the supply of goods and services) and can improve their own capacities even further.

This leads to the debate concerning the “autonomy” of robots.²¹ The potential development of the capacities of robots is exponential. The future will establish the exact consequence of this revolutionary development, but it appears that each economic sector will be impacted in an unprecedented way. Therefore, it is submitted that we should address these issues now and open the debate on the taxation of robots.

From the above analysis and considering the justification for existing legal entities (such as corporations), it follows that recognition of robots as a separate legal entity is possible. Following such a recognition and from the activities exercised by robots (work or services), it appears at least arguable that a “specific tax ability” of robots to pay should be recognized, resulting in accepting robots’ “electronic ability to pay”.

3.2. *The potential tax liability of robots*

To attempt to recognize a specific ability to pay of robots, or of their usage, it remains to be analysed how to implement such an ability to pay. Indeed, notwithstanding the legal norm, which recognizes the legal personality of an entity, as of now, the structures to which a tax capacity has been granted also benefit from a capacity to pay. Under Swiss law, the ability of legal entities to pay, notably corporations, has been recognized by the Swiss Federal Supreme Court and the majority of scholars according to the so-called “principle of separation”.²² This principle has also been used to justify the double economic taxation of profits, first at the level of the company and second upon distribution as dividends, even if

20. See, for instance, G. Groetz & G. Michaels, *Robots at work, Discussion Paper no. 10477* (Centre for Economic Policy Research 2015), showing that industrial robots increase both labour productivity and value added.

21. See, in this respect, T. Burri, *The Politics of Robot Autonomy*, 7 *European Journal of Risk Regulation* 2, p. 341 (2016), discussing and comparing the two views of robots’ autonomy: the technical view and the philosophical one.

22. See, in particular, A. Marantelli, in *Kommentar DBG, supra* n. 17, at n. 35 ad art. 1; J-B. Paschoud, *Commentaire Romand, Impôt fédéral direct*, n. 9 ad art. 49 LIFD (2nd ed., Helbing Lichtenhahn 2017) [hereinafter *Commentaire LIFD*]. The Swiss Federal Constitution also provides that the principle of ability to pay applies generally but “to the extent that the nature of the tax allows it”.

recent rules tend to alleviate the tax at the level of qualifying dividend participations. Even if this principle is subject to criticism, it seems that there is a consensus that companies, as legal entities, benefit from a sort of “objective” ability to pay, justified by various privileges (including the limited liability) that corresponds to a capacity of payment. In other words, as long as the profits are not distributed to the shareholders, the company benefits from a sort of “transitory” ability to pay.²³ Under US law, it seems that most scholars tend not to recognize that companies have an ability to pay, in a constitutional sense, but at least have a capacity to pay, the corporation tax generally being regarded as a tax that should be integrated with the income tax.²⁴ In any event, what is relevant for the purposes of this article is to recognize that legal entities, as tax subjects, tend to benefit from a capacity to pay, in the form of equity and/or reserves that may be used to pay the tax.

If an attempt is made to transpose this reasoning onto the case of robots, it appears that they indeed benefit from an ability to pay, which is, however, derived from the activities they exercise (work, transfer of goods and services) or that they will perform without consideration (salary or income). As such, the robot does not generally have a financial capacity, such as equity, personal assets or liquidities. It is the employer (enterprise) or owner who, ultimately, benefits from a capacity to pay.

If we take the example of the taxation of imputed rent under Swiss law, the consequence of this lack of financial capacity becomes more apparent. Under Swiss law, homeowners are subject to income tax on an imputed (theoretical) income, which should correspond to the amount of rent that the owner would have had to pay in order to live in this home.²⁵ This tax is justified by the fact that the owner benefits from an economic advantage (the absence of payment of the rent), coupled by the fact that renters cannot deduct the rent paid from the income tax.²⁶ In other words, the rental value constitutes an income in kind, which represents an economic value, corresponding to the rent that the owner should have paid. Indeed, according to the Swiss Supreme Court, the owner saves an indispensable expense: the rent.²⁷ In this case, the tax is clearly levied on a hypothetical income but at the level of the owner, who, as such, has a capacity to pay. By contrast, a robot may take the job or activities that would have generated income subject to tax, but it is not the robot which disposes of a capacity to pay; it is its employer or owner. It follows that, if we are looking at taxing the imputed income generated by robots’ activities, it is not the robot as such that should be subject to tax but the *use* of robots. The economic activity, to follow the lines of Simons,²⁸ corresponds here to the value attributable to the work, or services, rendered by robots in lieu of human labour forces.

