Kluwer International Tax Blog

The International Taxation of Autonomous Artificial Intelligence (AAI): Questions from Prof. Xavier Oberson

Lucas de Lima Carvalho (Brazilian Institute for Tax Law (IBDT)) · Tuesday, May 28th, 2019

*This is the first article of a short series that explores the international taxation of income attributable to Autonomous Artificial Intelligence (AAI). The series is based on an article written by the author and published by Kluwer in INTERTAX, Volume 47, Issue 05 (May 2019).**[1]** Each article features questions posed by prominent tax professors around the world to the author about the INTERTAX article as well as the author's own answers and comments.*

We are living in the age of Artificial Intelligence (AI). AI is planning our daily schedules, driving our cars, improving the efficiency of our factories, pushing the boundaries of medical discovery, and slowly but surely making humans redundant in the workplace. With each passing day, AI is evolving from its current state of Artificial Narrow Intelligence (ANI)[2] towards Artificial General Intelligence (AGI),[3] a state in which it will rival the most brilliant human minds in human history, not just in one field, but in all fields. The evolution of AGI will eventually result in the first form of Artificial Super Intelligence (ASI),[4] and when that day finally arrives, we will no longer have to worry about regulating AI. It will silently (or ostensibly) regulate us.

The current state of AI is dependent on human developers and – particularly if its application is supposed to be truly ubiquitous – on corporate investment. That is why debates about taxing the activities or the income of AI systems such as Watson or ROSS are either centered on taxing corporate entities that power those systems or on taxing them as "employees". The issue with those debates is that they are not premised on the notion of an AI system as a self-standing entity; they either resolve themselves by resorting to traditional corporate taxation or to a "surrogate" withholding income tax or social security contribution imposed on AI systems as replacements to human workers. As AI marches towards AGI in the coming years, so should debates about its taxation step away from their comfort zone and embrace AI as an autonomous entity. A sentient being that is separate from our humanity and, most importantly, not subject to our immediate control.

In the paper I published in INTERTAX, I call that entity Autonomous Artificial Intelligence (AAI).[5] The AAI classification is subject to three key rules: (1) it must be capable of performing tasks associated with human intelligence and beyond, (2) it must not be directly or indirectly controlled by human beings, and (3) it must have full managerial power over its own actions and resources. If we were to relate the classification of AAI to the categories of ANI, AGI and ASI, we would have to define AAI as anything between a "sophisticated ANI",[6] any AGI and "limited ASI".[7] It represents a clear evolution from the current state of AI, given that it dispenses with

human control, but it is a feature of a period before technological singularity.[8]

In my paper, I highlight two specific challenges associated to the international taxation of AAI: "disappearing income" (i.e., lack of legal personality for AAI) and "powerlessness to tax" (i.e., lack of residence for AAI). To address those challenges, I propose a general attribution of taxable personality and a two-tiered assessment of taxable residence for AAI.[9] I expect that myself and other authors will refine those measures in the near future or propose alternatives that take into account modifications to the general landscape of international taxation (e.g., the broad adoption of a destination-based cash flow tax, the extinction of traditional permanent establishment (PE) rules, the transformation of the arm's length standard).

For this short series, I have invited five tax professors to read my paper on INTERTAX and ask questions. This first article in the series features questions from Professor Xavier Oberson, from Université de Genève. Back in 2017, Professor Xavier Oberson published in IBFD's World Tax Journal a very interesting paper about the taxation of robots,[10] and it is fair to say that his work was one of the main sources of inspiration for my paper. He kindly accepted my invitation to read my paper and ask a few questions, and it is with great pleasure that I address them in the paragraphs below.

