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Taxes, Digitalization and Decentralization

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Abstract

In a statement at the World Economic Forum in Davos (2016), Nobel Laureate in Economics Christopher Pisaridis, outlined the need for creative strategies to develop new redistribution systems and income policies in response to the challenges posed by digitalization. The following report reproduces parts of the book "Public Sector Economics"[1] – with the sole purpose of promoting and once again validating the presence of this emerging topic[2], which in the future will be crucial for the successful transition to the digital public sector. As per this regard, the publication presents some of the scientific results of the research project "Digital Public Sector" (NID 21-2020, UNWE).

Keywords: taxes, digitalization, artificial intelligence, decentralization, digital public sector.

JEL: H0

"Robots are not good taxpayers"
Tax Policy in the Age of Automation,
Abbott & Bogenschneider

INTRODUCTION

In a statement at the World Economic Forum in Davos (2016), Nobel Laureate in Economics - Christopher Pisaridis outlined the need for creative strategies to develop new redistribution systems and income policies in response to the challenges posed by digitalization. He points out that the concept of universal basic income is "… one of the ways I support, as long as one knows how to apply it so as not to take away the incentive (for work) at the bottom of the market[3]" *(Pissarides; in parentheses - mine; I.B.*). But "one should always be wary of simple solutions to complex problems, and a universal basic income is no exception." The fact that this response to globalization and automation has been met with such enthusiasm is indicative not of a collapse in the economy, but rather of democracy and public relations" (Acemoglu, 2019). In other words, the introduction of basic income as a possible response to automation requires a serious restructuring of public sector relations. The academic literature examines a specific relationship between basic income, automation, and the introduction of taxation of robotized labor.

The concept of basic income - in one form or another (e.g., in the form of social

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2 The report was also presented at the scientific-practical conference "Smart cities and municipalities - a vision for the future", held on July 30-31, 2021 at "RIU Pravets Golf & SPA Resort"

3 https://www.weforum.org/agenda/authors/christopherpissarides/ (last visited on 23 July 2021).

assistance, tax relief, or social pension) is already introduced in developed countries, but mainly as a tool to reduce inequality. The transformation of the economy and in particular of the public sector, based on digital technologies, in exchange for human labor with an automated one and a displacement of the human factor by artificial intelligence, requires a process of rethinking the reasons behind the implementation of a basic income concept. In this sense, the introduction of basic income is a possible response to automation, which entails a serious restructuring of relations in the public sector. The academic literature pays attention to yet another specific factor - the introduction of taxation of robotic labor.

CORE DISCUSSION

As a theoretical problem, ***the taxation of robotic labor has already found its place in the public sector economy***, thanks to ***Straubhar***'s research (On the Economics of a Universal Basic Income, 2017); ***Abbott and Bogenschneider*** (Tax Policy in the Age of Automation, 2018); ***Uwe Thiemal*** (Optimal Taxation of Robots, 2018); Acemoglu and Restrepo (Robots and Jobs, 2017); ***Xavier Oberson*** (Taxing Robots: From the Emergence of an Electronic Ability to Pay on Robots or the Use of Robots, 2017); ***Guerriero, Rebelo***, ***and Teles*** (Should Robots Be Taxed ?, 2019); ***Gasteigar and Pretner*** (Automation, Stagnation, and the Implications of a Robot Tax, 2020) and others, who are emerging as one of the most authoritative in this new theory.

Until recently, the transformation of the economy based on digital technologies, in the face of the exchange for human labor with an automated one and a displacement of the human factor by artificial intelligence **(AI)**, was simply highlighted as a more advanced form of technological innovation from the late twentieth century (introduction of digital program-controlled machines, industrial robots, etc.), which led to the generation of competitive advantages based on the reduction of production costs and an increase of productivity. This was perceived as a "technological response" to the cheap imports from developing countries, competitively benefiting from low labor costs. At the same time, technologies that generate high added value were perceived as a "panacea" for a number of social and economic problems, such as population aging, inequality, and social deprivation. In view of this positive impact, tax policies have been formulated to encourage technological innovation. ***But…*** with the transformation of the production that combines machine and human labor into production significantly limiting or even excluding the human productive factor, through robotics and the introduction of artificial intelligence, it turned out that "(the influence of robots) differs from the impact of imports from China or Mexico "(Acemoglu and Restrepo, 2019), either from the use of seasonal workers (low paid and non-residents) or from outsourcing (to "cheap" companies relying on the low cost of wages).