23. In this sense, see X. Oberson, *Egalité de traitement, neutralité concurrentielle et liberté économique dans l'imposition des entreprises*, 4 Archives de droit fiscal suisse 73, pp. 177 et seq. and 184 (2004/05).

24. See, for instance, US Treasury Department, *Integration of the Individual and Corporate Tax System: Taxing Business Income Once*, 1992; A.C. Warren, *Integration of the Individual and Corporate Income Taxes: Reporter's Study of Corporate Tax Integration*, American Law Institute 1993.

25. See art. 21(1)(b) DBG 1990 (amended 2013).

26. In a case of 9 Dec. 1986, the Swiss Federal Supreme Court confirmed the constitutionality of the taxation of imputed income for homeowners (see CH: ATF [Arrêt du tribunal fédéral] [Swiss Supreme Court Judgment], 112 Ia 240).

27. CH: ATF [Arrêt du tribunal fédéral] [Swiss Supreme Court Judgment], 112 Ia 242. It should be mentioned that this line of reasoning also corresponds to the approach of H.C. Simons, *Personal Income Taxation, The Definition of Income as a Problem of Fiscal Policy*, notably p. 49 et seq. (Chicago Press 1938).

28. Simons, *supra* n. 27, at 51.

As a first stage, at very least the economic capacity to pay the tax should still be attributed to the employer or owner of the robots who, by using them, saves the salaries or other remunerations which would otherwise have been subject to tax. As a second stage, perhaps, an ability to pay attributable to the robots could be considered, when technology would allow for a payment capacity to be allocated to them (in the form of electronic equity, for example).

Following the recognition of robots' tax capacity (emerging from robots or the use of robots), various types of taxes could be contemplated. Thus, as far as the income tax is concerned, this concept could be to recognize a taxable capacity of the use of robots and levy the tax on the imputed salary (or some approximation of it) or the income derived from the activities of robots. Logically, other taxes could come into consideration. Robots may, among others, sell goods or render services. In this respect, VAT could also become relevant if we were to follow the idea that they have a legal personality. As a consequence, both the level of income tax (on the imputed salary or income) and the VAT proceeds could be used to finance the additional need to compensate the loss of jobs or, alternatively, to finance measures promoting the replacement of workers or their educational needs, or to provide technical assistance to help unemployed workers find a new job. In the longer term, this tax on robots, or on the activities of robots, could also become relevant for financing a global minimum income for everybody.²⁹

4. Taxing Robots or Their Usage – Some Options

4.1. *Introducing a tax on imputed income attributable to robots' multiple activities*

To the extent that a practical and justifiable definition of robots may be implemented, the recognition of a new legal personality for robots could lead to the recognition of a new tax capacity. Indeed, robots, as legal subjects, could then have legal responsibilities and their activities (work, transfer of goods and services), which would normally be subject to tax if effectuated by humans, could then also be taxed.

The type of tax would then depend on the legal position of the robot. In the case that the robot is employed by a company, and based on the idea that a robot replaces humans, and consequently prevents such humans from being paid their salaries, a tax on the imputed³⁰ hypothetical salary that robots should receive from equivalent work done by humans could be introduced. In other words, the tax could be levied on the hypothetical amount of salary that workers would have received to exercise the activity that was replaced by robots. This concept would rely on the legal characterization of the relationship between the company owner (and user of the robot) and the robot itself (as a tax person), in a similar way to a working contract. If the relationship differs from a working contract – for instance, if the robot is owned by a company or a person and acts under a contract of services (entertainment, help, advice, etc.) – then the imputed income could be some approximated amount of an arm's length consideration for similar services rendered by humans.