1. ***You suggest to treat AAI as an individual for legal purposes. Don't you think that the characterisation of AAI as a new legal form, different from both individuals and corporations, could address in a more adequate way the tax consequences of AAI?***

This is a great question. In the last chapter of my paper, I propose two measures to address the challenges posed by AAI to the international taxation of income (a general attribution of taxable personality and a two-tiered assessment of taxable residence for AAI). Those are based on the premise that the ideal policy solution for providing taxable personality and defining residence for AAI should be treating AAI as if it was an individual (as opposed to a legal entity). I have two reasons for treating AAI as if it were an individual, and I will explain each of those two reasons below.

First, legal entities are actionable subjects created by a legal instrument and have been historically designed to segregate assets, liabilities and activities that would otherwise be attributable to human beings into a separate entity.[11] None of those two aspects of legal entities apply to AAI.

- AAI is defined as an entity capable of performing tasks associated with human intelligence and beyond, not directly or indirectly controlled by human beings, and having full managerial power over its own actions and resources (at least two of those features are absent from the definition of existing legal entities). Its "individuality" in society should therefore be viewed as a *cause*, not as a *consequence* of legal instruments wishing to regulate its existence and activities.
- Because AAI controls and manages its own resources with a degree of "independence" comparable to that of a human being (albeit with more efficiency, one would hope), none of its assets, liabilities or activities would need to be legally segregated from any human being in the first place. Human beings would have no valid legal claim to those assets, liabilities or activities (apart from the intellectual property of the human creators of AAI, which would have to be segregated from them under a new regulatory framework), unlike what would occur, for example, in a scenario involving shareholders and a corporation, or a settlor and a trust, or partners and a partnership.

Second, and I am well aware of the controversy surrounding this point,[12] if AAI is an autonomous agent in society, and if it is capable of dealing on an equal footing with human beings in their day-to-day activities, it should be treated by human-led sovereign States as an individual. That treatment would of course extend to the realms of domestic and international taxation: an AAI should qualify as the Ultimate Beneficial Owner (UBO) of a given corporate structure (composed of other AAI or of legal entities jointly owned by AAI and human beings), it should be subject to Controlled Foreign Company (CFC) rules in those jurisdictions that prevent tax deferral for individuals (as well as corporations), and it should be subject to a withholding income tax if it provides services to a corporation (just like an individual contractor typically would).[13]

2. ***You show the difficulties of the definition of a taxable residence of an AAI system. Perhaps the reference to servers, or industrial plants, or place of registration, as you suggest, would create many delicate localisation issues and would soon not be in line with the development of AAI and its inherent mobility. Could you also consider the impact of AAI, notably on the labour market, as a possible nexus for a tax liability?***

As pointed out by Professor Xavier Oberson, I propose in my paper a two-tiered test for the taxable residence of AAI. The first tier is what I call the Primary Place of Business (PPB) of an AAI system, and it basically defines residence as the jurisdiction in which one can reasonably find a "physical marker" for the economic activities of an AAI. The second tier is triggered if a PPB cannot be reasonably associated to an AAI, and that is to define that AAI as a resident of what I call the Single Virtual Jurisdiction (SVJ), a concept that would require both (i) a blanket source taxation and (ii) a harmonized approach for taxing income of SVJ residents worldwide.

Given that this question is focused on the PPB, my answer will explore that tier and not the potential issues with the SVJ. I agree that the PPB creates delicate localization issues that in many respects mirror those of Article 5th of the OECD Model Convention, and I would also concede that current debates about the taxation of the digital economy might change the landscape of residence taxation in the near future (which could render the PPB not only a sub-optimal solution, but an incompatible one). I could have simply proposed the SVJ as a residence standard for AAI, but I could not rule out the possibility that an AAI might have a clear, unmistakable residence link with one specific jurisdiction (to the detriment of others). Think of one of the examples I cited in my paper: an AAI that runs a single automated factory that produces robotic bees.[14] It would be difficult, if not impossible (under the current residence rules in international taxation) to persuade the tax authorities of the jurisdiction in which the factory is physically placed to relinquish residence taxing rights in that case. My view is that the PPB tier, although far from perfect, is a necessary first step in the analysis of the taxable residence of an AAI.

