

**WHAT ARE YOU TAXING ABOUT?**  
**BALANCING OUT THE TAX SYSTEM TO AVOID THE CONSEQUENCES**  
**OF AUTOMATION IN THE WELFARE SYSTEM**

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## INTRODUCTION

While the “Fourth Industrial Revolution” may create new job opportunities, the employment of robots and AI technologies will certainly displace those workers unable to adapt. Employing robots instead of human workers represents a shift in taxation: from employment tax to capital. This may involve tax revenue reduction. Together with the technological unemployment, this may subsequently endanger the stability of the welfare system.

There are educational initiatives supporting displaced workers by retraining them. There are also initiatives to equip new generations with the skills that will supposedly protect them from being displaced, including complex problem solving, critical thinking, creativity, people management, and emotional intelligence among others.<sup>1</sup> Still, robot technology and AI are growing at exponential rates, and these solutions may be late and obsolete.

This paper aims at avoiding the pacing problem<sup>2</sup> by proactively contributing to the discussion on what are the impacts of the robot and AI automation on tax law. After the introduction, some examples illustrate the impacts of automation context in the first section. The second section explains what are the consequences of this phenomenon in taxation terms. In the third section, I explore and question the different solutions that have been proposed so far, including the attribution of personality to the robots and the imposition of an automation tax. In section four I argue that the principle of neutrality might not give response to the arisen problems as automated and human workers are incommensurable. Last section closes the paper with some conclusions. Overall, this paper aims at underlining the importance of preventing what could

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<sup>1</sup> See “10 skills you'll need to survive the rise of automation,” Desjardins, J., Artificial Intelligence and Robotics, World Economic Forum, last accessed 12 November, 2018, <https://www.weforum.org/agenda/2018/07/the-skills-needed-to-survive-the-robot-invasion-of-the-workplace>.

<sup>2</sup> Marchant, G.E., Allenby, B.R. and Herkert, J.R. eds., 2011. The growing gap between emerging technologies and legal-ethical oversight: The pacing problem (Vol. 7). Springer Science & Business Media.

be the worst menace to the welfare system we could ever imagine.

## I. AUTOMATION IS REPLACING HUMAN WORKERS

From self-service checkouts in major supermarkets and the post office to automated warehouses,<sup>3</sup> it is becoming more and more evident that robots are taking over jobs that humans were performing before.<sup>4</sup> While some argue that robots only perform those tasks that should have been carried out by them in the very first place, not by humans; others argue that robots are misplacing dignifying jobs.<sup>5</sup>

Researchers and consultancy companies have been reflecting on how jobs are increasingly susceptible to automation for some time now. Apart from existing more opinions than colors, these have been conflicting since the time of the Luddites.<sup>6</sup> Some studies raise awareness of the fact that advancements in big data techniques could substitute non-routine cognitive tasks, and that progress in robot dexterity is going to allow robots to perform manual tasks increasingly.<sup>7</sup> Although not in such alarming numbers, an extensive quantitative study on human replacement supports this

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<sup>3</sup> “Welcome to the automated warehouse of the future. How British supermarket Ocado is using robots to make online grocery shopping faster.” Vincent, J. The Verge, last modified May 8, 2018, <https://www.theverge.com/2018/5/8/17331250/automated-warehouses-jobs-ocado-andover-amazon>

<sup>4</sup> “The unpopular rise of self-checkouts (and how to fix them),” Hamacher, A. BBC, last modified May 10, 2017, <http://www.bbc.com/future/story/20170509-the-unpopular-rise-of-self-checkouts-and-how-to-fix-them>; see the Self-service machines at the post office: <https://www.postoffice.co.uk/mail/post-go-self-service>; “Welcome to the automated warehouse of the future. How British supermarket Ocado is using robots to make online grocery shopping faster,” The Verge, last modified May 8, 2018, <https://www.theverge.com/2018/5/8/17331250/automated-warehouses-jobs-ocado-andover-amazon>

<sup>5</sup> This is supported by the same Čapek when he did his play, see Čapek, K. (2004). RUR (Rossum's universal robots). Penguin; but also by contemporary authors like Pistono, who wonders why we came to the point of thinking that cashiers in the supermarket are dignifying jobs. See Pistono, F. (2014). *Robots will steal your job, but that's ok: how to survive the economic collapse and be happy*. Federico Pistono self-published book

<sup>6</sup> Binfield, K. (Ed.). (2015). *Writings of the Luddites*. JHU Press.

<sup>7</sup> Arntz, M., Terry G., and Ulrich Z. (2016) The risk of automation for jobs in OECD countries: A comparative analysis. OECD Social, Employment, and Migration Working Papers 189: 0\_1; Frey, C. B., & Osborne, M. A. (2017). The future of employment: how susceptible are jobs to computerisation?.

