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Taxing the Robots

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Abstract

Robots and other artificial intelligence-based technologies are increasingly outperforming humans in jobs previously thought safe from automation. This has led to growing concerns about the future of jobs, wages, economic equality, and government revenues. To address these issues, there have been multiple calls around the world to tax the robots. Although the concerns that have led to the recent robot tax proposals may be valid, this Article cautions against the use of a robot tax. It argues that a tax that singles out robots is the wrong tool to address these critical issues and warns of the unintended consequences of such a tax, including limiting innovation. Rather, advances in robotics and other forms of artificial intelligence merely exacerbate the issues already caused by a tax system that undertaxes capital income and overtaxes labor income. Thus, this Article proposes tax policy measures that seek to rebalance our tax system so that capital income and labor income are taxed in parity. Because tax policy alone cannot solve all of the issues raised by the robotics revolution, this Article also recommends non-tax policy measures that seek to improve the labor market, support displaced workers, and encourage innovation. Together, these changes have the potential to manage the threat of automation while also maximizing its advantages, thereby easing our transition into this new automation era.

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I. INTRODUCTION

We are on the brink of a new technological revolution.[1] Rapid advances in automation technologies—including artificial intelligence, robotics, machine learning, and other advanced computer technology—have begun to fundamentally transform our economy, society, and world.[2] In recent years, due to this new wave of technology, we have already seen robots[3] perform legal work, assist with medical surgeries, execute online marketing decisions, underwrite insurance policies, analyze financial data, self-drive cars, and perform numerous other cognitive tasks previously reserved for humans.[4] Many

1. This new time period has been referred to as "The Robot Revolution," "The Automation Revolution," "The Technological Era," "The Fourth Industrial Revolution," "The Second Machine Age," and "The Digital Revolution," among other names. *See, e.g.*, ERIK BRYNJOLFSSON & ANDREW MCAFEE, RACE AGAINST THE MACHINE: HOW THE DIGITAL REVOLUTION IS ACCELERATING INNOVATION, DRIVING PRODUCTIVITY, AND IRREVERSIBLY TRANSFORMING EMPLOYMENT AND THE ECONOMY (2011) [hereinafter RACE AGAINST THE MACHINE]; ERIK BRYNJOLFSSON & ANDREW MCAFEE, THE SECOND MACHINE AGE: WORK, PROGRESS, AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES (2014) [hereinafter THE SECOND MACHINE AGE]; JAMES MANYIKA ET AL., MCKINSEY GLOB. INST., A FUTURE THAT WORKS: AUTOMATION, EMPLOYMENT AND PRODUCTIVITY (2017), https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works_Full-report.ashx; KLAUS SCHWAB, THE FOURTH INDUSTRIAL REVOLUTION (2016); William Wilkes, *How the World's Biggest Companies Are Fine-Tuning the Robot Revolution*, WALL STREET J. (May 14, 2018, 10:24 AM), https://www.wsj.com/articles/how-the-worlds-biggest-companies-are-fine-tuning-the-robot-revolution-1526307839.

2. *See* MARTIN FORD, RISE OF THE ROBOTS: TECHNOLOGY AND THE THREAT OF A JOBLESS FUTURE 1–26 (2016); *see also* THE SECOND MACHINE AGE, *supra* note 1, at 14–96 (discussing some of the most important, recent technological advances).

3. *See* THE SECOND MACHINE AGE, *supra* note 1, at 27–37. Although a uniform definition of "robot" does not currently exist, most definitions treat the ability of a machine to function with "sufficient autonomy, and a capacity to learn, progress and make decisions" as a key characteristic. Xavier Oberson, *Taxing Robots? From the Emergence of an Electronic Ability to Pay to a Tax on Robots or the Use of Robots*, 9 WORLD TAX J., 247, 250 (2017). Thus, this Article uses the term "robots" broadly to refer to the newest wave of technology that relies on artificial intelligence, big data, machine learning, or algorithms to automate higher level cognitive tasks previously performed only by humans. *See id.*

4. *See* Carl Benedikt Frey & Michael A. Osborne, *The Future of Employment: How Susceptible are Jobs to Computerisation?*, 114 TECHNOLOGICAL FORECASTING & SOC. CHANGE 254 (2017); Jane Croft, *Artificial Intelligence Closes in on the Work of Junior Lawyers*, FIN. TIMES (May 4, 2017), https://www.ft.com/content/f809870c-26a1-11e7-8691-d5f7e0cd0a16; Dan Mangan, *Lawyers Could Be the Next Profession to Be Replaced By Computers*, CNBC (Feb. 17, 2017), https://www.cnbc.com/2017/02/17/lawyers-could-be-replaced-by-artificial-intelligence.html; Xavier Oberson, *How Taxing Robots Could Help Bridge Future Revenue Gaps*, OECD, http://www.oecd.org/forum/oecdyearbook/how-taxing-robots-could-help-bridge-future-revenue-gaps.htm (last visited Oct. 12, 2018); Erik Sherman, *5 White-Collar Jobs Robots Already Have Taken*, FORTUNE (Feb. 25, 2015), http://fortune.com/2015/02/25/5-jobs-that-robots-already-are-taking/.

predict that this is only the beginning of a major paradigm shift.[5]

Although the rapid emergence of these new technologies provides numerous benefits to society, it also presents substantial challenges. In particular, the automation of jobs through the use of robots and other advanced technologies has led to growing concerns about extensive unemployment and plummeting tax revenues. This, in turn, has led to concerns that the increase in profits that robots create will primarily benefit the few companies driving the automation, which will further intensify the existing inequality in the distribution of income, wealth, and influence. To address these concerns, there have been recent calls worldwide for the adoption of a robot tax.[6]

A "robot tax" is essentially a way to treat a robot the same as a person for tax purposes.[7] It generally does so by subjecting the income generated by a robot to income and/or payroll taxes, which are payable by the company using the robot. By increasing the cost of robots, the robot tax attempts to level the playing field between robots and humans, preserve jobs, and raise additional tax revenues to support displaced workers.

I argue that a robot tax is the wrong tool to address the issues raised by this new automation era. A robot tax gives rise to substantial practical issues and negative policy implications. In particular, implementing the proposed robot tax requires identifying the robot and subjecting the income it generates to taxation. But what is a "robot" for these purposes, how do we measure how much income it generates, and what is the purpose of this line drawing? Attempting to resolve these issues shows the significant difficulties involved in implementing and designing a robot tax that is equitable, effective, and enforceable. Moreover, a tax on robots is equivalent to a tax on innovation and is likely to hinder economic growth and overall prosperity. Given the many benefits of automation and technological progress, limiting innovation is a poor strategy for improving workplace stability, social welfare, and tax revenues.

Nevertheless, tax policy can play an important role in addressing the concerns raised by this technological revolution.[8] In particular, many of these

5. *See* THE SECOND MACHINE AGE, *supra* note 1, at 9; FORD, *supra* note 2, at 26–27; Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CALIF. L. REV. 513, 515 (2015).

6. *Infra* Part III.

7. *See* Ryan Abbott & Bret Bogenschneider, *Why We Should Start Taxing the Robots That Are Taking Human Jobs*, CONVERSATION (Feb. 28, 2018, 8:41 AM), http://theconversation.com/why-we-should-start-taxing-the-robots-that-are-taking-human-jobs-91295; *infra* Section III.A.

8. There is a growing recognition among academics that tax policy should be considered in this context. *See, e.g.*, Ryan Abbott & Bret Bogenschneider, *Should Robots Pay Taxes? Tax Policy in the Age of Automation*, 12 HARV. L. & POL'Y REV. 145, 149–51 (2018); Roberta F. Mann, *I Robot: U*

concerns are symptoms of a larger problem: namely, the manner in which the tax law currently undertaxes capital income and overtaxes labor income. As our economy continues to evolve to one that increasingly relies on robots and other capital assets, this taxation disparity creates many negative externalities and is no longer justifiable. Thus, the automation revolution provides yet another reason to reevaluate the tax preferences granted to capital income.

This Article sets forth several proposals that seek to rebalance our tax system towards a more neutral tax system as between labor and capital income.[9] First, Congress should reform the current payroll tax system to minimize its burden on labor income and expand its burden on capital income.[10] Because labor income bears the majority of payroll taxes, these changes are necessary to minimize the distortive effect that the existing tax system has on an employer's use of capital versus its use of labor. These changes, together with the introduction of a new tax base, are also necessary to counteract the unfavorable impact that automation increasingly has on the existing payroll tax base.

Second, I recommend that we reform the taxation of capital income.[11] By considering the justification for taxing capital income from the lens of the robotics revolution, this Article contributes to the growing literature that supports taxing capital income.[12] Specifically, it argues that these new automation technologies put further pressure on a tax system that relies heavily on labor income for its tax base.[13] By granting tax preferences to capital income, the tax system also encourages the nonoptimal use of robots, which creates undesirable economic inefficiencies and deadweight losses.[14] Automation

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Tax? Considering the Tax Policy Implications of Automation, McGill L.J. (forthcoming) (manuscript at 1–2) (on file with author); Jay A. Soled & Kathleen DeLaney Thomas, Automation and the Income Tax 2 (unpublished manuscript) (on file with author).

9. *See infra* Part IV.

10. *See infra* Section IV.A.

11. *See infra* Section IV.B.

12. *See, e.g.*, Reuven S. Avi-Yonah & Dmitry Zelik, *Are We Trapped by Our Capital Gains?* 59 (Univ. of Mich., Public Law and Legal Theory Research Paper Ser. No. 476, 2015), http://ssrn.com/abstract=2642860; David Gamage, *The Case for Taxing (All of) Labor Income, Consumption, Capital Income, and Wealth*, 68 TAX L. REV. 355, 401 (2015); Edward D. Kleinbard, *Capital Taxation in an Age of Inequality*, 90 S. CAL. L. REV. 593, 656–58 (2017); Chris William Sanchirico, *A Critical Look at the Economic Argument for Taxing Only Labor Income*, 63 TAX L. REV. 867, 867 (2010); Philippe Aghion et al., *Optimal Capital Versus Labor Taxation with Innovation-Led Growth* 2 (Nat'l Bureau of Econ. Research, Working Paper No. 19086, 2013); Victor Fleischer, Alpha: Labor Is the New Capital 11 (Nov. 19, 2015) (unpublished manuscript) (available at https://ostromworkshop.indiana.edu/pdf/seriespapers/2015f_c/fleischerpaper.pdf).

13. *See infra* Section IV.B.1.

14. *See* Fleischer, *supra* note 12, at 31–32.

also further blurs the labor-capital distinction, which creates tax gaming opportunities.[15] In addition, automation magnifies the tax system's effect on economic inequality by widening the economic gap between capital owners and workers. Several provisions in the recent Tax Act further exacerbate many of these issues by increasing the tax system's preference for capital over labor income.

Finally, this Article recognizes that neither the robot tax nor the suggested tax policy proposals will adequately address all of the concerns raised by the automation revolution.[16] Instead, nontax policy measures must also be adopted. These policies should seek to provide a substantial investment in human capital, an adequate social safety net to help displaced workers, and promote innovation.

This Article proceeds as follows: Part II of this Article discusses the threats, but also recognizes the benefits, posed by the increasingly prevalent use of robots and other manifestations of artificial intelligence.[17] Part III critiques the use of a robot tax as a means to address these issues.[18] This descriptive claim has normative consequences: namely, the better we understand why this proposal does not adequately address the concerns raised by the automation revolution, the better position we are in to adopt a proposal that does. Part IV argues that to address the challenges raised by the latest technological revolution, we need more fundamental tax reform that does not single out robots for taxation.[19] It proposes various methods to reform the current tax system's preference for capital income over labor income in the context of both the payroll tax and the income tax, and also suggests several targeted non-tax policy measures. It concludes that adopting these measures will allow us to mitigate some of the concerns raised by the rise in robotics and also improve the equity and efficiency of our tax system as a whole.[20]

II. THE THREAT OF THE ROBOT

Advances in technology often produce many benefits including efficiency gains, economic growth, increased wealth, and a higher standard of living.[21]

15. *See infra* Section IV.B.1.
16. *See infra* Section IV.C.
17. *See infra* Part II.
18. *See infra* Part III.
19. *See infra* Part IV.
20. *See infra* Part V.
21. *See* EXEC. OFFICE OF THE PRESIDENT, ARTIFICIAL INTELLIGENCE, AUTOMATION, AND THE ECONOMY 6, 11–12 (2016),

The technological progress made in the fields of artificial intelligence, robotics, machine learning, and other advanced computer technology is no exception.[22] Despite these benefits, automation technologies have also given rise to considerable fears and concerns.[23] The following section discusses the labor market disruption, increased economic inequality, and government tax shortfalls potentially caused by the latest technological revolution.

A. Loss of Jobs

Robots are Coming for You and Your Job.[24] *You Will Lose Your Job to a Robot–and Sooner Than You Think*.[25] *Robot Automation Will Take 800 Million Jobs by 2030*.[26] These recent headlines summarize the fear and anxiety created by the robotics revolution: the fear of massive technological unemployment.[27]

But is this a rational fear? Despite widespread public concern over the threat of massive unemployment, there is disagreement regarding whether widespread unemployment due to technological advances is a valid concern.[28] On the one hand, experts argue that this fear is overstated.[29] They predict that

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https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.pdf; NAT'L SCI. & TECH. COUNCIL, EXEC. OFFICE OF THE PRESIDENT, PREPARING FOR THE FUTURE OF ARTIFICIAL INTELLIGENCE 1 (2016), https://obamawhitehouse.archives.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/pre paring_for_the_future_of_ai.pdf; RACE AGAINST THE MACHINE, *supra* note 1, at 8, 20–22, 28; Yvonne A. Stevens, *The Future: Innovation and Jobs*, 56 JURIMETRICS J. 367, 368 (2016).

22. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 6–7; NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 5.

23. *See* Stevens, *supra* note 21, at 367; *infra* Part II.

24. Olivia Oran & Victoria Woollaston, *Robots are Coming for You and Your Job: Experts Discuss the Imminent Threat of Machines on EVERY Industry*, DAILY MAIL (May 3, 2016, 9:08 PM), http://www.dailymail.co.uk/sciencetech/article-3572378/Rich-powerful-warn-robots-coming-jobs.html.

25. Kevin Drum, *You Will Lose Your Job to a Robot—and Sooner than You Think*, MOTHER JONES, http://www.motherjones.com/politics/2017/10/you-will-lose-your-job-to-a-robot-and-sooner-than-you-think/ (last visited Oct. 13, 2018).

26. *Robot Automation Will 'Take 800 Million Jobs by 2030'—Report*, BBC (Nov. 29, 2017), http://www.bbc.com/news/world-us-canada-42170100.

27. *See* RACE AGAINST THE MACHINE, *supra* note 1, at 36–47. Technological unemployment generally refers to "unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour." JOHN MAYNARD KEYNES, *Economic Possibilities for Our Grandchildren (1930)*, *in* ESSAYS IN PERSUASION 358, 364 (1963).