29. It is interesting to note that the Swiss people in a referendum of 5 June 2016 recently rejected the idea of a global minimum income. In today's world, this vote is quite understandable. The idea should also be accepted on a more global scale than just in a small country like Switzerland. However, it shows that this idea is slowly starting to emerge. See <https://www.admin.ch/gov/fr/accueil/documentation/votations/20160605/pour-un-revenu-de-base-inconditionnel.html>.

30. The use of a tax on imputed hypothetical income is not new in the tax system. For instance, some countries, such as Switzerland, levy a tax on imputed rental income to homeowners (see section 3.2.).

Here, the imputed income corresponds to the economic advantage obtained using robots instead of a human workforce or services. Based on a similar reasoning, a tax on imputed salaries to robots could be justified by the fact that they replace, with no compensation, salaries or other remuneration paid to humans.

An alternative, and simpler or more practical, approach may be to tax a lump-sum amount representing an approximated “ability to pay” the tax.

Should a tax be levied on income attributable to robots’ activities, the issue of “double economic taxation” could arise. Indeed, in most cases, robots will be owned by corporations, already subject to profit taxes, and the income, at least part of it, could be taxed twice: first at the robot level, on the imputed salary or income arising from the use of the robots, and second at the corporation level. However, even these forms of economic double taxation are not new. Potential solutions to this issue exist. First, if we compare robots with workers and allocate a theoretical salary to their work, such a salary should logically be deductible as a cost at the level of the company so that double economic taxation does not occur. Indeed, salaries paid to human workers are generally recognized as deductible business expenses and the imputed salary to robots could be treated in the same way, since intelligent robots would replace humans. The imputed salary should therefore be treated the same way as salary paid in cash to humans. Second, under the current rules, robots are regarded as depreciable assets in most countries.³¹ This may become even more true in the future, since the developments of technology may render existing robots rapidly obsolete.³² If the legislator chooses the solution of deducting an imputed salary at the level of the company, a proper adjustment should be introduced in order to prevent a combination of asset depreciation and an imputed salary deduction.

Finally, to collect the tax on income attributable to robots’ activities (imputed salary), a mechanism of tax at source could be introduced at the level of the employer (owner).

4.2. Subjecting income attributable to robots’ activities to social security contributions

It is submitted that a logical consequence of recognizing an imputed income (salary or lump-sum amount) to robots should therefore be to subject the imputed income to social security contributions. If robots replace workers, it may be possible to argue that the imputed income should fall under the scope of social security levies. Indeed, this idea has already been suggested. Recently, the *Unión General de Trabajadores* (UGT), a Spanish union, proposed the introduction of a social security charge on enterprises using robots that replace human workers, notably in industrial companies.³³ This notion is at an early stage, and the base and computation of such a tax remain open issues. What is interesting for this analysis, however, is the link between the charge and the activities (here, working hours in industries) replaced by electronic workers.

31. See the various country examples quoted in Bensoussan & Bensoussan eds., *supra* n. 2.

32. In this context, it is interesting to quote *Runaround*, the famous novel of Isaac Asimov, first published in 1942 (where a robot from an older generation is used to bring back a more recent robot lost between the second and third law of robotics).

33. See C. Thibaud, *Ça se passe en Europe: un grand syndicat espagnol veut faire payer des cotisations sociales aux robots*, *Les Echos* (21 Oct. 2016), available at <http://www.lesechos.fr/monde/europe/0211415728108-ca-se-passe-en-europe-un-grand-syndicat-espagnol-veut-faire-payer-des-cotisations-sociales-aux-robots-2036900.php>.

If robots replace numerous existing jobs, without compensation in other sectors, the issue of financing social security systems could become crucial. The idea of charging an imputed salary makes particular sense in this context. In addition, the social security contribution would be due even where the employer (corporation) of the robots can deduct the imputed salaries from the profit tax.

If, at a second stage, robots would be considered as subject to the tax on the imputed salary, it could be attempted to follow the practice of many countries on the levy of social security contributions and split the burden of the charge (i.e. 50%) between the employer and the robots (workers).