Technological forecasting and social change, 114, 254-280. Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., ... & Sanghvi, S. (2017). Jobs lost, jobs gained: Workforce transitions in a time of automation. McKinsey Global Institute.

idea by showing that there is a tendency to replace human workers in industrial environments due to increased productivity.<sup>8</sup> The World Economic Forum (WEF) on the contrary suggests that, instead of replacing existing occupations and job categories, robots and AI are going to substitute specific tasks that could free workers up to focus on new tasks.<sup>9</sup> In the same line, the European Parliament (EP) points out that, in the context of healthcare, robots may ease the work of care assistants by performing automated tasks.<sup>10</sup> In the EP's understanding, this technology may allow caregivers to devote more time to diagnosis and better-planned treatment options.

Recent advances in the field of healthcare automation give reasons to believe, nonetheless, that those caregivers are not going to spend more time diagnosing.<sup>11</sup> Instead, AI and robot technologies may also replace them. The company Babylon created an AI-powered triage and diagnostic system that produced differential diagnoses with an accuracy comparable to human doctors in terms of precision and recall. Although only in some cases the system outperformed doctors, their findings showed that, on average, the AI system assigned triages more safely than human doctors.

Some authors argue that such automatization leads to the delegation of sensitive tasks, and promotes the “de-responsibilization” of humans vis-à-vis machines,<sup>12</sup> the consequences of which might be context-dependent. Other consequences refer to the technological unemployment, and to the re-education of displaced workers and new generations. In this paper, however, I focus on the problems associated with the

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<sup>8</sup> Acemoglu, D. and Restrepo, P., (2017) Robots and Jobs: Evidence from US Labor Markets. NBER Working Paper No. w23285. Available at SSRN: <https://ssrn.com/abstract=2941263>

<sup>9</sup> “The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution,” Global Challenge Report, World Economic Forum, last modified, January 2016, [http://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs.pdf](http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf)

<sup>10</sup> Civil Law Rules on Robotics European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)).

<sup>11</sup> Razzaki, S., Baker, A., Perov, Y., Middleton, K., Baxter, J., Mullarkey, D., ... & DoRosario, A. (2018). A comparative study of artificial intelligence and human doctors for the purpose of triage and diagnosis. arXiv preprint arXiv:1806.10698.

<sup>12</sup> Yang, G. Z., Bellingham, J., Dupont, P. E., Fischer, P., Floridi, L., Full, R., ... & Nelson, B. J. (2018). The grand challenges of Science Robotics. *Science Robotics*, 3(14), eaar7650.

employment of robots and AI technologies and its impact on the welfare state.

## 2. REPLACING HUMAN WORKERS WITH ROBOTS HAS TAX IMPLICATIONS

Automation portends unemployment rates rise and a generalized disruption of the labor market that could endanger the sustainability of the welfare system. By reducing employed staff, companies can 1) reduce taxes on labor, comprising wage taxes and social security contributions, which are currently a high financial burden especially in highly developed countries<sup>13</sup>; and 2) minimize production costs accordingly. These taxes on labor, nevertheless, feed into State Treasuries and Social Security funds,<sup>14</sup> which are the foundation of the welfare system. At the same time, costs for re-training programs, unemployment benefits or public employment initiatives could rise significantly.<sup>15</sup> The increasing employment of robot technology may inevitably result in a steep reduction in the overall tax base and global welfare, which may, moreover, exacerbate this conflict of interests between businesses and states in the future.

This gradual replacement of workers with robots signifies a shift in the sources of tax revenues: from employment taxes to capital taxes.<sup>16</sup> Considering that capital is taxed at much lower rates than labor while allowing accelerated tax depreciation on capital costs and exemption from indirect taxation,<sup>17</sup> the imposition of taxes on capital would further impact states' tax revenues negatively. With this in mind, it becomes apparent that the structure of the current tax system leads to a paradox: on the one hand, it incentivizes the replacement of humans with robots, while on the other hand, it leads to considerable losses of tax revenue and, as a consequence, to devastating repercussions on the welfare system.

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<sup>13</sup> See "United States Nonfarm Unit Labour Cost," Trading Economics, last accessed Novemeber 12, 2018, <https://tradingeconomics.com/united-states/labour-costs>.

<sup>14</sup> See Revenue Statistics - OECD Countries: Comparative Tables, (2016), <http://stats.oecd.org/Index.aspx?DataSetCode=REV> [https://perma.cc/74EJ-2KS8].

<sup>15</sup> Englisch, J. (2018). Digitalisation and the Future of National Tax Systems: Taxing Robots?. Available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3244670](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3244670).

<sup>16</sup> Abbott, R., & Bogenschneider, B. (2018) Should Robots Pay Taxes? Tax Policy in the Age of Automation. Harvard Law and Policy Review.