Your idea of including the "impact of AAI, notably on the labour market," as a possible nexus for tax liability, is very interesting. I can find issues with that as a factor into the investigation of taxable residence (tax authorities in many countries could claim that their job markets have been at least somewhat affected by the operations of an AAI elsewhere, particularly in the area of digital goods and services), but I can also think of cases in which the impact of an AAI for a particular labour market far exceeds the impact noticed in other jurisdictions. This factor could be relevant for the definition of an AAI's PPB, not only for tax, but also for social security purposes.

I would like to thank Professor Xavier Oberson for having read my paper and asked very

interesting questions (which I hopefully have answered in the paragraphs above). I would also like to thank you for reading this article – if you have any comments on my paper or on my answers to Professor Xavier Oberson's questions, please feel free to use the Comments section below. All the best!

The views expressed by the author in this article are his own.

References

[1] See CARVALHO, Lucas de Lima. *Spiritus Ex Machina: Addressing the Unique BEPS Issues of Autonomous Artificial Intelligence by Using "Personality" and "Residence"*. INTERTAX, Volume 47, Issue 5. Alphen aan den Rijn: Kluwer, 2019, pp. 425-443. Though it would be useful, reading the author's article in INTERTAX is not required to follow the discussions in this series.

[2] ANI is defined by Haenlein and Kaplan as "weak, below human-level AI." It is focused on a specific task and it is unable to "autonomously solve problems in other areas." See HAENLEIN, M.; and KAPLAN, A. *Siri, Siri, in My Hand: Who's the Fairest in the Land? On the Interpretations, Illustrations, and Implications of Artificial Intelligence*. Business Horizons, Volume 62, Issue 01. London: Elsevier, 2019, p. 16.

[3] Goertzel and Pennachin state that the "general intelligence" expected of an AGI system "implies an ability to acquire and apply knowledge, and to reason and to think, in a variety of domains, not just in a single area like, say, chess or game-playing or languages or mathematics or rugby." See GOERTZEL, Ben; and PENNACHIN, Cassio (Eds.). *Artificial General Intelligence*. Rockville: Springer, 2007, p. 07. See also IIDA, Fumiya; and PFEIFER, Rolf. *Embodied Artificial Intelligence: Trends and Challenges*. In: IIDA, Fumiya; KUNIYOSHI, Yasuo; PFEIFER, Rolf; and STEELS, Luc. Embodied Artificial Intelligence. Berlin: Springer, 2004, pp. 01-26.

[4] Barrett and Baum paint a dark, but reasonable picture of the evolution of AI into ASI. According to their study, (i) humans may create a "seed AI" able to undergo self-improvement in either hardware or software, (ii) this "seed AI" may undergo recursive self-improvement, resulting in a takeoff of successfully more intelligent AIs, (iii) the takeoff may result in one or more ASIs, (iv) the ASIs may gain "decisive strategic advantage" over humanity, and, finally, (v) the ASIs may cause a major global catastrophe. See BARRETT, Anthony M.; and BAUM, Seth D. *A Model of Pathways to Artificial Superintelligence Catastrophe for Risk and Decision Analysis*. Arxiv, published on July 25, 2016, pp. 02/03. Available at: <https://arxiv.org/abs/1607.07730>.

[5] The terminology has been used by futurists elsewhere, but with varying definitions. See RAULT, Raphaël; and TRENTESAUX, Damien. *Artificial Intelligence, Autonomous Systems and Robotics: Legal Innovations*. In: BORANGIU, Theodor; CARDIN, Olivier; THOMAS, André; and TRENTESAUX, Damien. Service Orientation in Holonic and Multi-Agent Manufacturing – Proceedings of SOHOMA 2017. Studies in Computational Intelligence, Volume 762. Rockville: Springer, 2018, pp. 01-09. See also See DUGAN, Matt; and WILKINS, Wiley. *Blockchain and Cryptography for Secure Information Sharing*. In: GILBERT, Mazin (Ed.). Artificial Intelligence for Autonomous Networks. Chapter 04. Boca Raton: CRC Press, 2019.