28. *See infra* notes 29–46 and accompanying text.

29. Lori G. Kletzer, *The Question with AI Isn't Whether We'll Lose Our Jobs—It's How Much We'll Get Paid*, HARV. BUS. REV. (Jan. 31, 2018), https://hbr.org/2018/01/the-question-with-ai-isnt-whether-well-lose-our-jobs-its-how-much-well-get-paid.

among other benefits, this new technology is likely to result in job shifts and the net creation of new jobs.[30] In particular, experts argue that automation is likely to increase productivity, which will thereby stimulate economic growth and create more labor demand.[31] In addition to stimulating the expansion of existing jobs, the technology will create new job opportunities in new and existing sectors of the economy.[32]

For instance, a 2017 study by the McKinsey Global Institute forecasted that although automation will likely displace up to one-third of the American workforce by the year 2030, new and additional work will be created in the future, globally, to offset the impact of automation.[33] Similarly, a study by a well-known economist examines the effect of computer automation on occupations from 1980 to 2013 and also concludes that automation will likely not result in an overall job loss.[34]

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30. *See* Stevens, *supra* note 21, at 380; *see also* Abbott & Bogenschneider, *supra* note 8, at 154, 158–59 (noting that automation may create new types of jobs and that a majority of economists are optimistic that automation will result in a net gain in jobs).

31. *See* JAMES MANYIKA ET AL., MCKINSEY GLOB. INST., JOBS LOST, JOBS GAINED: WORKFORCE TRANSITIONS IN A TIME OF AUTOMATION 1, 17 (2017); IAN STEWART ET AL., DELOITTE, TECHNOLOGY AND PEOPLE: THE GREAT JOB-CREATING MACHINE (2015), https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/finance/deloitte-uk-technology-and-people.pdf; Lewis D. Solomon, *The Microelectronics Revolution, Job Displacement, and the Future of Work: A Policy Commentary*, 63 CHI.-KENT L. REV. 65, 71–72 (1987).

32. *See* JAMES MANYIKA ET AL., *supra* note 31, at 1, 6; Solomon, *supra* note 31, at 71; STEWART ET AL., *supra* note 31, at 7–10.

33. JAMES MANYIKA ET AL., *supra* note 31, at 11–12 (basing their conclusions on "two different sets of analyses: one based on modeling of a limited number of catalysts of new labor demand and automation . . . and one using a macroeconomic model of the economy that incorporates the dynamic interactions among variables"). This study also concludes that approximately 400 to 800 million individuals worldwide will need to find new jobs as a result of automation. *Id.* at 11. The study predicts that new jobs will be created largely as a result of seven global trends that are a potential source of labor demand. *Id.* at 55. These global trends include: (i) rising incomes in emerging economies and the accompanying increase in consumer goods, health care, and education spending; (ii) aging populations creating an increased demand for health-care jobs; (iii) development and deployment of new technology, creating additional employment in the technology sector; (iv) increased infrastructure investment creating new labor demand, especially in emerging economies; (v) increased spending on residential and commercial buildings; (vi) increased investment in new energy sources and improving energy efficiency, potentially increasing jobs in the energy sector; and (vii) marketization of currently unpaid work. *Id.* at 55–64.

34. *See* James Bessen, *How Computer Automation Affects Occupations: Technology, Jobs, and Skills* 1–3, 29–31 (Bos. Univ. Sch. of Law, Law & Economics Working Paper No. 15–49, 2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2690435. Instead, the study indicates that automation of an occupation generally results in an increased demand for that job, often at the expense of other occupations. *See id.* (empirically analyzing "detailed US occupational data and [using] a partial equilibrium model that encompasses different ways [that] automation can affect occupations" to draw its conclusions on the effect of automation on jobs (alteration in original)). *But see* Stevens, *supra*

In addition, economists predict that automation is more likely to complement the tasks that humans do, rather than substitute the human workers, which would further minimize any massive unemployment.[35] Experts also point to past technological revolutions, which ultimately led to net job creation, as evidence that this technological revolution will also create new jobs and increase the demand for certain existing jobs more than it destroys other jobs.[36] Given this evidence, it is possible that this fear of massive unemployment may be unfounded.

On the other hand, other experts predict that robots will significantly disrupt the labor market in the near future.[37] An often-cited study estimates about 47% of total U.S. jobs are susceptible to displacement by robots and automation as a result of advancements in machine learning, artificial intelligence and big data that allow cognitive tasks to be automated.[38] Other studies generate similar results. For instance, a study conducted by the World Economic Forum calculates that with respect to the global workforce, "current trends could lead to a net employment impact of more than 5.1 million jobs lost to disruptive labour market changes over the period 2015–2020."[39]

In addition to these studies, these experts argue that this technological revolution is different than previous technological advances.[40] They predict that automation technology is likely to simultaneously invade most sectors of the economy, from the industrial sector to the professional services sector, whereas prior technological progress was largely confined to limited

note 21, at 371 (discussing why some technology experts have found this study to be misleading).

35. *See* Bianca Vazquez Toness, *Five Questions for David Autor*, UNDARK (Apr. 24, 2017), https://undark.org/article/five-questions-for-david-autor/.

36. JAMES MANYIKA ET AL., *supra* note 31, at 4; Bessen, *supra* note 34, at 10, 29–31; James Bessen, *Bill Gates Is Wrong That Robots and Automation Are Killing Jobs*, FORTUNE (Feb. 25, 2017), http://fortune.com/2017/02/25/bill-gates-robot-tax-automation-jobs/.

37. *See* STEWART ET AL., *supra* note 31, at 1 (citing a recent PEW Foundation survey indicating that 48% of U.S. technology experts fall in this category); RACE AGAINST THE MACHINE, *supra* note 1, at 36–47; THE SECOND MACHINE AGE, *supra* note 1, at 142–46; FORD, *supra* note 2, at 61; Sumit Paul-Choudhury, *A Robot Tax Is Only the Beginning*, 233 NEW SCIENTIST 25 (2017); Frey & Osborne, *supra* note 4, at 254–55; Solomon, *supra* note 31, at 72.

38. Frey & Osborne, *supra* note 4, at 265–69.

39. WORLD ECON. FORUM, THE FUTURE OF JOBS: EMPLOYMENT, SKILLS AND WORKFORCE STRATEGY FOR THE FOURTH INDUSTRIAL REVOLUTION 3–4, 13 (2016), http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf (basing its conclusions on a dataset comprised of an extensive survey of executives of the largest global employers in each target industry sector). However, this study also finds that the actual disruption to the labor market will vary significantly depending on the industry, region and occupation, as well as the actions taken today to minimize the labor disruption. *See id.* at 8.

40. *See* FORD, *supra* note 2, at 33–51, 58–61.

industries.[41] This change is principally due to advancements in artificial intelligence and machine learning that now enable automation of nonroutine, cognitive, and high-skill tasks that were previously difficult to automate.[42] Truck drivers, roofers, accountants, paralegals, line cooks, cashiers, credit analysts, loan officers, and telemarketers are some of just a few well-known jobs that are likely to be automated soon.[43] In addition, technological progress is accelerating at a rapid pace, which means that labor disruption is likely to occur more quickly than in previous eras of technological change.[44] Finally, the costs of computation have significantly declined, making the technology more accessible and more attractive relative to labor.[45] Thus, some experts predict that this adoption of the newest technology will result in long-term, wide-spread unemployment.[46]

In sum, it is too early to tell whether this time the fear of long-term structural unemployment is justified. Evidence supports both the optimists and the pessimists.[47] Nevertheless, there is a general consensus that robots will

41. *Id.* at 58–61, 85–86; Oberson, *supra* note 4.

42. *See* RACE AGAINST THE MACHINE, *supra* note 1, at 51; FORD, *supra* note 2, at 86–104; Abbott & Bogenschneider, *supra* note 8, at 145–47, 145 n.1; Frey & Osborne, *supra* note 4, at 258–60; Paul-Choudhury, *supra* note 37; *see also* Stevens, *supra* note 21, at 378 (discussing how the learning capacity of modern robots provides them with certain human capabilities such as "perception, speech recognition, and even vision").

43. *See* Frey & Osborne, *supra* note 4, at 255, 259–60; *9 Jobs Most Likely to Be Taken Over by Robots*, SALARY.COM, https://www.salary.com/9-jobs-taken-over-by-robots/ (last visited Oct. 14, 2018); Vindo Khosla, *Technology Will Replace 80% of What Doctors Do*, FORTUNE (Dec. 4, 2012), http://fortune.com/2012/12/04/technology-will-replace-80-of-what-doctors-do/; Bernard Marr, *Surprisingly, These 10 Professional Jobs Are Under Threat From Big Data*, FORBES (Apr. 25, 2016), https://www.forbes.com/sites/bernardmarr/2016/04/25/surprisingly-these-10-professional-jobs-are-under-threat-from-big-data/#6c9b07077426; Sean Welsh, *Are We Ready for Robotopia, when Robots Replace the Human Workforce?*, CONVERSATION (Aug. 31, 2016, 4:07 PM), https://theconversation.com/are-we-ready-for-robotopia-when-robots-replace-the-human-workforce-63653.

44. *See* RACE AGAINST THE MACHINE, *supra* note 1, at 28–29; Abbott & Bogenschneider, *supra* note 8, at 153; *see also* Paul-Choudhury, *supra* note 37 (noting that, as opposed to previous technology revolutions that only affected some sectors, the current robot revolution is enabling robots to fulfill jobs in many sectors, including jobs requiring cognitive abilities).

45. *See* FORD, *supra* note 2, at 63–64, 68; Abbott & Bogenschneider, *supra* note 8, at 153; Frey & Osborne, *supra* note 4*,* at 258; Paul-Choudhury, *supra* note 37; Stevens, *supra* note 21, at 378.

46. *See* MARTIN FORD, THE LIGHTS IN THE TUNNEL: AUTOMATION, ACCELERATING TECHNOLOGY AND THE ECONOMY OF THE FUTURE 95–99, 131–38 (2009); Abbott & Bogenschneider, *supra* note 8, at 146–47; William Hoke, *Taxing Automatons*, 88 TAX NOTES INT'L 11, 13 (2017); Robert J. Shiller, *Robotization Without Taxation?*, PROJECT SYNDICATE (Mar. 22, 2017), https://www.project-syndicate.org/commentary/temporary-robot-tax-finances-adjustment-by-robert-j--shiller-2017-03.

47. *See* THE SECOND MACHINE AGE, *supra* note 1, at 173–80; *supra* notes 28–46 and accompanying text.

significantly disrupt the labor market at least in the short-term.[48] As history has shown us, technology will inevitably create major upheavals in the labor market as workers that are displaced from one sector have to adapt to find employment in other sectors of the economy.[49] Thus, regardless of whether or not the fear of long-term structural unemployment is justified, policymakers need to act now to minimize the labor market turmoil that even short-term job transitions inevitably create.

B. Increased Economic Inequality

As automation has increased, so has the public's fear that automation will dramatically increase income and wealth inequality. This fear stems from the belief that the growing automation of tasks previously performed by workers will contribute to lower wages for workers and greater profits for those who own the robots.[50] In other words, automation may accelerate the transfer of income from workers to capital owners. Moreover, even among workers, wages are likely to be unevenly distributed as low-skill jobs face downward pressure relative to high-skill jobs.[51] With these wage shifts, automation may lead to increasing wealth concentrated in a small portion of society.[52]

More specifically, if robots ultimately displace primarily low-skill jobs and increase the demand for high-skill jobs, as recent waves of automation have done, then income disparity is likely to increase.[53] Numerous studies

48. *See* MANYIKA ET AL., *supra* note 31, at 12, 33, 48; OECD, AUTOMATION AND INDEPENDENT WORK IN A DIGITAL ECONOMY 1 (2016), https://www.oecd.org/els/emp/Policy%20brief%20-%20Automation%20and%20Independent%20Work%20in%20a%20Digital%20Economy.pdf (noting that, historically, technological developments resulted "in substantial job losses in the short term"); Abbott & Bogenschneider, *supra* note 8, at 146–47, 159.

49. *See* FORD, *supra* note 2, at 57–58; MANYIKA ET AL., *supra* note 31, at 1–6; Abbott & Bogenschneider, *supra* note 8, at 147.

50. *See* Tim Dunlop, *What Is a Robot Exactly—and How Do We Make It Pay Tax?*, GUARDIAN (Mar. 12, 2017), https://www.theguardian.com/sustainable-business/2017/mar/13/what-is-a-robot-exactly-and-how-do-we-make-it-pay-tax.

51. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 21–23.

52. *See* THE SECOND MACHINE AGE, *supra* note 1, at 144–45; THOMAS PIKETTY, CAPITAL IN THE TWENTY-FIRST CENTURY 305 (Arthur Goldhammer trans., 2014). Such significant inequality has an undesirable effect on both society and the economy: it may result in social unrest, deepen the cycle of poverty, and require increased social benefit transfers. *See* FORD, *supra* note 46, at 17–18. It may also contribute to a stagnant economy by reducing the average citizen's purchasing power and therefore reducing consumption and the accompanying demand for goods and services. *See id.* at 153–54.

53. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 11–12; Joao Guerreiro et al., *Should Robots Be Taxed?* 2 (Nat'l Bureau of Econ. Research, Working Paper No. 23806, 2017), https://www.nber.org/papers/w23806. For instance, in the late twentieth century, high-skilled workers primarily benefitted from the introduction of the computer and the internet as demand for and wages

predict that robots will primarily eliminate or depress the wages of low- and medium-skill jobs.[54] By further polarizing jobs in this manner, advances in automation threaten to widen "the wage gap between less-educated and more-educated workers."[55]

Even if robots do not eliminate routine and low-skill jobs, workers in these occupations are nevertheless likely to see a decline in wages. To compete with robots who are more productive, do not take sick days, make fewer errors, and are often less costly, workers in these positions will have to accept lower wages to keep their jobs.[56] With robots able to perform many tasks previously performed by humans, demand for this type of work will decrease, thereby further pushing down wages and exacerbating economic inequality.[57]

Alternatively, it is also possible that the benefits of automation will not go to labor at all, but rather will go to the owners of the robots—an even smaller group than just high-skill workers.[58] In fact, recent market trends indicate that this is already occurring, as income and wealth has steadily shifted away from labor and towards capital.[59] In the United States, the top one percent already owns a substantial amount of the country's wealth and

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of these workers increased at the expense of many routine, low-skill occupations. EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 1.

54. *See* NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 2, 29; OECD, *supra* note 48, at 2 (concluding that "workers with a lower level of education are at the highest risk of displacement. While 40% of workers with a lower secondary degree are in jobs with a high risk of job automation.").

55. NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 2; STEWART ET AL., *supra* note 31, at 10.

56. *See* Stevens, *supra* note 21, at 373; Guerreiro et al., *supra* note 53, at 2; Tom Simonite, *Robots Threaten Bigger Slice of Jobs in US, Other Rich Nations*, WIRED (Nov. 28, 2017, 7:17 PM), https://www.wired.com/story/robots-threaten-bigger-slice-of-jobs-in-us-other-rich-nations/.