The exponential development of the digital economy and the anticipated breakthroughs in terms of creating a common artificial intelligence would further complicate the situation, as this would translate not into a partial, as with limited artificial intelligence today, but a complete replacement of human labor (Prodanov, 2020). Indeed, this outlines a very futuristic but possible perspective - a number of ***OECD studies*** analyze the basic possibilities for ***"personality tax" of robots with a high or full degree of autonomy*** (Oberson, 2019). And in this sense, the entry of robots and AI, leading to the replacement of human labor, is ***a problem of a qualitatively different nature*** compared to the turnover provoked by the introduction of cheaper labor (even if it is more productive as well).

The qualitative difference boils down to job losses, as it remains uncertain how many new jobs will be created to replace them. The negative consequences of job destruction are clearly distinguishable: pressure on the fiscal system and the social system. In addition, due to the vulnerability of low-income groups, a third essential aspect emerges: social inequality. This grows into "polarization between owners of capital and the workforce - especially lower-skilled workers" (Straubhaar, 2017). All this "is the unforeseen result of an established system of taxation of labor, not of capital. **A system like this does not work once labor becomes capital. Robots are not "good taxpayers"** (Abbott & Bogenschneider, 2018; italics - my IB). The problem is neither "exotic" nor just theoretical... Empirical research confirms concerns about the proper functioning of the fiscal system. Acemoglu and Restrepo (Robots and Jobs: Evidence From US Labor Markets, 2017) analyze the effect of the increase in the use of industrial robots on the US labor market between 1990 and 2007 and prove that ***for the study period***, depending on the mobility of the labor factor, the change in the unit of the ratio of one robot to one thousand employees, has generated a shift in employment in the range of 0.34-0.37 percentage points, and in wages - a change of 0.5-0.73 percentage points, plus the effects on employment for men are about 1.5-2 times greater than those for women, while the effects on wages are at a comparable level for both groups (Acemoglu & Restrepo, 2017).

Of course, a trend established with an econometric model does not provide enough proof that it will continue in the future, but it is indicative enough for the presence of a negative correlation between automation and employment, which deepens inequality. This is confirmed in ***a report of the Executive Office of the President of the United States*** (EOR - Executive Office of the President, 2016), which namely states that "Research has consistently found that jobs that are at risk of automation are highly concentrated around lower-paid workers, low-skilled workers, and less-educated workers". All sorts of arguments - from official government documents to those from individual academic studies, clearly indicate that the emerging problems, in addition to theoretically understood, are understood by politicians. The question reasonably arises: what to do?

The strategies proposed are palliative: first, taking into account the positive effect on artificial intelligence productivity, public authorities will continue to promote technological innovation; secondly, the transformation of production based on artificial intelligence leads to the "evaporating" of some existing professions on one hand, but on the other - this generates employment in new industries, the other proposed strategy is focused mainly on education and retraining programs. The final strategy "includes steps to modernize the social security network" and the pension system.

The European Commission has a slightly more pragmatic approach. ***A special report by the Committee on Legal Affairs of the European Parliament*** states that "to maintain social cohesion and prosperity, the likelihood of collecting a tax on robot work or a fee for the use and operation of a robot must be seen in the context of the financing of the support and retraining of unemployed workers whose jobs have been reduced or eliminated"

(European Parliament, Committee on Legal Affairs, 2017). Obviously - ***the taxation of robotic labor*** - as a theoretical utopia or as it is aptly called by Bottone "food for thought" (Bottone, 2018), has to be sorted out due to the pragmatic need for a properly functioning of the fiscal system.

Abbott and Bogenschneider believe that there is a "simple solution to the complex issue" - a change in existing tax policies: "We believe that the solution is to adjust the tax system to be at least 'neutral' concerning the tax treatment of living and robotic labor" (Abbott & Bogenschneider, 2018). ***Tax "neutrality"*** between "people and automated workers" can be achieved by some combination of avoiding corporate tax deductions for automated workers, introducing an "automation tax", providing compensatory tax preferences for human workers, charging corporate self-employment tax and increasing the corporate tax rate" (Abbott & Bogenschneider, 2018). The proposed measures envisage reforming the tax systems by:

First: abolition of the existing regime on ***tax relief*** of the taxable financial result in the part concerning the recognition of the costs for the purchase of robots, in the cases when this leads to reduction of existing jobs and dismissal of living labor. This measure is combined with the proposal to re-evaluate ***the amortization policy***.