4.3. *Subjecting robots' activities to value added tax*

This approach appears particularly interesting and could be a complement to the attribution of an imputed salary to robots. It follows from recognizing a tax capacity of robots that, to the extent that they can be regarded as entrepreneurs, their activities could be subject to VAT. Indeed, as seen in section 1., robots can replace most human activities that are currently subject to VAT, such as the supply of goods or services. At the outset, before subjecting robots to VAT, three main issues should be contemplated. First, it should be clarified whether a robot could, in the future, be regarded as an enterprise falling under the scope of the VAT. Second, the characterization of the robots' activities should be defined (supply of goods or services). Third, the place of supply of these transactions should also be defined. An analysis of these issues goes much beyond this paper, but some initial thoughts are offered.

First, the EU VAT Directive (2006/112) recognizes that each activity exercised independently, against remuneration, may become subject to VAT.³⁴ This approach raises fascinating issues. At which level is a robot independent enough to become an entrepreneur subject to VAT? After all, behind the robots, as a form of technology, there are humans with some level of control. To what extent does this element of control have an impact on the "tax independence" of a robot? It appears that this issue is linked to the recognition of a tax personality of robots. It is submitted that the concept of independence in VAT refers to the definition of autonomy. The EU Final Report already tries to define the autonomy of a robot as "the ability to take decisions and implement them in the outside world, independently of external control or influence".³⁵ At least, it seems feasible to define more precisely the level of autonomy required to deem a robot as an enterprise within the meaning of the VAT. In this respect, a specific definition of independence could be introduced in the VAT systems.³⁶ However, in most cases, the robot would, similar to a worker, act under the control (or supervision) of its employer (company) so that it would be its employer that would be subject to VAT. In the future, at a second stage, with the development of the autonomy of robots, the concept of independence for VAT purposes could evolve and it cannot be excluded that robots, as such, could become subject to VAT. Indeed, the issue of ability to pay mentioned in section 3.2. could then be solved by requiring robots to levy a tax on remuneration charged for services or for the supply of goods.

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34. See Council Directive 2006/112/EC of 28 November 2006 on the Common System of Value Added Tax, art. 2(1)(a), OJ L347/1 (2006), EU Law IBFD [hereinafter EU VAT Directive (2006/112)].

35. EU Final Report, *supra* n. 6, at 5.

36. See, in this respect on the concept of robot autonomy, Burri, *supra* n. 21.

Second, the specific nature of each robot's activity should be taken into account in order to adopt a proper characterization. This remains true whether it is the employer of the robot or the (independent) robot itself that is subject to VAT. A hypothetical comparison with similar activities carried out by humans could serve as a likely reference, at least as a starting point. Various developments in the field of the application of VAT to electronic commerce, which sometimes raises similar concerns, may provide some guidance. Does the legal research carried out by ROSS correspond, from a VAT character standpoint, to the work previously performed by a human within a law firm? Should a medical analysis carried out by a robot be treated in the same way as a human doctor's advice? Can a course given by a robot that helps – or even replaces – a human professor to teach students still be characterized as education? These last two examples are quite relevant if we consider, in addition, that both medical treatment and education are usually VAT exempt.

At first sight, based on the general principles of VAT, neutrality should prevail. This would tend to favour a result similar to comparable human activities. However, in many cases, comparable activities would not exist. In addition, with the development of robots' capacities, the nature of robots' activities could evolve in such a way that it would become more and more difficult to compare them with humans. At this level, a specific rule could be developed. The recent difficulties determining the VAT treatment of services offered through the Internet already offers a glimpse of the complex characterization issues that would occur. In a recent case, the Swiss Supreme Court, taking into consideration the European rule in this field, considered that a foreign company managing a dating website accessible to customers all over the world, including in Switzerland, should register in Switzerland for VAT, because the services rendered were characterized as electronic services which differ from (here a platform for encounters) those offered outside of the Internet.³⁷

Third, similar concerns would occur in defining the place of supply. Robots' activities would be difficult to localize to a specific place. They may simultaneously occur in different locations. Clones or duplicated robots entering into similar activities in different places at the same time would be a distinct possibility. Again, the analysis on the taxation of the digital economy could offer relevant elements for consideration.