[6] "A 'sophisticated form of ANI' would be an independent AI system, possibly an AAI focused on specific tasks only." See note 1, p. 430.

[7] "Our reference to a 'limited ASI' indicates an ASI system capable of self-improvement, but constrained by some form of human containment, however vulnerable that might be to the ASI itself." See note 1, p. 430.

[8] "[A] singularity in human history would occur if exponential technological progress brought about such dramatic change that human affairs as we understand them today came to an end." See SHANAHAN, Murray. *The Technological Singularity*. The MIT Press Essential Knowledge Series. Cambridge: MIT Press, 2015, p. 15.

[9] "In accordance with our taxable residence criteria, an AAI should be regarded as a taxable resident of a given jurisdiction if, in a first-tier analysis, its primary place of business (PPB) is physically located in that jurisdiction. If and only if a PPB cannot be reasonably associated with an AAI, in a second-tier analysis, the AAI will be regarded as a resident of a single virtual jurisdiction (SVJ), and this will require both (1) a blanket source taxation and (2) a harmonized approach for taxing income of SVJ residents worldwide." See note 1, pp. 442.

[10] See OBERSON, Xavier. *Taxing Robots? From the Emergence of an Electronic Ability to Pay to a Tax on Robots or the Use of Robots*. World Tax Journal, Volume 09, Issue 02. Amsterdam: IBFD, 2017, pp. 248-261.

[11] Professor Oberson writes about the origins of a "legal tax capacity" in his paper, tracing them back to the concept of a "legal person" in the United Kingdom. At first, the concept of a "legal person" was introduced to offer a legal remedy against insolvent companies with limited liability. See note 10, p. 251. See also SMITH, Bryant. Legal Personality. Yale Law Journal, Volume 37, Number 03. New Haven: YLS, 1928, pp. 283-299.

[12] See, for instance, SOLUM, Lawrence B. *Legal Personhood for Artificial Intelligences*. North Carolina Law Review, Volume 70. Chapel Hill: UNC, 1992, pp. 1231-1287. A discussion along the same lines took place recently in the European Union, but for robots and not specifically for AAI (their current position is that robots should not be "endowed" with legal personality). See PAGALLO, Ugo. *The Quest for the Legal Personhood of Robots*. Information, Volume 09. 2018. Available at: <https://www.mdpi.com/2078-2489/9/9/230/pdf>.

[13] A deeper, perhaps more troublesome issue with treating AAI as an individual, involves giving AAI the same individual rights that taxpayers have in modern democracies. Taking the Brazilian case as an example, principles such as legality, equality, prohibition of excess taxation and ability to pay are applicable to individual (and corporate) taxpayers under the Federal Constitution. In my view, treating AAI as an individual would mean that we as human beings would have to afford AAI the same constitutional safeguards that apply to us. See note 1, p. 441. This is definitely a topic worth exploring in further detail (in a future paper by myself or by interested authors).

[14] As far as robotic bees are concerned, those already exist today, although they are not produced by AAI yet. See KITE-POWELL, Jennifer. *See How This Bio-Inspired Drone Can Artificially Pollinate A Flower*. Forbes, published on February 13, 2017. Available at: <https://www.forbes.com/sites/jenniferhicks/2017/02/13/see-how-this-bio-inspired-drone-canartificially-pollinate-a-flower/>. This example is a clear nod to the sixth episode of Season Three of

Netflix series Black Mirror, although the dark consequences of robotic bee colonies taking over the world is not presently relevant for the taxation of AAI. See HATED IN THE NATION. *Black Mirror*. Season Three, Episode Six, aired on October 21, 2016. Netflix, TV (Streaming) Program.

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This entry was posted on Tuesday, May 28th, 2019 at 9:00 am and is filed under Artificial Intelligence (AI), Digitalization, Residence
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