Second: introduction of a new "automation tax". This is a measure that is directly dictated by the fact that the replacement of live labor with robotic labor leads to the elimination of ***social security payments*** by businesses, which would otherwise be charged when there is a retention of employees.

Third: tax preferences for "living" labor. This measure logically complements the previous one, as not only businesses but also workers' pay (a certain part) from ***the insurance contributions to the health insurance and pension funds.*** Thus, as robots are not tax payers, workers must be exempt from these payments as well to achieve tax neutrality in the taxation of capital and labor.

Fourth: increase of the corporate tax rate. This measure compensates for fiscal losses since robots eliminate a significant part of the revenues from ***indirect taxes*** on consumption or sales.

Fifth: levying a corporate self-employment tax. It is about the so-called "Payroll tax on computers" but it would be more appropriate to accept it as a "social tax on computers", i.e., quasi-taxes, and the idea behind it is to show that this is not an ordinary payroll tax as proposed by Martin Ford (The Lights in the Tunnel: Automation, Accelerating Technology, and the Economy, 2009), which is an idea that has gained unenviable popularity in our country as a "tax programmer." The idea of introducing such a tax aims to "balance" the discrepancies between "equal tax treatment" of incomes generating different value added. Some industries incorporate automation and are those that generate high added value (in practice some of them have zero marginal costs, after the initial fixed costs of their creation), so the introduction of such a "balancing" tax seems fair. However, the question remains: How to determine the tax? William Meisel proposes that the tax be formed as the difference between the coefficient calculated on the basis of sales revenue relative to the number of employees (in a particular company), compared to a predetermined (by the state) reference value of this ratio (The Software Society: Cultural and Economic Impact, 2013). Thus, more and more automated industries will deviate more and more from the reference value, which will generate additional revenues in the fiscal area, determined by the magnitude of the calculated difference. Abbott and Bogenschneider accepted the idea, but suggested that the coefficient be determined not based on "sales" to the number of employees, but based on "profit" (i.e., added value) to staff costs (i.e., salaries). The refinement more fully reflects the principle of fairness in taxation, but does not take into account the possibility of full automation of production. The tax then transforms into a 'ban', which is clearly not acceptable.

The measures proposed by Abbott and Bogenschneider, although tempting, are debatable (Tom Devenport, 2020), but given the cited report of the committee to the European Parliament, at present two of the proposed decisions seem to be adopted by politicians, which means that these might have the potential to lead to corresponding changes in tax systems. These are the introduction of an "automation tax" and the likely adoption of a higher progression in income taxation.

In fact, an "automation tax" that seems utopian to some countries is a fact to others. South Korea, one of the technology leaders, introduced a ***"robot tax"*** back in 2017, which reduces tax omissions for technological innovations that reduce employment. In essence, this is the implementation of the first measure proposed by Abbott and Bogenschneider. Although the European Commission's initiative to introduce a ***pan-European profit tax*** on technology companies (and internet companies in particular) has been met with strong opposition (mainly from the US), individual EU member states such as France, Austria, Italy, etc., introduced (or envisage the introduction) of such an additional income tax of 3 percent. Thus, it is clear that the progression in taxation is increasing, which directly refers to measure four (according to Abbott and Bogenschneider): an increase in the corporate tax rate. In fact, in the analysis of Abbott and Bogenschneider, this measure is essentially aimed at achieving tax neutrality between industries, while equalizing the effective tax rate.

In this regard, according to the Commission, "digital companies pay an average effective tax rate of 9.5% in the EU, compared to 23.2% for traditional businesses", the introduction of a pan-European profit tax for "digital companies" is a matter of time and arrangements within the OECD. According to KPMG data for 2019, sixteen member states have introduced ***direct taxes*** on the 'digital economy', with fifteen more 'in the process of being adopted'; "digital businesses" are indirectly taxed in 66 countries, with the introduction of indirect taxation in another 11 OECD member states (Taxation of the digitalized economy, 2019, KPMG), but the debate is still pending (OECD / G-20 meeting: 2020).

The higher progression in the tax scales "placing a heavier burden on digital companies", in addition to the effect on tax neutrality, will also help reduce inequality. A study by Guirereiro, Rebelo, and Teles on the US economy, based on an econometric analysis, found that inequality can be reduced by making the current income tax system more progressive and by taxing robots (Guerreiro, Rebelo, and Teles, 2017). Their proposed model includes two types of workers, which they divide routine and irregular, at the same time, robots are defined as a supplement to non-standard workers (performing irregular work activities) and substitutes for routine work. ***Similar to Mirrlees' model of optimal taxation (1971)***, and based on current tax systems — and the United States in particular — they assume that fiscal authorities tax employees' income in the same way — on a progressive scale of taxation., without distinguishing the tax scales according to the type of employment (i.e., whether it is routine or not regular). To the extent that robots are "pushing out" employees from routine activities and helping to increase productivity in both routine and irregular employment, they show that "in the current tax system, the steady decline in the cost of automation (and its growing share in production), generates large income growth, but it is accompanied by significant inequality, as well as a steep decline in the well-being of those working in routine occupations" (Guerreiro, Rebelo and Teles, 2017).