<sup>17</sup> Mikesell, J. L. (2001). Sales Tax Incentives for Economic Development: Why Shouldn't Production Exemptions Be General?. *National Tax Journal*, 557, 562.

On the top of that, capital as a highly mobile factor provides more leeway for tax avoidance activities and aggressive tax planning practices to the detriment of those states where substantial economic activities take place but whose tax systems are not considered preferential.<sup>18</sup> This may trigger harsher tax competition among states at an international level and foster race to the bottom on corporate taxation. As a result, tax competition may mainly impact high-tax jurisdictions as the higher the corporate income tax rate, the more valuable the capital tax deductions provided.

### 3. PROPOSED SOLUTIONS SO FAR: ADVANTAGES AND INCONVENIENCES

Given the tremendous impact that the employment of robot and AI technologies are likely to have on the welfare state, radical changes in tax policy seem inevitable. So far, two are the central tendencies to address this problem: 1) the taxation of robots,<sup>19</sup> and 2) the taxation of the use of robots:<sup>20</sup>

1) Under the first approach, robots would receive a 'derivative' tax law personality, and taxed as business organizations (corporations or partnerships that are fiscally non-transparent entities).<sup>21</sup> This comes as no surprise after the EP recently proposed the attribution of the status of electronic person and make robots "responsible for making good any damage they may cause."<sup>22</sup>

2) A much more realistic approach refers to the creation of the 'automation tax' or the equalization of labor taxation:

a) 'Automation tax' may tax the use of robots to compensate for the caused unemployment. This may render the use of automated workers less preferential

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<sup>18</sup> Mazur, O. (2018). Taxing the Robots. SMU Dedman School of Law Legal Studies Research Paper No. 401. Available at SSRN

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3231660](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3231660), pp. 22-23.

<sup>19</sup> In early 2017 Bill Gates proposed a tax on robots, *see* Bill Gates on Quartz, accessible at <https://qz.com/911968/bill-gates-the-robot-that-takes-your-jobshould-pay-taxes>.

<sup>20</sup> Oberson, X. (2017). Taxing robots? From the Emergence of an Electronic Ability to Pay to a Tax on Robots or the Use of Robots. *World Tax Journal*, 9(2), 247-261, p. 253.

<sup>21</sup> Englisch, J. (2018). Digitalisation and the Future of National Tax Systems: Taxing Robots?. Available at SSRN 3244670, 6.

<sup>22</sup> European Parliament Resolution on Civil Law Rules of Robotics op. cit.

from a tax perspective.<sup>23</sup>

b) There are different ways to equalize capital and labor taxation: through the repeal of tax benefits for automated workers, the introduction of tax preferences for humans,<sup>24</sup> or the imposition of an ‘equalization levy,’ or Pigouvian tax, that would reduce the negative externalities resulting from the rapid replacement of humans with automated workers.<sup>25</sup>

Despite the undeniable originality of some of the proposed tax policy solutions, some drawbacks cannot go unnoticed. In relation to 1., treating the robot as a ‘tax person’ with a nexus at the place of its operation will most likely give rise to the same aggressive tax planning methods regarding the manipulation of a legal entity’s place of tax residence or the location of intangible property. Considering the relative mobility of robots, either as legal entities or as software, their location at low or no tax jurisdictions may cause a further shrinking of the tax base.

Concerning 2.a., an ‘automation tax’ may increase the effective corporate tax rate and the complexity of the tax system. Apart from functioning as an impediment to innovation and economic growth, such tax would single out robots thus giving tax preference to other capital assets.<sup>26</sup> Besides, the calculation of the number of humans that have been displaced by robots and their value could be proven incredibly and inherently problematic.<sup>27</sup> Indeed, matching robot with generated income may be difficult to state, as robots may take over tasks instead of an entire job,<sup>28</sup> perform entirely new jobs,<sup>29</sup> or complement the human workers

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<sup>23</sup> William Meisel has already proposed a “payroll tax on computers” that could make the creation of jobs more attractive than their replacement with automation, see Meisel, W. (2013), *The Software Society: Cultural and Economic Impact*, Trafford Publishing, 220.

<sup>24</sup> Abbott and Bogenschneider, 2018, op. cit.

<sup>25</sup> Englisch, 2018, op. cit

<sup>26</sup> Mazur, 2018, op. cit.

<sup>27</sup> “Rise of Robots: Boon for Companies, Tax Headache for Lawyers,” Thomson, L.A. Bloomberg, last accessed November 12, 2018, [http://dailyreport.bna.com/drpt/display/batch\\_print\\_display.adp?searchid=30421246](http://dailyreport.bna.com/drpt/display/batch_print_display.adp?searchid=30421246).

<sup>28</sup> “The Robot Tax Fallacy: Anthropomorphizing Automation,” Rosenblatt, G., Vital Edge, last modified, June 5, 2017, <http://www.the-vitaledge.com/robot-tax/>.