57. *See supra* note 56 and accompanying text. The globalization of the economy, which has enabled companies to outsource labor offshore, has already significantly contributed to this problem of depressed wages and displaced U.S. workers. Andre Barbe & David Riker, *The Effects of Offshoring on Domestic Workers: A Review of the Literature* 3, 7 (U.S. Int'l Trade Comm'n, Economics Working Paper Series No. 2017-10-A, 2017) (noting that there is a general consensus, and providing specific examples, that offshoring labor has an overall negative effect on low-skilled labor, including job loss and wage decrease).

58. *See* RACE AGAINST THE MACHINE, *supra* note 1, at 33–34; THE SECOND MACHINE AGE, *supra* note 1, at 148; Jon Perry & Ted Kupper, *A Detailed Critique of "Race Against the Machine"*, THE DECLINE OF SCARCITY, http://declineofscarcity.com/?p=1037 (last visited Oct. 14, 2018); PIKETTY, *supra* note 52, at 257–60. This phenomenon, where a select few acquire the majority of the benefits of technological progress, has been referred to as "capital-biased technological change." THE SECOND MACHINE AGE, *supra* note 1, at 148.

59. *See* THE SECOND MACHINE AGE, *supra* note 1, at 166; *see also* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 21 (recognizing that "since 2000, . . . the distribution of benefits going to capital and labor have . . . been diverging").

automation is likely to further increase that amount.[60]

Furthermore, previous technological advancements have not resulted in higher wages for the majority of American workers, despite higher productivity and economic growth.[61] Instead, capital owners, not labor, benefitted to a large extent from the economic benefits attributable to this increased productivity.[62] Similarly, empirical evidence also suggests that the higher productivity generated by robots may not result in higher wages for workers.[63] Thus, those who own the robots, a form of capital, are likely to be the ones to primarily benefit from the innovation, growth, and productivity that this new technology brings.[64] Because capital is generally owned by the wealthy, this would further widen the gap between the top one percent and the rest of the population.[65]

Ultimately, automation's effect on income distribution and economic welfare will depend on the types of jobs eliminated, whether the demand for labor in other fields increases, whether labor productivity transforms into wage increases, and the types of public policies and institutions we have in place.[66] But, in any case, policy intervention will need to play a part in

60. *See* RACE AGAINST THE MACHINE, *supra* note 1, at 33–34; PIKETTY, *supra* note 52, at 248 tbl.7.2.

61. *See* Josh Bivens & Lawrence Mishel, ECON. POLICY INST., UNDERSTANDING THE HISTORIC DIVERGENCE BETWEEN PRODUCTIVITY AND A TYPICAL WORKER'S PAY: WHY IT MATTERS AND WHY IT'S REAL 3–4 (2015), https://www.epi.org/files/2015/understanding-productivity-pay-divergence-final.pdf; EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 21 (estimating that "since the late 1970s, the bottom 90% of households have seen their income fall from two-thirds of the total to about one half of the total share of U.S. income," and observing that "productivity growth did not translate to higher real wages for low-income and even middle-income American workers").

62. Lawrence Mishel, THE WEDGES BETWEEN PRODUCTIVITY AND MEDIAN COMPENSATION GROWTH 1, 5–7 (Econ. Policy Inst., Issue Brief No. 330, 2012), https://www.epi.org/files/2012/ib330-productivity-vs-compensation.2012-04-26-16:45:37.pdf; THE SECOND MACHINE AGE, *supra* note 1, at 145.

63. *See* Daron Acemoglu & Pascual Restrepo, *Robots and Jobs: Evidence from US Labor Markets* 1, 4 (Nat'l Bureau of Econ. Research, Working Paper No. 23285, 2017), http://www.nber.org/papers/w23285.pdf (predicting that the addition of "one more robot per thousand workers reduces aggregate employment to population ratio by about 0.34 percentage points . . . and wages by about 0.5 percent").

64. *See* Catherine Clifford, *Elon Musk Says Robots Will Push Us to a Universal Basic Income—Here's How It Would Work*, CNBC (Nov. 18, 2016, 11:28 AM), https://www.cnbc.com/2016/11/18/elon-musk-says-robots-will-push-us-to-a-universal-basic-income-heres-how-it-would-work.html; *see also* FORD, *supra* note 46, at 153–54.

65. *See supra* notes 58–64 and accompanying text.

66. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 1–2, 22–23; *see also* MANYIKA ET AL., *supra* note 31, at 12 (discussing factors that determine how automation affects a country's work force, including wage levels, economic and productivity growth, demographics, and economic sectors prevalent in the country).

addressing the potential negative ramifications of the rapid growth in robotics and artificial intelligence automation.[67]

C. Loss of Tax Revenue

The rise in robotics also raises concerns that governments will lose a substantial amount of much-needed tax revenue as more human workers are displaced by machines.[68] This concern stems from the fact that under our current tax system, a significant source of federal and state tax revenues is borne by workers, not capital.[69]

In particular, a worker's earnings are subject to multiple levels of taxation.[70] First, wages are subject to payroll taxes,[71] which are often remitted directly to the government through wage withholding or quarterly estimated tax payments.[72] These employment taxes are comprised of: (1) a 12.4% tax on wages up to $128,400 (for 2018) to provide old age, survivors, and disability insurance ("OASDI" or "Social Security tax"); and (2) a 2.9% tax on an uncapped amount of wages to provide Medicare or hospital insurance ("Medicare tax").[73] If the worker is an employee, then the worker pays half of these taxes, while the employer pays the other half.[74] If the worker is self-employed,

67. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 1–2; RACE AGAINST THE MACHINE, *supra* note 1, at 36–39, 64–70; OECD, *supra* note 48, at 1, 4; Stevens, *supra* note 21, at 369, 380; Tim De Chant, *Navigating the Robot Economy*, PBS (Oct. 15, 2014), http://www.pbs.org/wgbh/nova/next/tech/automation-economy/.

68. *See* Abbott & Bogenschneider*, supra* note 8, at 150; Sami Ahmed, *Cryptocurrency & Robots: How to Tax and Pay Tax on Them*, 69 S.C.L. REV. 697, 699 (2018); Hoke, *supra* note 46, at 12; Oberson, *supra* note 4; Gideon Rosenblatt, *The Robot Tax Fallacy: Anthropomorphizing Automation*, VITAL EDGE (June 5, 2017), http://www.the-vital-edge.com/robot-tax/; Matt Simon, *Who Will Pay for the Future if Not the Robots?*, WIRED (May 30, 2017, 7:00 AM), https://www.wired.com/2017/05/will-pay-future-not-robots/; Linda A. Thompson, *Rise of Robots: Boon for Companies, Tax Headache for Lawmakers*, BNA.COM (Feb. 20, 2017), https://www.bna.com/rise-robots-boon-n57982084077/.

69. *See* Abbott & Bogenschneider, *supra* note 8, at 156; Rosenblatt, *supra* note 68 ("[R]oughly 65% of total US federal tax dollars depend on wage-based income.").

70. *See* Abbott & Bogenschneider, *supra* note 8, at 156. Labor income is generally also indirectly subject to sales tax because workers generally use their income to buy products and services that are subject to sales tax. *See id.*; Simon, *supra* note 68.

71. I.R.C. § 3101(a)–(b) (2018).

72. I.R.C. § 3102(a) (2018) (requiring that the payroll tax be collected by the taxpayer's employer from the taxpayer's wages "as and when paid").

73. *See* I.R.C. §§ 3101(a)–(b)(1), 3111(a)–(b) (2018). Technically, these taxes apply only to "covered" wages. I.R.C. § 3111; *see* I.R.C. § 3121 (2018) (defining "wages"). The taxable wage base subject to the Social Security tax ($128,400 for 2018) is adjusted annually for inflation. *Contribution and Benefit Base*, SSA.gov, https://www.ssa.gov/oact/cola/cbb.html (last visited Oct. 15, 2018).

74. *See* I.R.C. §§ 3101(a)–(b)(1), 3111(a)–(b).

the worker pays the entire tax without any employer assistance.[75] In addition to these taxes, high-income earners are subject to an additional Medicare tax of 0.9% on wages that exceed $250,000 (if married filing jointly), resulting in a combined 3.8% Medicare tax on wages over the threshold.[76]

Capital income is not subject to these payroll taxes.[77] Instead, the net investment income[78] of high-income individuals is subject to an additional tax of 3.8% ("unearned income Medicare tax"[79] or "Section 1411 surtax").[80] As currently structured, this Section 1411 surtax can potentially capture income generated by robots and other capital investments to the extent that qualified net investment income exceeds a threshold amount.[81]

Currently, the federal government receives more than $1 trillion in revenue annually, or approximately one-third of its total tax revenue, from

75. I.R.C. § 1401(a)–(b)(1) (2018). However, the worker is entitled to deduct a portion of the tax paid on his or her income tax return. *See* I.R.C. § 164(f)(1) (2018).

76. I.R.C. §§ 1401(b)(2)(A)(i), 3101(b)(2)(A); *supra* text accompanying note 73. The employer is not subject to the additional Medicare tax. *See* I.R.C. § 3111(b). This additional Medicare tax is effective for taxable years beginning in 2013 and applies to both employees and self-employed individuals. I.R.C. §§ 1401(b)(2)(A), 3101(b)(2). For a single or head of household taxpayer, the threshold is $200,000. I.R.C. §§ 1401(b)(2)(A)(iii), 3101(b)(2)(C).

77. For the tax imposed on certain capital income, including investment income of individuals, see I.R.C. § 1411 (2018).

78. For Section 1411 purposes, net investment income generally consists of the sum of specific sources of gross income and net gains from the disposition of property, minus specific deductions allocable to the gross income or net gains. *See* I.R.C. § 1411(c). It includes: (1) "gross income from interest, dividends, annuities, royalties, and rents, other than such income which is derived in the ordinary course of" qualified trades or businesses; (2) "other gross income from" qualified trades or businesses; and (3) net gain from "the disposition of property other than property held" in a qualified trade or business. I.R.C. § 1411(c)(1)(A). For purposes of Section 1411, a qualified trade or business is a trade or business that either constitutes "a passive activity . . . with respect to the taxpayer" or consists of "trading in financial instruments or commodities." I.R.C. § 1411(c)(2). In addition, net investment income also generally includes any item of gross income from the investment of working capital, any net gain attributable to the investment of working capital, and interest, dividends, annuities, royalties and rents derived from a trade or business of trading in financial instruments or commodities even if the taxpayer actively participates in that business. *See* I.R.C. §§ 469(e)(1), 1411(c)(3) (2018).

79. Despite being commonly referred to as the "unearned income Medicare tax" or "unearned income Medicare contribution," this tax is not technically a Medicare tax because revenues generated from the tax are not dedicated to the Medicare Trust fund. *See* I.R.C. § 1411.

80. *See* I.R.C. § 1411(a)–(b).

81. *See supra* note 78. The 3.8% surtax applies to the lesser of (i) the individual's net investment income for the taxable year or (ii) the excess of modified adjusted gross income for the taxable year over a threshold amount. I.R.C. § 1411(a)(1). The threshold amount is $250,000 for married taxpayers filing joint returns, $125,000 for married taxpayers filing separate returns, and $200,000 for all other individuals. I.R.C. §1411(b). This tax also applies to certain estates and trusts. I.R.C. § 1411(a)(2).

employment taxes.[82] Because they do not earn wages, robots and other forms of technology are not subject to the brunt of these taxes.[83] Consequently, a reduction in the number of humans employed will inevitably result in a reduction in the amount of employment taxes collected by the government.[84] Given that employment taxes comprise an important source of federal tax revenue and help finance Social Security and certain Medicare benefits, a decline in these taxes have the potential to significantly affect the government's ability to continue to fund its expenditures.[85]

Even though the government will not have to make retirement or Medicare insurance disbursements to robots, the government will nonetheless face significant budgetary pressures. The current Social Security system is funded on a pay-as-you go basis, which means that as the number of human workers declines, less payroll tax revenue will be available to fund the currently retired and disabled workers.[86] Furthermore, government expenditures are likely to grow if robots displace human workers because additional benefit programs will be necessary to support the unemployed.[87] The current system does not technically accumulate payroll taxes in a Social Security Trust Fund, but rather uses the funds to pay benefits to current beneficiaries and treats any surplus as an additional source of tax revenue for the federal government to spend

82. BUREAU OF THE FISCAL SERVICE, U.S. DEP'T OF THE TREASURY, FINAL MONTHLY TREASURY STATEMENT OF RECEIPTS AND OUTLAYS OF THE UNITED STATES GOVERNMENT FOR FISCAL YEAR 2016 THROUGH SEPTEMBER 30, 2016, AND OTHER PERIODS 34 tbl.9 (2016), https://www.fiscal.treasury.gov/fsreports/rpt/mthTreasStmt/mts0916.pdf. Employment taxes represent the second-largest source of federal revenues after individual income taxes. CONG. BUDGET OFFICE, THE BUDGET AND ECONOMIC OUTLOOK 2017 TO 2027, at 9–11 (2017), https://www.cbo.gov/sites/default/files/115th-congress-2017-2018/reports/52370-outlook_1.pdf; *see* BUREAU OF THE FISCAL SERVICE, *supra*, at 34 tbl.9. States also receive a significant source of tax revenue from employment taxes on labor income, which states often use to help fund state unemployment and disability insurance. CHAD STONE & WILLIAM CHEN, CTR. ON BUDGET & POLICY PRIORITIES, INTRODUCTION TO UNEMPLOYMENT INSURANCE 7 (July 30, 2014), https://www.cbpp.org/sites/default/files/atoms/files/12-19-02ui.pdf; *Who Actually Pays for Workers' Compensation?*, DISABILITY SECRETS, https://www.disabilitysecrets.com/workmans-comp-question-20.html (last visited Oct. 15, 2018).

83. *See* Simon, *supra* note 68; *supra* notes 68–70, 77 and accompanying text.

84. *See* Simon, *supra* note 68; *supra* notes 68–70, 77 and accompanying text.

85. *See* Joint Comm. on Taxation, Technical Explanation of the Revenue Provisions of the "Reconciliation Act of 2010," as Amended, in Combination with the "Patient Protection and Affordable Care Act" 134 (Mar. 21, 2010), https://www.jct.gov/publications.html?func=startdown&id=3673; *supra* notes 82–84 and accompanying text.

86. *See* David John, *Misleading the Public: How the Social Security Trust Fund Really Works*, HERITAGE FOUND. (Sept. 2, 2004), https://www.heritage.org/social-security/report/misleading-the-public-how-the-social-security-trust-fund-really-works.

87. *See* Clifford, *supra* note 64; *supra* note 52.

for other purposes.[88] Accordingly, a reduction in the number and wages of employed workers will significantly affect not only the government's financial ability to finance Social Security and Medicare but also other government programs that can potentially help those negatively affected by the automation revolution.