4.4. *Introducing an object tax on robots*

This alternative operates similarly to taxes on planes, cars, animals or other products. In this option, the ownership or the use of a robot would be subject to a tax. The tax could be based on a flat (fixed) rate or adjusted in accordance with different types of robots. For example, taxes on cars or motorbikes tend to include tariff variations based on different criteria, such as power, noise or pollution components.

It is submitted that this solution should only be considered from a practical standpoint, but that this solution does not appear very efficient. In particular, such a concept remains based on a vision of robots as machines or equipment or as other tools with no specific autonomy. What is new and requires a different perspective is that smart robots, using AI, would replace human activities. The design of the tax should therefore take into consideration this fact and consider robots more like electronic persons that are capable of working or rendering services in the same way as humans. Furthermore, the link between the use of robots

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37. CH: ATF [Arrêt du tribunal fédéral] [Swiss Supreme Court Judgment], 20 May 2013, 139 II 346.

and the replacement of workers is rather remote. The correct way to tackle this development in the future is to consider robots as taxable persons.

4.5. *Introducing a fee on robots*

Another option is to design a tax on robots based on the principle of equivalence, as a compensation for a service or an economic advantage granted by the state. These types of taxes, usually characterized as fees, are quite usual as compensation for the use of state infrastructure (e.g. toll tax or airport use) or specific other types of advantage as a consideration for a public service. In other words, the tax here is viewed as a price paid by the taxpayer for a service granted by the state (service fee). To be justified, a sufficient nexus should exist between the levy of the fee and the service granted by the state (the so-called “principle of equivalence”). Other types of fee (so-called “compensatory fees”) are levied as a consideration for a specific advantage obtained from the state. An example of such compensatory tax may be found in the Swiss case law pertaining to a tax introduced as a compensation for the change of construction zones for homeowners who obtain by such change of legislation a huge economic advantage.³⁸

Introducing a fee on robots would require a sufficient link between the use of robots and a counterpart from the state. At first glance, it appears rather difficult to link a tax (fee) on robots with an equivalent service or advantage obtained from the state. A service fee could still be considered as a counterpart for specific registration tasks or infrastructures put in place by a state for the supervision and control of robots’ activities. However, the idea to design a compensatory fee on the theoretical income attributable to robots’ activities would seem contrary to the principle of equivalence. Indeed, in such a case, the link between such theoretical income and a specific advantage granted by the state appears too remote. As mentioned in section 4.1., such imputed salary should be subject to an income tax in accordance with the general principles of tax law.

5. **International Aspects**

Introducing a tax on robots or on the use of robots would be a major global development requiring a coordinated approach, such as at OECD or UN level. Indeed, international tax issues, notably risks of double taxation, double non-taxation, transfer pricing, aggressive tax planning or tax avoidance, could be exacerbated.

First, a generally accepted definition of robots and tax on robots should be adopted to try to mitigate potential conflicts of characterization and/or of attribution of income. For example, a conflict may arise if one state recognizes the tax liability of the robots directly, while the other treats “the robots as transparent and levies the tax on another entity, typically the employer or the owner. In this respect, to apply double tax treaties (DTTs) to robots, they should be characterized as “persons” according to article 1 of the OECD Model Tax Convention on Income and on Capital (hereinafter OECD Model).³⁹ Currently, the term “person” only includes an individual, a company and any other body of persons (article 3(1) (a) of the OECD Model). The OECD Model should therefore be modified to include robots as a new form of “electronic persons”.

38. CH: ATF [Arrêt du tribunal fédéral] [Swiss Supreme Court Judgment], 31 Mar. 1995, 121 II 138.

39. *OECD Model Tax Convention on Income and on Capital* (26 July 2014), Models IBFD.