<sup>29</sup> “Is a “Robot Tax” Really an “Innovation Penalty”?” Cousins, S., Crunch Network, last modified April 22, 2017, <https://techcrunch.com/2017/04/22/save-the-robots-from-taxes/>.

rather than displace them.<sup>30</sup> This adds the further challenge of allocating the value produced between the capital and the labor component.<sup>31</sup>

An alternative approach to reverse the tax benefits of capital taxation proposed in 2.b., does not seem to adequately address the shortage of funds in the social security system, while the provision of offsetting tax preferences to human workers could prove catastrophic for the welfare system.

As we can see, all these proposals claim to restore the disruption of the tax system caused by automation either through the reversal of the tax system's structural characteristics or by introducing neutral tax measures. Non-neutral taxation, however, plays a significant role in balancing capital and labor, especially if a possible imbalance could challenge the welfare state. If the complexity of the international tax system is considered, then one can easily conclude that devising tax policies to address the imbalances created by automation is, therefore, a very delicate and multilayered trade-off topic that requires careful consideration.

#### 4. BALANCING OUT THE TAX SYSTEM TO ADDRESS THE PROBLEM OF AUTOMATION

New uses and development of robots and AI technologies pose unforeseen consequences to the tax system that cannot be addressed by superficial changes.

The massive reduction of labor taxes does not call on for a similar source of income to restore a level playing field, especially by naming robots humans.<sup>32</sup> In the same way, given that investment in people can prove more beneficial in the long term, the idea that capital investment is beneficial to economic growth may have to be revisited too.

The starting point of the discussion should, nevertheless, be the re-conceptualization of the well-established economic principle of tax neutrality, i.e., that the tax system should strive to be neutral

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<sup>30</sup> "What's Wrong With Bill Gates' Robot Tax," Smith, N., Bloomberg, last modified February 28, 2017, <https://www.bloomberg.com/view/articles/2017-02-28/what-s-wrong-with-billgates-robot-tax>.

<sup>31</sup> "The Challenges of Administering A Robot Tax," Steptoe and Johnson LLP, Lexology, last modified September 25, 2017, <https://www.lexology.com/library/detail.aspx?g=d55a305f-989b-400e-9b32-547f6a95fbb0>.

<sup>32</sup> Englisch, 2018, op. cit

so that decisions are made on their economic merits and not for tax reasons. However, is there a valid justification on why taxes should be neutral?

Outperforming human labor and efficiency are determinant factors for the employment of robots and AI technologies. On these grounds, equalizing capital and labor for tax purposes would entail an insurmountable disadvantage for human workers who would continue to face technological unemployment, not for tax but productivity and efficiency reasons. Despite the attempts to attribute human characteristics to robots,<sup>33</sup> automated and human workers are incommensurable. A neutral tax treatment that disregards this incommensurability would only accelerate the collapse of the welfare system.

Technological advancements and digitalization will, moreover, exacerbate the preexisting inconsistencies of the international tax system. Traditionally, political and ideological approaches and delicate tradeoffs in international relations have driven domestic and international tax policy decisions. Together with the fact that states have never been willing to compromise on their sovereign power to enact and enforce taxes, this inevitably distorts tax neutrality. In this respect, aiming at a neutral tax system without establishing first multilateral cooperation and intergovernmental agreement seems illusionary.

If automation decreases the international ‘tax pie,’ tax competition concerning the allocation of the pie will be even harsher. Instead of devising tax neutral policy solutions, therefore, developed states should introduce tax provisions that positively discriminate against developing ones, so that a fairer redistribution of wealth is achieved internationally.

## CONCLUSIONS AND FUTURE WORK

Automation offers the opportunity to reconsider the tax system. Given the incommensurability of automated and human workers, however, the idea of having a neutral tax system should be abandoned. Indeed, the enactment of nonneutral taxes may play well in balancing out the negative impacts of the employment of robot technology and ensure the stability of the welfare system.

Apart from the importance of not overlooking the future

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<sup>33</sup> Bryson, J. J., Diamantis, M. E., & Grant, T. D. (2017). Of, for, and by the people: the legal lacuna of synthetic persons. *Artificial Intelligence and Law*, 25(3), 273-291.

consequences of present solutions directed at solving the problems associated with automation in tax law, in this paper, I also support and stress the idea of using tax as a wealth redistribution tool both domestically and internationally. This will require multilateral coordination and additional mechanisms to bridge the gap between developed and developing countries.

At the same time, and given the scale of the issue, it would be unwise to consider that tax measures could, on their own, slow down the by-products of the employment of robot and AI technologies. In this respect, future work will explore broader aspects of the problem, e.g., the exclusion of the voice of those affected the most by the automation in the workplace (workers), the gap between skilled and unskilled workers, the differences between developed and developing countries, or what can tax law do about companies that are robotized/automatized from their very inception.