In addition to payroll taxes, the tax code also imposes an income tax on a worker's wages, which comprises the largest source of federal tax revenue for the U.S. government.[89] Worker's earnings are subject to federal income tax rates ranging from 10% to 39.6%, with the new Tax Act temporarily lowering the top rate to 37% beginning in 2018.[90] The majority of states also subject this same income to a state income tax.[91]

Conversely, other sources of income are subject to a much smaller income tax burden. In particular, income derived from business profits and investments is generally taxed on a net basis, unlike wages which are taxed on a gross basis.[92] This form of income often also benefits from numerous and generous tax deductions, including accelerated depreciation and research and development tax preferences, which further reduce the effective tax rate on this income.[93] Income derived from capital gains and qualified dividends benefit from a preferential tax rate of up to 20%, as compared to the 37% tax rate imposed on labor and some types of investment income.[94] Holders of this

88. John, *supra* note 86. In other words, "[t]he Social Security trust fund is merely an accounting device" that keeps tracks of the payroll taxes paid by taxpayers and the payroll tax collections that the federal government uses for other purposes. *See id.*

89. CONG. BUDGET OFFICE, *supra* note 82, at 9, 10 tbl.1-1; *see* CONG. BUDGET OFFICE, OPTIONS FOR REDUCING THE DEFICIT: 2017 TO 2026, at 119 (2016), https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/52142-budgetoptions.pdf (showing that, for the fiscal year 2016, the government collected 47% of its total tax revenues from individual income taxes and 34% from payroll taxes). Of the individual income taxes collected, approximately two-thirds were levied on wage income, as opposed to investment income, thereby resulting in wage income generating about 65% of total federal tax revenues. *See* Rosenblatt, *supra* note 68.

90. Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 11001, 131 Stat. 2054, 2054–59 (2017) (codified at I.R.C. § 1 (2018)). The new Tax Act reduces the rates across all brackets: beginning in 2018, the individual income tax rates will be 10%, 12%, 22%, 24%, 32%, 35%, and 37%. *Id.* However, this reduction in tax rates is only temporary and is set to revert back to 2017 tax rates in 2026. *Id.*

91. MORGAN SCARBORO, STATE INDIVIDUAL INCOME TAX RATES AND BRACKETS FOR 2018, at 1–2 (TAX FOUND., Fiscal Fact No. 576, 2018), https://files.taxfoundation.org/20180315173118/Tax-Foundation-FF576-1.pdf.

92. *See* I.R.C. § 162(a) (2018) (allowing a deduction for "all the ordinary and necessary expenses paid or incurred during the taxable year in carrying on any trade or business"); Soled & Thomas, *supra* note 8, at 9.

93. *See* I.R.C. §§ 38(a)–(b), 41(a), 168 (2018).

94. *See* I.R.C. § 1(h), (j). This income may also be subject to the 3.8% § 1411 surtax. I.R.C. § 1411(a)(1), (c)(1) (2018).

type of income also benefit from a time value of money perspective,[95] because they may often defer, and sometimes even completely escape, paying taxes on capital gains.[96] Deferral also enables their money to grow at a lower rate in the corporate form prior to paying it out as dividends.[97]

Moreover, the recent Tax Act extends additional benefits to holders of these types of income. For instance, the Tax Act reduces the maximum corporate tax rate from 35% to 21%.[98] In addition, business income earned in a partnership, sole proprietorship or other pass-through entity can benefit from an additional 20% income deduction.[99] Although labor income earned in this entity form can also benefit from the 20% deduction, this deduction does not benefit employees and phases out for many businesses generating primarily labor income.[100] Significantly, the Tax Act also further reduces the tax burden

95. For a review of the concept of time value of money, see Glenn S. Daily & David A. Ludgin, *Understanding the Time Value of Money*, N.J. LAW, July 1994, at 12.

96. *See* I.R.C. § 1001 (2018). Significantly, the realization principle provides that gains derived from capital assets generally are not subject to tax until the occurrence of a realization event, thereby potentially allowing appreciation to remain untaxed for many years. *See* I.R.C. § 1001(a)–(b). Other provisions also allow for deferral or complete exemption of taxes on capital gains, such as the like-kind exchange provisions, the step-up in an asset's basis at the death, and others. *See, e.g.*, I.R.C. §§ 1014(a), 1031(a) (2018).

97. *Compare supra* note 90 and accompanying text (providing the tax rates for individuals, the highest of which is 37% after 2018), *with infra* 98 and accompanying text (providing that the corporate tax rate is 21%).

98. Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13001(a), 131 Stat. 2054, 2096 (2017) (codified at I.R.C. § 11(b) (2018)). According to many economists, employees are unlikely to be the ones to benefit from this reduction in the corporate tax rate; instead, shareholders are more likely to bear the incidence of corporate taxation and realize these benefits. *See* Kimberly A. Clausing, *In Search of Corporate Tax Incidence*, 65 TAX L. REV. 433, 437, 465–66 (2012); Mann, *supra* note 8 (manuscript at 17–18). Moreover, even though corporate income is also subject to a second level of tax when the business profits are distributed to the corporation's shareholders, *see* I.R.C. § 1(h), the combined tax rate imposed on this income is often lower than the 37% rate imposed on individual income because of the benefits of deferral, *see supra* notes 96–97 and accompanying text, and the fact that some shareholders are tax exempt. *See* I.R.C. § 1(h)(1)(B) (providing a 0% tax rate on dividends for taxpayers whose taxable income falls below a certain level). The Tax Act also eliminates the Corporate Alternative Minimum Tax. *See* §12001(a), 131 Stat. at 2092 (codified at I.R.C. § 55(a) (2018)).

99. *See* § 11011(a), 131 Stat. at 2063–70 (codified at I.R.C. § 199A (2018)).

100. *See* I.R.C. § 199A(f)(1)(A) (2018) (limiting the deduction to partners and shareholders of partnerships and S-Corporations, respectively). Specifically, the deduction phases out for taxpayers with taxable income in excess of $315,000 (if married filing jointly) that are engaged in "any trade or business involving the performance of services in the fields of health, law, . . . accounting, actuarial science, performing arts, consulting, athletics, financial services, brokerage services, or any trade or business where the principal asset of such trade or business is the reputation or skill of 1 or more of its employees," or any trade or business that "involves the performance of services that consist of investing and investment management, trading, or dealing in securities, . . . partnership interests, or commodities." I.R.C. §§ 199A(d)–(e), 1202(e)(3)(A) (2018).

on capital income by allowing businesses to deduct the full cost of depreciable assets in one year instead of recapturing the costs over several years.[101]

In summary, the above discussion suggests that if the amount of labor income declines, so will the tax base. Even though automation is likely to increase productivity and economic growth, most of that profit is likely to be captured as either business profits or capital gains, both of which are subject to a much lower tax burden. Currently the corporate tax contributes only 9% of federal tax revenues,[102] and this number is not likely to significantly increase even if the majority of the excess profits generated by automation are captured in the corporate form. Therefore, if machines displace a significant number of workers, even for the short-term, governments will likely be unable to maintain current levels of spending, which would put further pressure on government budgets and widen the fiscal gap.[103] The technology revolution is likely to magnify this problem because this downward trend in tax revenues would come at a time when governments are facing increased spending demands to sustain workers displaced by technology.[104] Thus, in light of the acceleration of automation and the growing shift from labor income towards capital income, it is critical that we rethink our current tax system and how we fund welfare spending and other social transfers of wealth.

III. THE ROBOT TAX

With growing public concern over the loss of jobs, increasing economic inequality, and declining tax revenues, there have been calls around the world for a robot tax. Section A defines "robot tax."[105] Section B critically analyzes the robot tax proposal and highlights the many negative implications that result from such a tax.[106] It concludes that, although a robot tax as currently contemplated should not be pursued, we should consider tax policy as one tool

101. *See* Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13201, 131 Stat. at 2105–08 (codified at I.R.C. § 168(k) (2018)). However, the amount of the deduction phases down beginning in 2023. *Id.*

102. *See* CONG. BUDGET OFFICE, *supra* note 89, at 119.

103. *See* Abbott & Bogenschneider, *supra* note 8, at 168; Ross Campbell, *Technology, Automation and Maintaining the Public Finances*, ICAEW (Aug. 30, 2017), https://ion.icaew.com/talkaccountancy/b/weblog/posts/technology-automation-and-maintaining-the-public-finances; Frank, *Automation Could Cause America to Lose 35% of Its Tax Base in the Next 20 Years*, 60 SECOND STAT. (Feb. 28, 2017), https://www.60secondstatistics.com/automation-could-cause-america-to-lose-35-of-its-tax-base-in-the-next-20-years/; Simon, *supra* note 68.

104. *See* Ahmed, *supra* note 68, at 730–31; Obserson, *supra* note 4.

105. *See infra* Section III.A.

106. *See infra* Section III.B.

to address the threats raised by the automation revolution.[107]

A. What is a "Robot Tax"?

A "robot tax," also referred to as an "automation tax," is essentially a tax on companies that use robots or automated technologies that replace human workers.[108] When humans perform work, that work is subject to both income and payroll taxes, whereas the same work performed by a robot is not subject to the same level of tax.[109] A robot tax seeks to level the playing field and tax robots comparably to the humans that they are replacing.[110] According to its proponents, the general idea behind the tax is to help protect jobs against automation by increasing the cost of robots relative to humans and slowing down the adoption of this technology.[111] It also attempts to protect the tax base and provide governments with revenues that can be used to support or retrain displaced workers, foster the creation of new jobs, and provide other social benefits to mitigate economic inequality.[112]

The first serious proposal to tax the robots originated in the European Union.[113] European lawmakers recommended treating robots as "electronic persons" for purposes of tax and social security contributions.[114] Under this proposal, the economic income generated by the robot for a company would

107. *See infra* Section II.B.4.

108. *See* Mady Delvaux (Rapporteur), Comm. on Legal Affairs, *Report with Recommendations to the Commission on Civil Law Rules on Robotics*, at 4, 2015/2103(INL) (Jan. 27, 2017), http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A8-2017-0005+0+DOC+PDF+V0//EN; Anna Massoglia, *The Rise of Robot Taxes*, BNA.COM (Aug. 29, 2017), https://www.bna.com/rise-robot-taxes-b73014463832/; James Walker, *San Francisco Could Start Taxing Robots to Save Jobs*, DIGITAL J. (Aug. 25, 2017), http://www.digitaljournal.com/tech-and-science/technology/san-francisco-could-start-taxing-robots-to-save-jobs/article/500931.

109. *See supra* Section II.C.

110. *See* Kevin J. Delaney, *The Robot that Takes Your Job Should Pay Taxes, Says Bill Gates*, QUARTZ (Feb. 17, 2017), https://qz.com/911968/bill-gates-the-robot-that-takes-your-job-should-pay-taxes/; Massoglia, *supra* note 108.

111. *See* Delaney, *supra* note 110 (quoting Bill Gates as saying, "[y]ou ought to be willing to raise the tax level and even slow down the speed" of automation); Massoglia, *supra* note 108.

112. Delvaux, *supra* note 108, at 4, 15; Joyce E. Cutler, *Rise of Machines to Spark Rise of San Francisco Taxes?*, BNA.COM (Mar. 16, 2017), https://www.bna.com/rise-machines-spark-n57982085273/; Delaney, *supra* note 110; Roisin Kiberd, *A French Presidential Candidate Wants to Tax Robots to Save Human Workers*, MOTHERBOARD (Feb. 3, 2017, 6:00 AM), https://motherboard.vice.com/en_us/article/xyvvgj/a-french-presidential-candidate-wants-to-tax-robots-to-save-human-workers.

113. *See* Delvaux, *supra* note 108, at 4, 15; Shiller, *supra* note 46.

114. *See* Delvaux, *supra* note 108, at 4, 15, 18; Massoglia, *supra* note 108.

be subject to a similar tax to the one currently imposed on labor income.[115] Because robots do not pay taxes, the company using the robot would be responsible for the payment of this tax.[116]

Although the European Parliament ultimately rejected this recommendation on February 16, 2017, the following day, Bill Gates stated his support for a similar robot tax in the United States.[117] Similarly, a San Francisco politician, concerned about the growing revenue gap and wealth inequality brought about by automation, proposed that the City of San Francisco adopt an automation tax to replace taxes lost to automated jobs.[118] According to her proposal, companies would pay payroll taxes on machines based on the payroll tax that the job automation replaced.[119] Meanwhile, across the world, South Korea introduced what has been called the first "robot tax."[120] The provision does not directly impose a tax on robots, but rather reduces tax incentives for investments in automation technology.[121] Thus, it is not technically a robot tax, but seeks to achieve similar policy goals.

These calls for a robot tax are only the beginning of the robot tax discussion. As the automation revolution further accelerates and its impact is felt across society, the calls for a robot tax are likely to increase as well.[122]

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115. *See* Delvaux, *supra* note 108, at 15.

116. *Id.*; *see* Paul-Choudhury, *supra* note 37.

117. Abbott & Bogenschneider, *supra* note 8, at 149 & n.19; *see* Massoglia, *supra* note 108; Tech. News, *European Parliament Calls For Robot Law, Rejects Robot Tax*, REUTERS (Feb. 16, 2017), https://www.reuters.com/article/us-europe-robots-lawmaking/european-parliament-calls-for-robot-law-rejects-robot-tax-idUSKBN15V2KM.

118. *See* Cutler, *supra* note 112; Massoglia, *supra* note 108.

119. Cutler, *supra* note 112; Massoglia, *supra* note 108.

120. Cara McGoogan, *South Korea Introduces World's First 'Robot Tax'*, TELEGRAPH (Aug. 9, 2017, 12:54 PM), http://www.telegraph.co.uk/technology/2017/08/09/south-korea-introduces-worlds-first-robot-tax/.

121. Massoglia, *supra* note 108; McGoogan, *supra* note 120. The tax legislation reduces the three to seven percent deduction in corporate taxes currently available to employers who invest in automation to a two percent deduction. Massoglia, *supra* note 108.

122. *See* Massoglia, *supra* note 108; Brandon Vigliarolo, *South Korea 'Robot Tax' Is No Tax at All; It's a Warning of Looming Automation Crisis*, TECHREPUBLIC (Aug. 11, 2017, 7:21 AM), https://www.techrepublic.com/article/south-korea-robot-tax-is-no-tax-at-all-its-a-warning-of-looming-automation-crisis. More recently, British politician, Jeremy Corbin, also strongly expressed the need to address the challenges of automation, suggesting that this include the introduction of a robot tax in the United Kingdom. *See* Adam Becket, *Jeremy Corbyn's Labour Conference Speech in Full*, BUS. INSIDER (Sept. 27, 2017), http://www.businessinsider.com/full-text-of-jeremy-corbyns-labour-conference-speech-2017-9; Kari Paul, *Why Robots Should Pay Taxes*, MARKETWATCH (Sept. 28, 2017), https://www.marketwatch.com/story/why-robots-should-pay-taxes-2017-09-12/print.

B. Critique of the Robot Tax

The robot tax, as currently contemplated, gives rise to practical issues and negative policy implications. As one commentator accurately noted, "[T]he idea that we can tax a robot like we tax a human is a vast over-simplification."[123] The following discussion highlights four of the biggest issues that a robot tax presents.