The conclusion from this ***static model*** is clear: retraining of employees in routine occupations is needed, just as recommended by the EIA strategy (see above), which should be funded "by the incentive - automation", by introducing a tax on the purchase of robots (i.e., an 'automation tax' is seen as a kind of Pigouvian tax), as suggested by Abbott and Bogenschneider. However, if the fiscal "price" is set and one for all, then the individual "price" for the retraining of those who will still make their choice of profession, compared to those who are already in the labor market, is different.

To account for this difference, these researchers have built a static model by incorporating ***Diamond's overlapping generation model*** (the so-called OLG Model), which includes aspects of the labor supply lifecycle. Thus, the already ***dynamic model*** also takes into account that "workers have different costs for acquiring skills and choosing between a routine or irregular profession before entering the labor market" (Guerreiro, Rebelo, and Teles, 2017). These researchers come to a very important conclusion, which is in line with the EIA's belief that the effect of automation on the labor market will be transient as job losses in routine industries will be accompanied by the creation of new ones in irregular professions (see above in the text). And since the "horizon" of active work is estimated to be of four decades, they calculate that the ***optimal amount of tax on the purchase of a robot*** should follow this time structure as well. Thus, in the "first period (i.e., the first decade), where the workforce still includes older workers who have chosen their profession in the past, the optimal tax for robots is 7 percent, 3 percent in the second decade, and 1 percent in the third decade. By their logic, once the initial generations retire, the optimal tax for the robot amounts to zero.

This solves the problem that arises with the proposed by Abbott and Bogenschneider "self-employment tax" (i.e., "computer payroll tax" or rather "social computer tax", see above), with full automation of production (implicitly routine employment). In the perspective of this study, "tax automation" seems like a palliative (temporary) measure. This view is shared both by politicians (specifically in the United States, see above) and by other researchers. In the authoritative study of Uwe Tuemel, the conclusions of Guerreiro, Rebelo, and Teles are confirmed, and the need for a gradual reduction of "tax automation" to zero rates in the long run (3-4 decades) is justified by the efficiency of production. In this regard, Tuemel points out that "the tax on robots impairs the efficiency of production." This conclusion is argued by combining ***the production efficiency theorem*** (Diamond and Mirrlees, 1971) ***with the Atkinson-Stiglitz theorem*** (Atkinson and Stiglitz, 1976). Thus, according to the first, in order to achieve production efficiency, redistributive tax policy must be neutral with regard to "production decisions, provided that the government can tax all inputs of production, as well as final products, linearly and at different rates." According to the second theorem, if utility is a function of consumption and leisure, "commodity taxes should not be used for redistribution, provided that the government can use non-linear income taxes." Since capital taxation can also be seen as a tax on future consumption that exceeds the tax on current consumption, according to Tuemel's analysis, the theorem suggests that governments should refrain from taxing capital if they have the option of nonlinear taxation of income from capital, as the taxation of capital income would not improve equity (i.e., the amount of productive capital) compared to the effect of the non-linear tax on labor income, and the possible taxation of capital income will generate an additional negative effect, expressed in the deformation of savings decisions. Thus, the combination of the two theorems suggests that "neither consumption nor production decisions should be distorted for redistributive reasons, provided that the government can tax labor income nonlinearly and has sufficient tools at its disposal to tax factors of production and end products "(Thuemmel, 2018). The introduction of an "automation tax" is essentially equivalent to the introduction of an additional capital tax, and given the two theorems, according to Turmel, the direct consequence is that a "robot tax would have the opposite effect", deepening inequality and contributing insignificantly to welfare. Furthermore, resolving this issue may have contradictory consequences, as the imposition of robotic taxes at a national level could mean the flight of capital to countries where there are no such taxes, which would significantly change the global division of digitalized labor, create conditions for gaining or losing certain comparative advantages, and this would have a significant impact on the distribution of economic and political power between different countries and regions (Prodanov, 2020).