Second, the application of treaty allocation rules should be precisely defined. Complex and new characterization issues would be raised in cross-border situations and the proper application of DTTs would have to be clarified. For example, for tax treaty purposes, the “imputed salary” of robots subject to tax could be regarded as a salary within the meaning of article 15 of the OECD Model. Another state may apply article 7 (business income) or article 21 (other income). The choice of the appropriate treaty allocation rule could have an important impact. For example, if a state follows the idea that the “imputed salary” should be taxed at the level of the robot according to article 15 of the OECD Model, it should arguably not be taxed in the source country according to the conditions of the “*monteur* clause” of article 15(2) of the OECD Model. If, however, another state views the robot not as a “salaried person”, but rather as a piece of equipment, falling under the definition of a “fixed place of business” within the meaning of article 5 of the OECD Model, the robot could be characterized as a permanent establishment, subject to tax in the country of source and on the income attributable thereto.⁴⁰

Third, issues of valuation and transfer pricing would become essential and yet difficult to implement in this area.⁴¹ At first glance, the activities of the robots may be compared with similar human tasks (work or services). A robot replacing a worker could arguably become subject to an imputed salary corresponding to the arm’s length consideration for such an activity. But with the development of AI, and the interaction between robots, activities rendered by robots will become less and less comparable with human activities, even perhaps difficult to understand for human brains. As a consequence, alternative valuation methods should be considered. In the same vein, potential new tax planning opportunities should also be analysed. The interaction between robots, and also between robots and humans, notably if we attribute a legal personality to robots, could lead to the potential shifting of income between robots, or between robots and humans, with a view to minimizing taxes. Here again, some specific transfer pricing rules might be required for robots’ activities, between robots, and between humans and robots.

Finally, new distributional issues between countries would also come into play. The concerns raised related to electronic commerce pertaining to a fair allocation of taxing rights between jurisdictions could be exacerbated with the use of robots. States more advanced with the development of AI and using robotics could expand their tax base to the detriment of other less developed states. This could lead more states, notably with an important cus-

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40. Such a point a view could be based on reasoning by analogy to the modification of the OECD Commentary, according to which, a permanent establishment could exist at the place of location of computer equipment, even if no personnel is required at this place to exploit it; see *OECD Model Tax Convention on Income and on Capital: Commentary on Article 5* para. 42.6 (22 July 2010), Models IBFD. In the same vein, recent changes to art. 5(4) *OECD Model*, recommended in Action 7 of the OECD/G20 Base Erosion and Profit Shifting project (BEPS), Preventing the Artificial Avoidance of the Permanent Establishment Status, will limit the application of the exception of art. 5(4) *OECD Model* to activities which are otherwise of a preparatory or auxiliary nature. So long as robots tend to perform activities similar to humans, such a change to art. 5(4) could indeed expand the scope of application of the permanent establishment concept also in this area. See OECD/G20, *Preventing the Artificial Avoidance of Permanent Establishment Status – Action 7: Final Report* (OECD 2015), International Organizations’ Documentation IBFD [hereinafter *Action 7 Final Report*]).

41. See also OECD/G20, *Addressing the Tax Challenges of the Digital Economy – Action 1: Final Report*, para. 225 et seq. and para. 376 et seq. (OECD 2015), International Organizations’ Documentation IBFD [hereinafter *Action 1 Final Report*], which also describes key transfer pricing issues to pursue the overall objectives to bring the allocation of income within groups of companies more in line with the location of the economic activity that gives rise to that income.

tomers base, to favour systems of taxation under the destination principles (both from an indirect and direct tax perspective), i.e. at the place of consumption of the robots' activities.

Trying to develop these crucial issues goes much beyond the scope of this paper. Action 1 of the OECD/G20 BEPS Project is designed to address some of challenges of the digital economy.⁴² This action refers to robotics, but merely focuses on the potential progress of AI beyond the manufacturing sector and on a broader segment of the economy.⁴³ At this stage, OECD Action 1 does not consider the impact of taxing robots to be within the framework of the BEPS Project. The OECD, however, does recognize that conclusions reached may evolve as the digital economy continues to develop and that it is important to continue working on these issues, notably considering that:

As technology continues to advance, developments in advanced robotics will make it increasingly possible to perform complex tasks and take decisions with limited human intervention.⁴⁴

It appears that further analysis is required in this area and that, at very least, the debate should also start focusing on the taxation of robots' activities.