1. Definitional Issues

One of the main questions that a robot or automation tax raises is: How do we define a "robot" for these purposes? The question is more complicated than robot tax proponents make it seem.[124] Is a "robot" any type of machine that replaces a human job with automation? Does the definition include bots—robots programmed to perform tasks online? Does the definition necessitate physical qualities, or can it include intangible software or algorithms that allow a computer to work as a doctor, lawyer, or architect? The European Union's robot tax proposal defined a robot as having the following characteristics: (i) acquires "autonomy through sensors and/or by exchanging data with its environment" and the trading and analyzing of the data, (ii) is self-learning through experience and interaction, (iii) has a physical support, and (iv) adapts its behaviors and actions to its environment.[125] But is this the right definition for *tax* purposes? This definition likely excludes many types of labor-displacing automation, while at the same time including many forms of labor-enhancing technologies, thereby undermining the goals of the robot tax.[126] Any definition that is ultimately adopted needs to be clear, practicable, and justifiable. Thus far, it seems nearly impossible to achieve these goals, especially

123. Rosenblatt, *supra* note 68.

124. For a discussion of some of the difficulties in defining the term "robot," see Daniel Hemel, *Should Robots Be Subsidized?*, MEDIUM (Aug. 17, 2017), https://medium.com/whatever-source-derived/should-robots-be-subsidized-18909e1fdb64; Kiberd, *supra* note 112; Simon, *supra* note 68.

125. Delvaux, *supra* note 108, at 8.

126. *See* Hoke, *supra* note 46, at 14 (implying, based on the comments of Professor Shu-Yi Oei, that robot characteristics are on a continuous spectrum, which leads to difficulties in determining how much agency, physical form, and autonomy is necessary to constitute a robot; may encourage robot developers to design their systems to be just beyond the line; and will likely give rise to complex facts and circumstances litigation); Kiberd, *supra* note 112; Robert J. Kovacev, *The Challenges of Administering a Robot Tax*, LEXOLOGY (Sept. 25, 2017), https://www.lexology.com/library/detail.aspx?g=d55a305f-989b-400e-9b32-547f6a95fbb0; Lawrence Summers, *Picking on Robots Won't Deal With Job Destruction*, WASH. POST (Mar. 5, 2017), https://www.washingtonpost.com/opinions/picking-on-robots-wont-deal-with-job-destruction/2017/03/05/32091f08-004b-11e7-8ebe-6e0dbe4f2bca_story.html; Walker, *supra* note 108.

as technology, jobs, and business models continue to evolve.[127]

Regardless of how we define a robot, another big question that arises is: Why are we taxing this particular type of capital asset but not taxing other types of capital assets?[128] A tax on robots is essentially a tax on the capital employed by the business that utilizes the robot. If we single out robots for this additional tax, then other capital assets are given a tax preference—but is this the right policy result? If the goals of the robot tax are to increase government revenues while minimizing labor market disruption, then the robot tax should encompass all technology that increases automation and productivity at the expense of human workers. Moreover, if robots are in fact increasing productivity, especially in relation to other capital investments, then why do we want to discourage their use? Finally, as discussed above, a significant contributor to the declining government revenues at a time of increased automation is that the tax law favors capital over labor.[129] Thus, singling out robots for taxation does not get at the root of the problem. Instead, we need to rethink our taxation of capital income.[130] This type of change has the potential to more effectively address the job disruptions, economic inequality, and government budget deficits exacerbated by the automation revolution.

2. Innovation Issues

In addition to the definitional and line-drawing issues raised by a robot tax, this type of tax is also likely to hinder innovation.[131] A robot tax would increase the cost of robots, therefore reducing the incentive for companies to

127. *See* Steve Cousins, *Is a "Robot Tax" Really an "Innovation Penalty"?*, TECH CRUNCH, https://techcrunch.com/2017/04/22/save-the-robots-from-taxes/ (last visited Oct. 17, 2018); Hemel, *supra* note 124; Kovacev, *supra* note 126 (observing that "[t]here is enough trouble sorting out whether a human worker is an employee or an independent contractor. It is not difficult to imagine the controversy and ambiguity that would result from trying to sort out whether a particular machine or algorithm is a taxable robot."); Shiller, *supra* note 46.

128. Cousins, *supra* note 127; Summers, *supra* note 126.

129. *See supra* Section II.C.

130. *See infra* Sections IV.A–B.

131. *See* Ahmed, *supra* note 68, at 732; Edward D. Kleinbard, *Reimagining Capital Income Taxation* 5 (Oxford Univ. Ctr. for Bus. Taxation, Working Paper No. 1524, 2015); *California Tax on Robots, Automation Equals a Tax on Innovation*, SAN DIEGO UNION-TRIB. (Dec. 4, 2017), http://www.sandiegouniontribune.com/opinion/editorials/sd-robot-tax-innovation-jane-kim-20171201-story.html; Cousins, *supra* note 127; Sam Reynolds, *A Robot Tax Will Not Solve Automation Problems*, IND. DAILY STUDENT (Feb. 22, 2017), https://www.idsnews.com/article/2017/02/robot-tax-wont-help; Summers, *supra* note 126.

innovate and penalizing technological progress and productivity.[132]

New technology is often a major driver for economic growth and progress.[133] Advancements in robotics, automation, and artificial intelligence are likely to do the same, as this technology dramatically increases productivity and improves the quality of goods and services produced.[134] As noted by the National Science and Technology Council, "R&D on AI ha[s] already begun reaping major benefits to the public in fields as diverse as health care, transportation, the environment, criminal justice, and economic inclusion."[135] Given the numerous benefits that automation provides for society, deterring the development of artificial intelligence and related technologies will ultimately harm, rather than improve, overall social welfare. Moreover, taxing robots would negatively impact a country's international competitive position, which would drive production abroad and further exacerbate the loss of jobs, growing inequality, and lost tax revenues.[136] Therefore, even though we need to address the negative implications of automation, it is essential to do so in a manner that does not impede innovation, but rather harnesses the benefits of automation.

3. Tax Avoidance Issues

A robot tax also may be subject to significant tax avoidance techniques, thereby limiting its effectiveness at achieving its goals. This is partly because a robot is relatively mobile. Automation of jobs is often created by software that does not require a physical structure, which allows many of these systems to be hosted in the "cloud" or on the internet and to be accessed remotely.[137]

132. *See* Cousins, *supra* note 127. Economists generally agree that an optimal tax system should not hinder productivity. *See* Peter A. Diamond & James A. Mirrlees, *Optimal Taxation and Public Production I: Production Efficiency*, 61 AM. ECON. REV. 8, 24–25 (1971). *But see* Guerreiro et al., *supra* note 53, at 1, 35 (concluding that a robot tax is optimal when there is partial automation because the tax can help increase the wages of routine workers who would otherwise be displaced by machines).

133. RACE AGAINST THE MACHINE, *supra* note 1, at 8; *see* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 1; Abbott & Bogenschneider, *supra* note 8, at 153.

134. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 1; NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 1, 5; Delvaux, *supra* note 108, at 44; Cousins, *supra* note 127.

135. NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 1 (alteration in original).

136. *See* Hoke, *supra* note 46, at 15; Reynolds, *supra* note 131; Summers, *supra* note 126.

137. *See* Ahmed, *supra* note 68, at 730; Campbell, *supra* note 103. However, this is not always the case: some "robots" do require a physical structure, such as driverless cars. *See* Shiller, *supra* note 46. Moreover, the extent of this issue significantly depends on how robots are defined for purposes of the robot tax. *See supra* Section III.B.1.

In many instances, this makes it possible to move the "robot" to a no- or low-tax jurisdiction.[138] Because a robot tax generally creates a tax at the source (i.e., the location of the robot), in the absence of substantial international tax reform, a company, with sufficient advance planning, can potentially avoid the robot tax altogether.[139] Even if a company is unable to relocate a robot, the adoption of a robot tax may result in companies relocating to other jurisdictions that do not impose a robot tax.[140]

Also, because a robot tax is essentially a tax on a specific type of corporate profits, it would further incentivize the use of aggressive tax planning methods that exist today.[141] A robot tax is also likely to add more complexity into our tax system.[142] With additional complexity, there is an increased risk of tax non-compliance, as companies may not know how much tax they are required to pay, and of enforcement difficulties, as tax authorities may not be able to verify the accuracy of the asserted tax liability.[143]

4. Design, Implementation, and Administrative Issues

Finally, even if the above concerns can be addressed, actually designing, implementing, and administering a robot tax creates significant challenges. These difficulties occur because a robot does not actually earn income or pay taxes.[144] This gives rise to the question: What is the tax base for the robot tax and how would it be measured? Various ways to implement a robot tax have been suggested, but each face substantial hurdles.[145]

For instance, governments may tax the increased profits generated by a labor-displacing robot by subjecting the "imputed hypothetical salary the robots should receive from equivalent work done by humans" to the same type

138. *See* Orly Mazur, *Taxing the Cloud*, 103 CALIF. L. REV. 1, 60–63 (2015); Campbell, *supra* note 103; Kovacev, *supra* note 126.

139. *See* Thompson, *supra* note 68; Ahmed, *supra* note 68, at 730. Under current law, it is unclear where the robot is generating value: Is it at the location of the hardware, the software learning algorithms, or somewhere else? *See* Ahmed, *supra* note 68, at 730. These components may be located in different jurisdictions. *See id.* Thus, this determination is important because it affects whether or not the income is taxable in the United States. *See id.*

140. Thompson, *supra* note 68.

141. *See supra* notes 139–40 and accompanying text.

142. *See* Abbott & Bogenschneider, *supra* note 8, at 170.

143. *See* Thompson, *supra* note 68; Kovacev, *supra* note 126.

144. Paul–Choudhury, *supra* note 37; Rosenblatt, *supra* note 68.

145. Yanis Varoufakis, *A Tax on Robots?*, PROJECT SYNDICATE (Feb. 27, 2017), https://www.project-syndicate.org/commentary/bill-gates-tax-on-robots-by-yanis-varoufakis-2017-02.

of income and payroll taxes as labor income.[146] The robot would either have a legal personality, similar to that of a business organization, and be subject to the tax directly, or the owner of the robot would be liable for the tax.[147]

This approach is unworkable in practice. Calculating how many human workers a robot displaces is incredibly problematic.[148] In practice, robots often take over tasks before taking over an entire job, which makes finding a link between the robot and the displaced worker difficult.[149] Sometimes, automation displaces some workers but creates demand for new workers to complete a different task or performs completely new jobs that a human worker never performed previously.[150] Alternatively, a robot may complement, rather than displace a human worker, but differentiating between job-enhancing and job-displacing robots is often difficult.[151] Given these issues, it is "nearly impossible to prove a direct correlation between the implementation of automation technology and the net loss of jobs."[152] Moreover, even if such correlation were possible or not required to trigger the tax, determining the robot's hypothetical salary would create its own set of issues.[153]

A similar, but perhaps even more problematic approach, would be to impose the robot tax on the amount of income generated by the use of automation.[154] This raises the question: how do we measure the profits or value created by the robot or automation program? Robots and human workers often work together to complete a job and jointly contribute to the value produced.[155] To allocate the income between the different labor and robot

146. Oberson, *supra* note 4; *see* Hoke, *supra* note 46, at 14.

147. *See* Hoke, *supra* note 46, at 14; Oberson, *supra* note 4; Celia Luterbacher, *Should Robots Be Taxed for Stealing Jobs?*, SWISS INFO (Mar. 7, 2017), https://www.swissinfo.ch/eng/business/automated-workforce_tax-robots-for-stealing-jobs/42976564.

148. *See* Thompson, *supra* note 68.

149. *See* Rosenblatt, *supra* note 68.

150. *See* Cousins, *supra* note 127; Kovacev, *supra* note 126; Varoufakis, *supra* note 145.

151. Noah Smith, *What's Wrong With Bill Gates' Robot Tax*, BLOOMBERG (Feb. 28, 2017), https://www.bloomberg.com/view/articles/2017-02-28/what-s-wrong-with-bill-gates-robot-tax.

152. Cousins, *supra* note 127; *see supra* notes 149–51 and accompanying text.

153. *See* Varoufakis, *supra* note 145. For instance, the robot's hypothetical salary could potentially be based on the displaced employees' last annual salary amounts. *Id.* This gives rise to questions, such as: How would this number be adjusted over time? *Id.* What salary would be imputed to the robot when it performs a new job or when it creates new jobs for human workers? *See* Cousins, *supra* note 127; Varoufakis, *supra* note 145. Alternatively, the tax base could be calculated based on the ratio of corporate profits or revenues to the company's gross employee wage expenses. *See* Abbott & Bogenschneider, *supra* note 8, at 171–72. This type of tax is also problematic because it penalizes labor productivity and may be subject to manipulation. *See id.* at 171–72.

154. *See* Kovacev, *supra* note 126.

155. *See* Cousins, *supra* note 127; Rosenblatt, *supra* note 68.

components would create significant compliance challenges.[156] Similarly, multiple capital assets, not all of which are "robots," often work together to contribute to the value produced, but there is no clear-cut method to assign profits to the robot components.[157]

Alternatively, governments may consider using the ratio of the company's revenues to the number of employees to compute the tax base for the robot tax.[158] Under this approach, as the ratio of sales to the workforce increases, so would the tax.[159] Because productivity is measured as the ratio of economic outputs to labor input,[160] this approach effectively penalizes productivity, which is necessary for GDP growth.[161] It also encompasses more than just robots, including any type of innovation that increases productivity, even non-labor displacing technology, which seems contrary to the goals of the robot tax.

Overall, these proposals involve substantial elements of arbitrariness and complexity in implementation, likely increasing compliance and administrative burdens on companies and tax authorities.[162] Moreover, given the substantial implementation difficulties, unjustified line-drawing, negative implications for innovation and economic growth, and enforcement challenges, among other issues, a robot tax is not an effective way to address the threat of massive unemployment, rising inequality, or declining tax revenues.[163] Hence, a robot tax is not the answer. The remainder of this article discusses why we need more fundamental tax reform that is not about robots and proposes several options that can better address the issues raised by the rise in robotics.

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156. *See* Kovacev, *supra* note 126; *supra* note 155 and accompanying text.

157. *See* Rosenblatt, *supra* note 68; Thompson, *supra* note 68.

158. *See* Oberson, *supra* note 4.

159. *See id.*

160. *Labor Productivity and Costs: Frequently Asked Questions*, BUREAU OF LAB. STAT., https://www.bls.gov/lpc/faqs.htm (last visited Oct. 17, 2018).

161. *See* Hemel, *supra* note 124.

162. *See, e.g.*, Varoufakis, *supra* note 145. Other approaches have also been suggested, but they are just as problematic. *See* Abbott & Bogenschneider, *supra* note 8, at 169–73; Oberson, *supra* note 4. For instance, another approach to taxing robots would be to levy a tax on a lump sum amount representing the robot owner's ability to pay the tax at the time of the sale of the robot to the owner. Oberson, *supra* note 4. This approach also raises the issue of how to objectively calculate the lump sum amount, as well as how to separate out the robot from other capital assets into which it may be incorporated. *See* Varoufakis, *supra* note 145.