Thus, the topic acquires yet a new dimension, which in the theory of public sector economics is referred to as "fiscal decentralization" (discussed in the following topics of the textbook). It is clear that in the context of a globalizing digital public sector, individual national public policies in different countries (no matter how well justified in theory) must be synchronized through international arrangements - at least at the OECD level in order to be able to produce the intended positive effects. The debate is yet to come (OECD / G-20 meeting: 2020).

In summary: the digital transformation and innovation in the public sector are an objectively determined process, requiring necessary ***new forms of institutional design and organization of the public sector*** to make it possible to meet digital challenges in the "market", the correct formulation and successful implementation of macroeconomic functions of the state and public policies.

CONCLUSION

As presented by the main part of the topic discussion, it is safe to confirm the common view on the matter - in scientific circles and political ones (policymakers) - that on the basis of digitalization there is an underlying process of a greater transformation of the economy and other spheres of public life. This process is objectively determined and logically leads to the creation of a new system element: the ***"digital public sector"***, which may be understood not only as a production tool but also as a way of synchronization between the private and the public sector, both of which is beneficial for the public and personal well-being. Thus, if Adam Smith denotes the term ***"invisible hand"*** within the framework of the unspoken interaction between economic operators, which is lead through a coordinated price mechanism, in order to increase both the individual and the community well-being, however, in accordance with modern circumstances, the term transforms into the ***"digital hand" of digital technologies***. In an even more detailed plan: "classical" price mechanisms, which Hayek highlights as not consciously created by man, but rather a spontaneous order; "This is what a human action is, but it is not a human design" and "… serves to separate and synchronize common and personal knowledge, allowing it to be included in society in order to achieve diverse and complex results according to the principles of spontaneous self-organization" (Hayek, Fr. "Using Knowledge in Society", 1945), on the basis of the "spontaneous" entry of digital technologies in all areas of our daily lives, it will be transformed into coordinated mechanisms of a qualitatively different nature.

With the unfolding of the fourth industrial revolution there is a transition to a society in which ***the main coordinator will be not the market and price signals, but big data and algorithms***, which increasingly turn the spontaneous order into a planned organization and control (Prodanov, 2020). Accelerating this development will change the content of activities and the nature of relations in the public sector - it will not only be "digitalized", consequently, the changes in the public sector will not be limited to the transition from our familiar classical forms of functioning to those based on digital technologies, but will change the nature and content of the offered public goods, the way and the content of public choice, the sources of well-being, the system of income redistribution, etc. We believe that ***the public sector reform*** will ultimately transform the already familiar (from previous chapters) "traditional" public sector into a ***"digital public sector".***

Before clarifying the content of this new concept for the theory of public sector economics, let us take a look at our daily lives: each of us is present in the digital environment. Everyone is paid electronically; makes consumer choices and orders different products; "Likes" one or another "post"; expresses an opinion; correspond by the means of an e-mail, via smart devices or other "virtual" way; self-attributes to one or another e-community; forms interest groups in the platforms for social communities; practices sports, and at the same moment a "smart" sports watch collects data on the main health insights, the route, the location; learns in a virtual environment; the navigation of the car or that of the smart-device guides us about the destination and the traffic, determines and offers routes, calculates various indicators - e.g. arrival time, based on the collected personal data; etc. All this - generates a huge amount of personal data, forming the so-called ***"personal digital fingerprint"***. Sharing this data enables "digitalization and the penetration of artificial intelligence to create the preconditions for the public sector to improve public services and policies" (Open Data Directive; Directive (EU) 2019/1024). The personal digital footprint allows ***public services*** to be personalized (e.g., personal health, training, etc.) and public policies to be adapted more precisely to individual preferences. This new, qualitative characteristic transforms the "traditional" public sector and transforms it into a new digital being: the ***"digital public sector"***: this is the modern public sector in which public policies are derived and adapted to the "digital person" and not to the presumption of a " median voter". This means that public policies will be closer to everyone, which will reasonably lead to an increase in individual and community well-being.

In summary, digitalization and artificial intelligence form a tendency to transpersonalize individuals into "digital representatives" for whom public policies will be formulated. The automation of the production and implementation of robots with a high degree of autonomy has a strong effect on the fiscal systems, the distribution of income, and welfare, the nature of which is determined by the undertaken public policies. Digital transformation and the implementation of innovations in the public sector are an objectively determined process, requiring the necessary new forms of institutional design and organization of the public sector to make it possible to meet digital challenges in the "market", macroeconomic functions, and public policies.

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