6. Conclusion

From this general overview, it appears that the idea of granting a legal personality to robots could also lead to the emergence of an electronic ability to pay of robots, which should be recognized for tax purposes. As a consequence of this development, a specific tax personality could be granted to robots, to the extent that the law is capable of defining them, based on a sufficient level of autonomy. In this respect, legal definitions of robots have already been suggested internationally and they tend to focus on the autonomy and decision-making process of robots. Contrary to machines, the decisive factor appears to rely on the existence of AI, which includes sufficient autonomy, the capacity to learn, progress and render decisions. In other words, the definitions should take into account whether the robots can be considered "smart" robots. Critically, contrary to machines, infrastructures or devices, smart robots may now replace inherent human activities, such as the interaction, learning and decision-making processes. From a tax perspective, a rather "form neutral" definition of robots is suggested for tax purposes, focusing on the use of smart robots, combining AI and autonomy, rather than considering a robot as a machine. Recognizing a tax capacity of robots could then lead to the tax implications detailed below.

First, from an income tax standpoint, it is submitted that robots could benefit from an ability to pay, which is, however, derived from the activities they perform (work, transfer of goods and services, etc.) without consideration (salary or income). However, as such, the robot does not have a financial capacity, such as equity or reserves. It is the employer (enterprise) or the owner who, ultimately, has a capacity of payment. It follows that, if tax on an imputed income generated by robots' activities is contemplated, it is usually not the robot that should be subject to tax but the use of robots. As a first stage, at very least, the economic capacity to pay the tax should be attributed to the employer or owner of the robots who, by using them, saves the salaries or other remuneration which would otherwise have been subject to tax. As a second stage, an ability to pay to robots should be considered, when

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42. *Action 1 Final Report, supra* n. 41.

43. *Action 1 Final Report, supra* n. 41, at 44 et seq., sec. 3.2.3., paras. 90 et seq.

44. *Action 1 Final Report, supra* n. 41, at 138 et seq., paras. 358/359.

technology allows for a payment capacity to be allocated to them ((in the form of electronic equity, for example).

Second, following the recognition of an imputed income (typically salary) arising from the use of robots should also logically lead to charges levied on this “salary”.

Third, the application of VAT on robots’ activities could also be considered. This could even lead, depending on the level of autonomy, to the recognition of “robot entrepreneurs”. However, the application of VAT raises complex issues of characterization and localization of the various types of supplies rendered by robots. The growing independence and complexities of the development of technology in this field will only exacerbate the issues.

Fourth, the concept of an (objective) tax on robots, similar to taxes on cars, boats or planes, does not seem to correspond to a modern perspective of robots, i.e. that robots replace human activities and have decision-making possibilities, replacing human activities with AI and decision-making possibilities. Such a tax does not appear very efficient from this perspective. The same is true of introducing a fee as a form of compensation for an economic advantage granted by the state, based on the principle of equivalence. The link is too remote.

Finally, the tax issues go much beyond the borders of any particular state. They should be analysed globally taking into account the recent developments in international taxation at OECD and/or UN level. In particular, a generally accepted definition of robots and tax on robots should be adopted in order to try to mitigate potential conflicts of characterization and/or of attribution of income. In addition, new characterization issues on the application of tax treaty provisions to the tax on robots’ income would occur. Furthermore, if we were to recognize a tax capacity of robots, the proper application of tax treaty allocation provisions and transfer pricing rules should be revisited as well. Indeed, with the development of AI, the activities of robots, with their exponential possibilities of combination and/or development, would become difficult to compare with human activities. Alternative valuation methods should therefore be considered. In addition, such development could also lead to potential aggressive planning concerns.

It appears that, at least at EU level, some work has already been done to develop rules of “civil law” on robotics. Further analysis of the development of a tax capacity of robots, in the form of an “electronic ability to pay”, is required.

Well-designed robots should, at very least, be programmed to be tax compliant. Unless one day they decide to refuse to pay taxes ... without representation.