163. *See* Cousins, *supra* note 127; Paul, *supra* note 122; Smith, *supra* note 151; *Why Taxing Robots Is Not a Good Idea*, ECONOMIST (Feb. 25, 2017), https://www.economist.com/finance-and-economics/2017/02/25/why-taxing-robots-is-not-a-good-idea.

IV. ADDRESSING THE ROBOT THREAT

The recent wave of robot tax proposals reveals a lot about the challenges of this new automation era. In particular, the robot tax discussion highlights the job disruption, economic inequality, and government revenue difficulties that are likely to arise as our economy continues to shift away from labor and towards a capital-oriented economy. By imposing additional taxes on certain types of capital investments, the robot tax essentially seeks to address these issues by minimizing the taxation disparity that our tax system creates between capital and labor income. Although a robot tax is the wrong tool for addressing these critical issues, it accurately recognizes the need to reexamine the U.S. tax code and the benefits it grants to capital over labor.[164]

This idea that our tax law does not properly tax capital income is not a new issue. But, as our economy continues to evolve to one that increasingly relies on robots and other capital assets, the urgency with which we need to reform the taxation of capital income has become more pressing.[165] This Part suggests a range of policy options to promote labor, enhance revenue collections, and improve economic equity, while also encouraging advances in technology.[166] These proposals seek to rebalance our tax system, moving away from an emphasis on the taxation of labor income toward a more neutral tax system as between labor and capital income.

Section A focuses on ways to reform our current payroll tax system to address the distortionary effect the tax system has on the use of capital in place of labor.[167] It also considers potential additional sources of tax revenues to offset the declining tax revenues collected from human workers. Section B focuses on ways to reform our current income tax system to take into account the increased use of capital and decreased use of labor to generate profits.[168] Finally, Section C emphasizes the need for additional tax and non-tax policy initiatives to take advantage of these technological innovations, while also minimizing their negative effects.[169]

164. *See* Ahmed, *supra* note 68, at 729–32; Paul, *supra* note 122; Thompson, *supra* note 68.
165. *See* Hoke, *supra* note 46, at 11–12; Oberson, *supra* note 4; Thompson, *supra* note 68.
166. *See infra* Sections IV.A–C.
167. *See infra* Section IV.A.
168. *See infra* Section IV.B.
169. *See infra* Section IV.C.

A. Modify the Payroll Tax

The current employment tax system subjects labor income and a limited amount of capital income to employment taxes.[170] This Section proposes modifying the payroll tax on labor income and expanding the Section 1411 surtax on capital income to address some of the issues raised by the new technological revolution.

1. Payroll Tax on Labor Income

The purpose of the payroll tax is primarily to fund the Social Security and Medicare federal benefit programs.[171] These programs provide economic benefits to retired or disabled workers and their survivors and help fund the nation's health insurance program for people age 65 or older.[172] However, the current system is unsustainable. The effectiveness and continued viability of these social insurance programs have been criticized on numerous grounds.[173]

The current automation era contributes to these concerns in several regards. First, because labor income bears a substantial majority of the employment taxes, the decline in human workers resulting from automation will significantly reduce the funding available for these social insurance programs, which are already under financial pressure.[174] Second, because the Social Security Trust Fund is essentially an accounting mechanism, rather than an actual trust that accumulates funds to finance its intended purpose, a decline in payroll taxes not only affects the solvency of the program, but also affects the funds available to the government to spend for other purposes.[175] With

170. *See supra* notes 68–80 and accompanying text.

171. John Olson, *What Are Payroll Taxes and Who Pays Them?*, TAX FOUND. (July 25, 2016), https://taxfoundation.org/what-are-payroll-taxes-and-who-pays-them/.

172. SOC. SEC. ADMIN., PUB. NO. 05-10024, UNDERSTANDING THE BENEFITS 1, 17 (2018); *How Is Medicare Funded?*, MEDICARE.GOV, https://www.medicare.gov/about-us/how-is-medicare-funded (last visited Oct. 18, 2018). Medicare also provides health care benefits to individuals with certain disabilities that are under the age of 65 years, disabled children of certain wage earners, and individuals with permanent kidney failure. SOC. SEC. ADMIN., *supra*, at 17–18.

173. *See, e.g.*, ROMINA BOCCIA, A SOCIAL SECURITY PRIMER FOR THE NEW ADMINISTRATION: REFORM NEEDED NOW (2017), https://www.heritage.org/sites/default/files/2017-02/BG3186.pdf; Peter A. Diamond & Peter R. Orszag, *A Summary of Saving Social Security: A Balanced Approach* (MIT Dep't of Econ., Working Paper No. 04-21, 2004), https://ssrn.com/abstract=544244; *Updating Social Security for the 21st Century: 12 Proposals You Should Know About*, AARP, https://www.aarp.org/work/social-security/info-05-2012/future-of-social-security-proposals.html (last updated Oct. 18, 2018).

174. *See* BOCCIA, *supra* note 173, at 1–3; Oberson, *supra* note 4; Varoufakis, *supra* note 145.

175. *See* John, *supra* note 86.

automation threatening to disrupt the labor market, even for a short-term duration, government expenditures for these and other benefit programs are likely to increase to help support the displaced workers.[176] Finally, by subjecting labor income to a heavier tax burden than capital income, the payroll tax system potentially artificially accelerates the shift from labor to capital.[177]

In particular, the current employment tax system requires employers to pay half of the payroll tax imposed on their employees' earnings, which increases the cost of human workers relative to capital equipment.[178] To avoid this additional cost and administrative burden, employers may be incentivized to use robots or other capital equipment in place of human workers, even when it is not otherwise economically efficient to do so.[179] This distortion can potentially further exacerbate any disruption of the labor market, increase the need for social benefit programs, and decrease the funding available to finance these programs.[180] As one commentator observed, "The better machines become at substituting for human labor, the bigger negative effect any tax or mandate will have on human employment."[181] Thus, with this new automation era, an employment-based tax system no longer makes sense.

To address these issues, one option is to completely repeal the payroll tax system and replace it with a less labor-focused tax system that could better fund social insurance programs.[182] Eliminating the payroll tax would reduce the hiring disincentive created by the tax system.[183] It would also potentially improve workers' economic welfare by increasing the after-tax wages of workers and creating a tax system that treats labor income more in parity with capital income.[184] Abolishing the payroll tax would also help address

176. *See* Oberson, *supra* note 4.

177. *See* FORD, *supra* note 2, at 277–78; Abbott & Bogenschneider, *supra* note 8, at 163–66; *supra* Section II.C.

178. *See* FORD, *supra* note 2, at 277–78; Abbott & Bogenschneider, *supra* note 8, at 163–64; *supra* notes 70–83 and accompanying text.

179. *See* THE SECOND MACHINE AGE, *supra* note 1, at 239–40; Abbott & Bogenschneider, *supra* note 8, at 150, 163–64; Soled & Thomas, *supra* note 8, at 7–8. *But see* Michael Simkovic, *The Knowledge Tax*, 82 U. CHI. L. REV. 1981, 2027 (2015) (noting that "most economists believe that the incidence falls primarily on labor income and reduces wages").

180. *See* FORD, *supra* note 2, at 277–78; *supra* Part II.

181. THE SECOND MACHINE AGE, *supra* note 1, at 240.

182. *See* FORD, *supra* note 2, at 277–78; Abbott & Bogenschneider, *supra* note 8, at 168, 171; *supra infra* notes 183–89 and accompanying text.

183. *See* FORD, *supra* note 2, at 277–78; Abbott & Bogenschneider, *supra* note 8, at 171 (noting that "a repeal of the employer contributions to the Social Security and Medicare systems" would put humans and automated workers on the same level, in terms of wage taxes, in an employer's eyes).

184. *See* FORD, *supra* note 2, at 277–78; *supra* notes 70–83 and accompanying text.

difficulties inherent in the current system of differentiating between labor income and capital income—a task that has become more complex over time.[185] It would also help address the ability of high-income taxpayers to disguise labor income as capital income, a problem that the Tax Act of 2017 greatly exacerbates.[186] However, this proposal also has its limitations: specifically, it would not stop the trend away from labor and towards capital, solve income inequality, or increase government tax revenues (in fact, it would significantly decrease tax revenues), and may not be politically feasible at this time.[187]

Another option is to exempt employers from making employment tax payments on the wages and salaries of their employees.[188] Modifying the payroll tax in this manner would reduce the cost and burden on employers for hiring human workers, thereby potentially reducing the tax law's role in incentivizing employers to use capital over labor.[189] Of course, human workers are still more costly than robots in that they require health insurance, sick days, vacation days, and are unable to work continuously.[190] But this modification of the payroll tax system would at least reduce an artificial incentive to use capital at the expense of labor.

Modifications can also be made to the payroll tax system to help provide relief to workers who face declining wages as a result of increased automation. For instance, one possibility is to exempt a certain amount of labor income

185. *See also* Karen C. Burke, *Exploiting the Medicare Tax Loophole*, 21 FLA. TAX REV. 570 (2018) (describing numerous ways to disguise labor income as capital income in order to minimize the taxpayer's Medicare tax liability); Patricia E. Dilley, *Breaking the Glass Slipper: Reflections on the Self-Employment Tax*, 54 TAX LAW. 65 (2000) (noting the difficulties in distinguishing between various forms of income).

186. *See* Burke, *supra* note 185.

187. *See* Part II. However, because the receipt of Medicare benefits does not generally vary with earnings, this common argument against modifying the payroll tax also has its weaknesses. *See* Burke, *supra* note 185, at 608; Willard B. Taylor, *Should Payroll Taxes Be Repealed?*, 148 TAX NOTES 213, 214 (2015) (demonstrating how the link between payroll taxes and benefits received is weakening). Moreover, many of "[t]he complications of current law . . . are required by the underlying imperative to tie Social Security benefit eligibility to earnings." *See* Dilley, *supra* note 185, at 92. Thus, there are reasons that this option should be considered despite political opposition. *See supra* notes 183–86 and accompanying text.

188. *See* Abbott & Bogenschneider, *supra* note 8, and accompanying text. This change would also require making a parallel change with respect to self-employed taxpayers; specifically, an equivalent amount of tax on self-employed earnings would have to be exempt from taxation. *See supra* notes 71–75 and accompanying text (explaining how self-employed workers pay the wage taxes that would otherwise have been paid by an employer).

189. *See* FORD, *supra* note 2, at 277–78; Abbott & Bogenschneider, *supra* note 8, at 171.

190. *See* Will Gish, *What Is the Average Employer's Costs for Personnel?*, SMALLBUSINESS.CHRON.COM, https://smallbusiness.chron.com/average-employers-costs-personnel-15641.html (last visited Oct. 18, 2018); *supra* note 56 and accompanying text.

from payroll taxes.[191] Alternatively, Congress could consider re-enacting a universal, refundable wage tax credit on a capped amount of every worker's earnings.[192] These types of measures would decrease the marginal tax on labor earnings, thereby increasing a worker's after-tax income.

Each of the modifications to the payroll tax system proposed above would result in a significant decline in government revenues and deprive Social Security and Medicare of much-needed revenues.[193] As a result, adopting any of these changes would also require the introduction of a new tax or taxes that can generate substantial revenues to fund Social Security, Medicare, or any replacement social insurance program.[194] This would provide policymakers with an opportunity to introduce a tax that does not solely rely on labor income. A tax that relies on a broader tax base could help minimize the current distortionary effect of the payroll tax system on employers' use of labor income, maximize the optimal allocation of investments, and provide some relief to workers.[195] Despite these potential benefits, eliminating such a

191. *See* Michael J. Graetz, *The Tax Reform Road Not Taken—Yet*, 67 NAT'L TAX J. 419, 431–32 (2014) (proposing a payroll tax credit that would effectively eliminate payroll taxes for certain low-income families). In other words, Congress could introduce a zero-rate bracket for payroll tax purposes to help lower-income households. *See id.*

192. *See* American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 1001, 123 Stat. 115, 309–12 (repealed 2014) (enacting the "Making Work Pay Tax Credit," which authorized a refundable tax credit equal to 6.2% of a worker's wages up to $400 for single taxpayers and $800 for married taxpayers, and phased out for higher-income taxpayers); Len Burman, *A Tax Credit to Give Middle-Class Workers a Raise*, FORBES (Aug. 3, 2017), https://www.forbes.com/sites/beltway/2017/08/03/a-tax-credit-to-give-middle-class-workers-a-raise/#ddd78521aef2 (proposing implementation of a broad-based VAT to finance a "100 percent refundable tax credit on the first $14,000 of every worker's earnings," and the "cap on the credit would be indexed to a rolling average of Gross Domestic Product"). In 2011, Congress replaced the "Making Work Pay Tax Credit" with a temporary payroll tax holiday, which reduced employee payroll tax contributions for all workers by two percent for a period of two years. *See* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 1001, 126 Stat. 156, 158–59 (extending the payroll tax holiday through the end of 2012); Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010, Pub. L. No. 111-312, § 601(a)(2), (c), 124 Stat. 3296, 3309 (enacting the payroll tax holiday for the calendar year 2011). Although popular with the public, this measure was also criticized for providing too many benefits to high-income taxpayers relative to the "Making Work Pay Tax Credit" and for its temporary nature. *See* CHUCK MARR & BRIAN HIGHSMITH, LETTING PAYROLL TAX CUT EXPIRE WOULD SHRINK WORKER PAYCHECKS AND DAMAGE WEAK ECONOMY 4–5 (2011), https://www.cbpp.org/sites/default/files/atoms/files/9-7-11tax.pdf.

193. *See* David Harrison, *Social Security Expected to Dip Into Its Reserves This Year*, WALL STREET J. (June 5, 2018, 6:03 PM), https://www.wsj.com/articles/social-security-expected-to-dip-into-its-reserves-this-year-1528223245.

194. *See* Graetz, *supra* note 191 (proposing the use of a 12.9% VAT tax to cover, among other things, payroll tax credits); Burman, *supra* note 192; *supra* note 193 and accompanying text.

195. *See* Graetz, *supra* note 191; John S. Treu, *Less is More: Applying a Modified Reasonable Compensation Standard to Eliminate the Inconsistencies Among the Payroll Tax Bases and the Net*

significant source of government revenue and introducing a new tax that does not link the payment of tax to the receipt of future benefits is also likely to face significant political opposition.[196] Nevertheless, because the current tax system relies so heavily on labor income, regardless of whether or not these payroll tax changes are adopted, additional sources of tax revenue will be necessary to support existing social insurance programs and to support future government spending.[197]

One option for raising additional tax revenues includes a consumption tax—such as a value added tax—which is already a major source of revenue for governments around the world.[198] Another option is to tax wealth by revising the tax base to include measures of wealth, increasing the tax rate imposed on income based on the taxpayer's wealth, or by taxing transfers of wealth.[199] Although not likely to be a substantial source of revenue, other ways to raise supplemental revenues include using technology to design, implement, and impose more Pigovian taxes on negative externalities, such as a carbon tax.[200] In addition, as I argue below, reforming the taxation of capital income is another potential and necessary source of tax revenues.

2. Payroll Tax on Capital Income

Traditionally, only an individual's earned income was subject to payroll

Investment Income Tax Base Under the Affordable Care Act, 92 NEB. L. REV. 586, 625 (2014); Burman, *supra* note 192. This type of change would also help address difficulties inherent in the current system of differentiating between labor income and capital income—a task that has become more complex over time. *See supra* note 185 and accompanying text. It would help address the ability of high-income taxpayers to disguise labor income as capital income, a problem that the Tax Act of 2017 greatly exacerbates. *See supra* note 186 and accompanying text.

196. *See* Dilley, *supra* note 185, at 69–71.

197. *See id*. at 100 (proposing an income surtax on the self-employed to compensate for the repeal of self-employed taxes); *supra* Section II.C.

198. *See* Graetz, *supra* note 191; OECD, INTERNATIONAL VAT/GST GUIDELINES 4 (2017), https://www.oecd-ilibrary.org/taxation/international-vat-gst-guidelines_9789264271401-en; Burman, *supra* note 192.

199. *See* Ari D. Glogower, *Wealth and the Income Tax* (Ohio State Pub. Law, Working Paper No. 368, 2016), https://ssrn.com/abstract=2841479. Our tax system currently taxes a taxpayer's annual income but not the taxpayer's wealth. *See id.*; *supra* Section II.C. A proposed method to tax both income and wealth within the current income tax is by having a taxpayer's wealth affect the rate of tax imposed on the taxpayer's annual income. *See* Glogower, *supra.* Although our tax system technically taxes transfers of wealth through the use of gift and estate taxes, in reality, most taxpayers do not pay these taxes due to a substantially high exclusion amount. *See* I.R.C. §§ 2001, 2010, 2503 (2018).

200. *See* THE SECOND MACHINE AGE, *supra* note 1, at 224–26; FORD, *supra* note 2, at 272.

taxes.[201] However, with the introduction of Section 1411, the tax law now also imposes a similar tax on certain capital income of high-income individuals.[202] Although not technically a Medicare tax,[203] the Section 1411 surtax is an important component of any payroll tax discussion because it is intended to subject an individual's unearned income to the same 3.8% Medicare tax that applies to the individual's wages or self-employment earnings.[204] It can also be viewed as a potential—though not required—financing source for Medicare.

In reforming our tax system to account for the shift away from labor to capital, the Section 1411 surtax is a step in the right direction.[205] It ensures that the income generated by robots and other capital investments is at least partially subject to a comparable tax already imposed on labor income.[206] This is beneficial because it makes a step towards neutralizing the tax system's preference for capital income and is a source of additional government revenues, which will grow over time as the dollar threshold amounts are not indexed for inflation.[207] The Section 1411 surtax also encompasses all capital income, rather than singling out a robot's income, which makes it a more workable and equitable tax than that proposed by current robot taxes.[208] For these reasons, if the current employment tax system continues, this provision should not be repealed as recently contemplated by lawmakers.[209]

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201. *See* Burke, *supra* note 185, at 572–73; *supra* notes 70–81 and accompanying text (explaining the payroll tax's application to earned income and its inapplicability to capital gains).

202. *See* I.R.C. § 1411 (2018). The effective Section 1411 surtax imposed on net investment income is technically higher than the parallel Medicare tax imposed on labor income because half of the Medicare tax, or 1.45%, is deductible by the employer or self-employed individual in calculating taxable income, whereas no portion of the Section 1411 surtax is deductible. *See* I.R.C. §§ 162, 164(f), 1411 (2018); Edward D. Kleinbard, *Corporate Capital and Labor Stuffing in the New Tax Rate Environment* 16 (USC Gould Sch. of Law, Legal Studies Research Paper No. 13-5, 2013), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2239360##.

203. *See* Burke, *supra* note 185, at 572 & n.4 (noting that the revenue generated from the Section 1411 surtax is not dedicated to the Medicare Trust fund—instead, the revenue is part of general tax revenues).

204. Taylor, *supra* note 187, at 213; *see* JOINT COMM. ON TAXATION, *supra* note 85, at 134–35.

205. *See* Burke, *supra* note 185, at 608–09.

206. *See id.*; Taylor, *supra* note 187, at 213.

207. *See* I.R.C. § 1411(b) (2018); FORD, *supra* note 2, at 277–78; Burke, *supra* note 185, at 608–09.

208. *See* I.R.C. § 1411(c); *supra* Sections III.B.1, 4.

209. *See* Patient Protection and Affordable Care Act, Pub. L. No. 111-148, 124 Stat. 119 (2010); Burke, *supra* note 185, at 571–72. However, Section 1411 should be modified to limit the tax planning techniques available to taxpayers to avoid the Section 1411 surtax and the comparable Medicare tax on labor income. *See* Burke, *supra* note 185, at 620–21. To address these concerns, Congress should expand "the definition of net investment income to include gross income and gain from any trades or

However, the Section 1411 surtax also has its limitations and, as such, is not a perfect tool for subjecting capital income to an equivalent amount of payroll taxes. First, because the Section 1411 surtax only applies a 3.8% tax to net investment income if the taxpayer's "modified adjusted gross income" is above a certain threshold, capital income will often not be subject to any Medicare-type tax.[210] As a result, some capital income completely escapes this additional tax, whereas an equivalent amount of labor income would be subject to a cumulative payroll tax of up to 15.3%.[211] Second, net investment income earned in a corporation taxed under subchapter C of the Code (a "C-corporation") is not subject to the Section 1411 surtax until it is distributed to its shareholders.[212] This deferral of the tax enables taxpayers to benefit from a time value of money perspective.[213] Although this is a relatively small advantage, it becomes a bigger issue if the Section 1411 surtax rate increases.[214]

businesses of an individual that is not otherwise subject to employment taxes." U.S. DEP'T OF THE TREASURY, GENERAL EXPLANATIONS OF THE ADMINISTRATION'S FISCAL YEAR 2017 REVENUE PROPOSALS 170 (2016), https://www.treasury.gov/resource-center/tax-policy/Documents/General-Explanations-FY2017.pdf; *see* Burke, *supra* note 185, at 608. Alternatively, Congress could amend § 1402(a)(13) to subject self-employment taxes to the distributive shares of partnership, LLC and S corporation income tax of owners who materially participate in the business. *See* I.R.C. § 1402(a)(13) (2018); U.S. DEP'T OF THE TREASURY, *supra*, at 170–71. Although Congress considered amending § 1402 to close this loophole in recent tax reform discussions and included such language in the House Bill, it unfortunately had to abandon any provision relating to Social Security as a result of the Byrd rule. *See* Erik Wasson, *What You Need to Know About the Byrd Rule*, BLOOMBERG (Nov. 14, 2017, 9:59 AM), https://www.bloomberg.com/news/articles/2017-11-14/how-the-byrd-rule-will-shape-u-s-tax-overhaul-quicktake-q-a.

210. *See* I.R.C. § 1411(a)–(b); Tony Nitti, *Overview of the New 3.8% Investment Income Tax, Part 1*, FORBES (Apr. 26, 2013, 1:16 PM), https://www.forbes.com/sites/anthonynitti/2013/04/26/overview-of-the-new-3-8-investment-income-tax-part-1/#398dd8066061.

211. *See supra* notes 71–76 and accompanying text. Wages up to $128,400 would be subject to both a 12.4% Social Security tax and a 2.9% Medicare tax, and wages in excess of $128,400 but less than $200,000 ($250,000 for married filing jointly) would be subject to a 2.9% Medicare tax. *See id.*

212. *See* Kleinbard, *supra* note 202, at 18–19.

213. *Id.* at 19 & n.35 (explaining that the shareholder has the benefit of "earning a tax-free return on the compounding of each year's . . . deferred tax for the period of the deferral"). In addition, the Section 1411 tax "does not apply to the fraction of a C corporation's pretax earnings paid in corporate income tax," further reducing the effective rate of the Medicare tax imposed on capital income. *Id.* at 19 & n.34. However, labor income earned in corporate form also benefits from this same advantage and may incentivize taxpayers to convert labor income into corporate income to avoid any compensatory tax on the portion of pretax earnings used to pay the corporate income tax. *See id.* at 18–19.

214. *See id.* at 19–20. Other limitations also exist especially with respect to the tax planning opportunities available to taxpayers to avoid the earned and unearned income Medicare tax. *See* Burke, *supra* note 185, at 576. In particular, the current law encourages owner-employees of S-corporations (and some other pass-through entities) to understate their labor income and allows income derived from robots and other capital investments to completely escape the Medicare tax. *See id.* at 577, 584–88; Kleinbard, *supra* note 202, at 16–18. Many of these types of tax planning opportunities arise

Despite these limitations, the earned and unearned income Medicare tax, together, capture a significant amount of corporate income attributable to high-income earners. Thus, if the payroll tax system remains, the Section 1411 surtax should not be repealed.[215] Instead, the issues described above should be taken into account in modifying the payroll tax provisions to further minimize the tax disparity between capital and labor income.[216] For instance, one option is to consider increasing the Medicare tax on earned and unearned income above a certain dollar threshold, although, doing so would increase the advantage of operating in the corporate form and deferring distributions to shareholders.[217] Another option is to increase the deductibility of the Medicare tax imposed on earned income and continue to deny the deductibility of the Medicare tax on unearned income.[218] This change would increase the effective tax rate preference for wages and self-employment income, thereby making it more comparable to the effective Medicare tax rate imposed on capital income. Ultimately, regardless of the method of reform, replacing our current employment tax system with a tax system that taxes capital income more in parity with labor income is necessary in this current economy.

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because the unearned income Medicare contribution surtax does not apply to all unearned income above a specified threshold. *See* Burke, *supra* note 185, at 606–09. Instead, Section 1411 only imposes the surtax on net investment income, which excludes most types of active business income. *See* I.R.C. § 1411(c); Burke, *supra* note 185, at 608. This exception enables business income earned in a pass-through entity to circumvent the 3.8% Medicare tax on wages and the 3.8% tax on net investment income. *See* Burke, *supra* note 185, at 606–09. Thus, an owner, who is also an employee of the business, can structure his or her operations in a manner to completely avoid the Medicare tax imposed on both earned and unearned income. *See* OFFICE OF TAX ANALYSIS, U.S. DEPT. OF THE TREASURY, GAPS BETWEEN THE NET INVESTMENT INCOME TAX BASE AND THE EMPLOYMENT TAX BASE 4–5 (2016), https://www.treasury.gov/resource-center/tax-policy/tax-analysis/Documents/NIIT-SECA-Coverage.pdf; Burke, *supra* note 185 (providing a comprehensive discussion of the various Medicare tax loopholes available to owner-employees).

215. *See* Burke, *supra* note 185, at 576. *But see* Alvin D. Lurie, *Case for Repealing Investment Income Tax*, SBCA, http://sbca.net/case-for-repealing-investment-income-tax/ (last visited Oct. 19, 2018).

216. *See* Burke, *supra* note 185, at 608; *infra* notes 217–18 and accompanying text.

217. *See supra* notes 212–14 and accompanying text. High income employees are already subjected to an additional 0.9% Medicare tax on wages exceeding $250,000 (if married filing jointly). *See supra* notes 73–76 and accompanying text.

218. *See supra* note 202 (explaining the deductibility of the earned Medicare tax, and the nondeductibility of § 1411 taxes, by employers and the self-employed).

B. Tax Capital Income

The current income tax system significantly favors capital income over labor income.[219] It grants numerous tax preferences that essentially subsidize capital relative to labor.[220] The most prominent of these preferences is a reduced tax on capital gains and dividend income.[221] Other favorable tax provisions include deductions in the form of expensing and accelerated deductions,[222] the tax credit for certain research and development expenses,[223] and various provisions that allow capital owners to defer their gains.[224] The recent 2017 tax legislation provides additional benefits to holders of capital income through measures such as large tax cuts for corporations, additional deductions for certain pass-through entities, and immediate expensing of qualified capital purchases.[225]

Contrary to this favorable tax treatment, labor income bears a heavier tax burden. It is generally taxed on an annual basis at ordinary income tax rates and any preferential tax treatment it receives is limited and substantially less than that received by capital income.[226] The following discussion argues that

219. *See* Soled & Thomas, *supra* note 8, at 4–19 (discussing why the tax law evolved into a system that places a greater tax burden on labor income than business, investment, and capital income).

220. *See generally* Phyllis C. Taite, *Saving the Farm or Giving Away the Farm: A Critical Analysis of the Capital Gains Tax Preferences*, 53 SAN DIEGO L. REV. 1017 (2016) (providing a comprehensive overview of the history of capital gains tax preferences and their role in wealth and income inequality); *supra* notes 98–101 and accompanying text.

221. *See* I.R.C. § 1(h)(11) (2018).

222. *See* I.R.C. §§ 168(a), (k), 179 (2018).

223. *See* I.R.C. § 41 (2018).

224. *See, e.g.*, I.R.C. § 1001 (2018) (allowing capital owners to defer gains until they dispose of the asset or otherwise engage in another realization event); I.R.C. § 1031(a) (2018) (providing for the deferral of gains on the like-kind exchange of qualified property). Some provisions even enable capital owners to avoid taxation entirely. *See, e.g.*, I.R.C. § 1014 (2018) (providing a step-up in basis at death, which eliminates any inherent gain); I.R.C. § 121 (2018) (providing a conditional exclusion of a fixed amount of gain from the sale of a principal residence).

225. *See supra* notes 98–101 and accompanying text.

226. For instance, tax provisions that benefit labor income include the exclusion of certain fringe benefits, the exclusion of scholarship and fellowship income, the deduction for tuition-related expenses, tax credits for higher education, the provision of various retirement benefits, and the earned income tax credit, among other limited provisions. *See, e.g.*, I.R.C. §§ 25A, 32, 117, 119, 125, 127, 132, 219, 221, 408A (2018). However, the 2017 Tax Act further limited some of the benefits previously granted to labor—in particular, it repealed the moving expense deduction. *See* Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 11049, 131 Stat. at 2088–89. The repeal of this deduction may hinder a worker from finding employment in a new city, which is particularly important given the increased potential job loss associated with the rise in automation. *See* Mann, *supra* note 8 (manuscript at 1–2, 4). The 2017 Tax Act also eliminated miscellaneous itemized deductions, which included a deduction for unreimbursed employee business expenses. *See* Tax Cuts and Jobs Act, Pub. L. No. 115-97,

the rise in automation requires us to tax capital income.

1. The Automation Justification

The question of whether or not to tax capital income is a controversial and constantly debated area of tax policy.[227] On the one hand, there is the view that neither capital income nor wealth should be taxed.[228] This view is supported by the traditional optimal capital taxation literature, which concludes that taxing capital income creates more distortions than exclusively taxing labor income.[229] According to this economic theory, taxing labor creates a distortion away from work and towards leisure, whereas taxing capital distorts *both* the number of hours worked and the amount saved or invested.[230] Because taxation of capital results in a double distortion, it more adversely impacts economic growth.[231] Moreover, taxing capital income may further exacerbate these distortions because capital is more mobile than labor and, therefore, may be more responsive to taxation.[232]

On the other hand, there is the view that capital income should be taxed

§§ 11011, 11045, 131 Stat. at 2063–71, 2088. The loss of this deduction may hinder an employee from seeking additional education or training in her current trade or business when that training is unreimbursed by her employer. *See* Mann, *supra* note 8 (manuscript at 4).

227. *See* Lily Kahng, *Who Owns Human Capital?*, 94 WASH. U. L. REV. 607, 607–09 (2017); Sanchirico, *supra* note 12, at 867; Daniel N. Shaviro, *Uneasiness and Capital Gains*, 48 TAX L. REV. 393, 393–95 (1993); Aghion, *supra* note 12, at 2.

228. *See* Joseph Bankman & David A. Weisbach, *The Superiority of an Ideal Consumption Tax over an Ideal Income Tax*, 58 STAN. L. REV. 1413, 1415–19 (2006); David Gamage, *How Should Governments Promote Distributive Justice?: A Framework for Analyzing the Optimal Choice of Tax Instruments*, 68 TAX L. REV. 1, 4–7 (2014); Louis Kaplow, *The Optimal Supply of Public Goods and the Distortionary Cost of Taxation*, 49 NAT'L TAX J. 513, 513 (1996); Aghion, *supra* note 12, at 2–3; GEORGE R. ZODROW, SHOULD CAPITAL INCOME BE SUBJECT TO CONSUMPTION-BASED TAXATION? 1–4 (2006), https://www.bakerinstitute.org/media/files/Research/361a2912/rp_2006_002.pdf.

229. *See* A.B. Atkinson & J.E. Stiglitz, *The Design of Tax Structure: Direct Versus Indirect Taxation*, 6 J. PUB. ECON. 55, 56, 65–66 (1976); Gamage, *supra* note 228, at 4–8; Kaplow, *supra* note 228, at 513–15; Aghion, *supra* note 12, at 2–3. This is often referred to as the "double-distortion" argument. Gamage, *supra* note 228, at 4.

230. *See* IMF, *Tackling Inequality*, FISCAL MONITOR 14 (Oct. 2017), https://www.imf.org/en/Publications/FM/Issues/2017/10/05/fiscal-monitor-october-2017; LOUIS KAPLOW, THE THEORY OF TAXATION AND PUBLIC ECONOMICS 122–33 (2008); Atkinson & Stiglitz, *supra* note 229, at 56, 65–66; Peter Diamond & Emmanuel Saez, *The Case for a Progressive Tax: From Basic Research to Policy Recommendations*, 25 J. ECON. PERSP. 165, 179–80 (2011), http://piketty.pse.ens.fr/files/DiamondSaez2011.pdf; Gamage, *supra* note 228, at 7.

231. *See* IMF, *supra* note 230 , at 14; Simkovic, *supra* note 179, at 2009. *But see* Fleischer, *supra* note 12, at 11.

232. *See* IMF, *supra* note 230, at 14; Eric M. Zolt, *The Uneasy Case for Uniform Taxation*, 16 VA. TAX REV. 39, 77–79 (1996).

in addition to labor income. This view is partially based on the growing recognition in recent years that taxing capital income is necessary to improve the distributional equity of the tax system.[233] Capital income is generally distributed more unequally than labor income, because the wealthy tend to own a greater percentage of capital than average and low-income taxpayers.[234] Based on this reasoning, multiple commentators have concluded that taxing capital income would improve the progressivity of the tax system.[235] Similarly, horizontal equity concerns also support taxing capital income because income from capital, like income from labor, also increases a taxpayer's ability to pay and should be taxed comparably.[236]

In addition, taxing capital income would reduce, rather than increase, market distortions and improve economic growth.[237] Numerous scholars have persuasively argued that many of the justifications commonly proffered for the capital gains tax preference are questionable.[238] Common rationales include the argument that the lower tax rate is necessary to (i) increase savings and encourage risk-taking; (ii) avoid taxing gains attributable to inflation; (iii) avoid taxing income that has already been taxed as either salary or business income; and (iv) minimize the lock-in effect[239] or the risk that taxpayers will hold onto assets longer than economically efficient in order to avoid the tax on disposition.[240] These rationales have been criticized on several grounds,

233. *See* IMF, *supra* note 230, at 14; Chris Evans & Richard Krever, *Taxing Capital Gains: A Comparative Analysis and Lessons for New Zealand*, 23 N.Z.J. TAX'N L. & POL'Y 486, 490–91 (2017); Gamage, *supra* note 228, at 3–4; Gamage, *supra* note 12, at 401; Kahng, *supra* note 227, at 609; Kleinbard, *supra* note 12, at 645–60.

234. *See* Evans & Krever, *supra* note 233, at 491; Thomas Piketty, Emmanuel Saez & Stefanie Stantcheva, *Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities*, 6 AM. ECON. J.: ECON. POL'Y 230, 245–46 (2014).

235. *See* IMF, *supra* note 230, at 14; Evans & Krever, *supra* note 233, at 491; Gamage, *supra* note 228, at 3–4; Gamage, *supra* note 12, at 401; Kahng, *supra* note 227, at 609.

236. *See* Evans & Krever, *supra* note 233, at 491.

237. *See* Gamage, *supra* note 12, at 424–26.

238. *See, e.g.*, Avi-Yonah & Zelik, *supra* note 12, at 1–2; Noel B. Cunningham &; Deborah H. Schenk, *The Case for a Capital Gains Preference*, 48 TAX L. REV. 319, 344–45 (1993); Daniel Halperin, *A Capital Gains Preference is Not EVEN a Second-Best Solution*, 48 TAX L. REV. 381, 381, 385–91 (1993); Calvin H. Johnson, *Taxing the Consumption of Capital Gains*, 28 VA. TAX REV. 477, 500 & n.87 (2009); Fleischer, *supra* note 12, at 10–12, 35–39.

239. Many commentators agree that the lock-in effect is probably the strongest argument for a capital gains preference. *See* Fleischer, *supra* note 12, at 38 (explaining that "[l]ock-in both reduces revenue and creates an additional efficiency cost because the holders of appreciated assets may not be the most economically efficient owner of the assets").

240. *See* Walter J. Blum, *A Handy Summary of the Capital Gains Arguments*, 35 TAXES 247, 252–58 (1957); Orly Mazur, *Social Impact Bonds: A Tax-Favored Investment?*, 9 COLUM. J. TAX L. 141, 165 (2017); Fleischer, *supra* note 12, at 35–39.

including findings that empirical evidence fails to clearly support that a lower tax rate increases investments and stimulates economic growth and that the benefits of deferral counteract the taxation of non-economic gains.[241] Thus, continuing to allow capital gains to be taxed at a lower tax rate increases the risk of capital being misallocated.[242]

An increasing number of scholars have also found the argument that taxing all capital investment the same as labor income could reduce investments in capital assets or cause capital flight to be misguided.[243] Instead, granting different tax treatments to different types of income introduces additional economic inefficiencies in the market and reduces social welfare.[244] This is because we currently have an oversupply of capital in the United States, which is likely to further increase as a result of the recent capital incentives implemented by the 2017 Tax Act.[245] This surplus of capital depresses the rates of return on U.S. capital and results in a growing number of unproductive investments.[246] Accordingly, incentives to encourage capital investment are wasteful and unnecessary.[247] Moreover, subsidizing this tax preference prevents Congress from using its limited government revenues for other measures that can more effectively create jobs and more directly stimulate economic growth.[248]

Taxing capital income is also necessary because the disparate tax treatment of capital versus labor income encourages tax gaming.[249] Specifically,

241. *See* Blum, *supra* note 240, at 265; Cunningham & Schenk, *supra* note 238, at 377–79.

242. *See, e.g.*, Blum, *supra* note 240, at 265; Cunningham & Schenk, *supra* note 238, at 343–45; Halperin, *supra* note 238, at 385–91; Johnson, *supra* note 238, at 500–01; Mazur, *supra* note 240, at 165; Fleischer, *supra* note 12, at 11.

243. *See, e.g.*, Avi-Yonah & Zelik, *supra* note 12, at 59; Calvin H. Johnson, *Wasting $2.5 Trillion on No-Growth Capital*, 158 TAX NOTES 909 (2018); Kleinbard, *supra* note 12, at 656–58.

244. *See* Evans & Krever, *supra* note 233, at 491; Louis Kaplow, *Human Capital Under an Ideal Income Tax*, 80 VA. L. REV. 1477, 1513 (1994); Simkovic, *supra* note 179, at 1982.

245. *See* Johnson, *supra* note 243; Kleinbard, *supra* note 12, at 656 (noting that "the United States, along with most other advanced economies, is held back by weakness in demand, not capital supply").

246. *See* Johnson, *supra* note 243.

247. *See id.* at 911. It is also possible that certain tax preferences, such as expensing or accelerated depreciation, could result in less U.S. investment, rather than more due to behavioral biases of firms. Lily L. Batchelder, Accounting for Behavioral Considerations in Business Tax Reform: The Case of Expensing 4 (Jan. 24, 2017) (unpublished manuscript) (available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2904885) (observing that "firms would respond less to the positive investment incentives created by expensing than traditional corporate finance theory suggests" and that expensing may result in less U.S. investments than otherwise would be the case).

248. *See* Johnson, *supra* note 243.

249. *See* Avi-Yonah & Zelik, *supra* note 12, at 40–58; Evans & Krever, *supra* note 233, at 491; Gamage, *supra* note 12, at 366, 424–26.

taxing labor income more heavily than capital income incentivizes high-income taxpayers to mischaracterize labor income as capital income, thereby significantly minimizing their tax burden.[250] This type of tax avoidance further undermines the tax system by creating deadweight losses, unnecessary tax administration costs, and further inequality.[251] These issues are exacerbated as it continues to become more difficult to distinguish between labor income and capital income.[252]

Advances in robotics and other forms of artificial intelligence present an added impetus for taxing capital. First, as discussed above, the growing use of automation is transforming the labor market and is likely to result in a decrease in labor income for a period of time.[253] With a declining return to labor, a tax system that heavily relies on the taxation of labor income will be unsustainable. Taxing capital, a rapidly growing source of production, will help mitigate the decline in tax revenues.[254]

Second, automation is likely to occur regardless of whether or not capital income is subject to taxation.[255] Market forces already encourage taxpayers to invest in robotics, artificial intelligence, and other forms of capital.[256] Tax incentives to purchase capital assets are likely to result in an overinvestment in automation.[257] They contribute to a misallocation of resources and are likely to accelerate the shift from the use of labor towards the use of capital, thereby contributing to further job losses, budget deficits, and economic inequality.[258] Conversely, taxing capital income would better promote economic growth by minimizing inequality, reducing existing economic distortions

250. *See* IMF, *supra* note 230, at 14; Fleischer, *supra* note 12, at 32; Gamage, *supra* note 228, at 5; Kleinbard, *supra* note 202, at 45–47. Treating different types of capital income differently for tax purposes also incentivizes taxpayers to classify certain capital investments as tax-favored investments. *See* IMF, *supra* note 230, at 14.

251. *See* Evans & Krever, *supra* note 233, at 491; Gamage, *supra* note 228, at 5, 65–66; Kleinbard, *supra* note 12, at 658–59.

252. *See* Kahng, *supra* note 227, at 610 (arguing that the tax law subsidizes capital owners' conversion of their workers' labor into intellectual capital, which makes the tax law's distinction between labor income and capital income no longer meaningful); Fleischer, *supra* note 12, at 3–6 (observing that founders' stock, partnership equity, and carried interest earn capital gains essentially allow taxpayers to convert their labor efforts into capital gains).

253. *See supra* Sections II.A–B.

254. *See* Kleinbard, *supra* note 12, at 593.

255. *See* Soled & Thomas, *supra* note 8, at 2–3, 49.

256. *See* Abbott & Bogenschneider, *supra* note 8, at 145–47; Yoram Margalioth, *Not a Panacea for Economic Growth: The Case of Accelerated Depreciation*, 26 VA. TAX REV. 493, 494–95, 499 (2007); Batchelder, *supra* note 247, at 10.

257. *See* Johnson, *supra* note 243, at 909; *supra* Section II.C.

258. *See* Johnson, *supra* note 243, at 910; *supra* notes 59, 177, 242 and accompanying text.

created by the tax system, and providing the government with a larger revenue base with which to invest in human capital—the "most important capital stock" of our economy.[259]

Third, these automation technologies potentially further minimize the distinction between capital and labor income, which, combined with the disparate tax treatment of capital and labor, is likely to present additional tax-gaming opportunities.[260] Experts predict that jobs in the new technological era are likely to complement the tasks completed by robots. As the relationship between capital and labor becomes further interdependent in economic production, the government's ability to distinguish between labor and capital income is likely to become more challenging and arbitrary.[261] This, in turn, increases taxpayer opportunities to convert labor income into capital income for tax purposes.[262] With the rise in automation more closely tying together capital and labor in economic production, it makes even less sense to require the disaggregation of the return for purposes of taxing them at different rates.[263]

Finally, automation exacerbates the tax system's effect on economic inequality. The current tax system already benefits capital owners at the expense of workers by under-taxing capital income. Automation is likely to further benefit these same capital owners by allowing them to capitalize the profits generated by the additional productivity that automation brings at the expense of low- and middle-class workers.[264] Thus, the substantial tax preferences granted to many high-income capital owners further contribute to the distributional effects of automation. Taxing capital income would help minimize the widening economic gap between capital owners and workers.[265]

In sum, the rise in automation is one more factor in favor of taxing capital income and should be taken into account in analyzing changes to the tax system.[266] This change would help raise revenue, redistribute wealth to alleviate

259. *See* Kleinbard, *supra* note 12, at 656–60; *supra* Section IV.A.2.

260. *See* Kahng, *supra* note 227, at 607–10, 639–46.

261. *See* Kahng, *supra* note 227, at 639–46 (arguing that the rise of intellectual capital already creates this type of interdependent relationship, which makes it difficult to disaggregate economic production into labor income and capital income).

262. *See* Kahng, *supra* note 227, at 641 (noting a "widespread ability to convert self-supplied labor into capital gain").

263. *See id.* at 646.

264. *See supra* notes 61–66 and accompanying text.

265. *See* PIKETTY, *supra* note 52, at 373–74 (explaining that "an effective tax rate of 30 percent, if applied to all forms of capital, can by itself account for a very significant deconcentration of wealth"); Aghion et al., *supra* note 12, at 2.

266. Many scholars support the introduction of a progressive consumption tax instead of our current income tax system. *See, e.g.*, Bankman & Weisbach, *supra* note 228; Zodrow, *supra* note 228, at 51.

inequality, and improve economic efficiency.[267] Even though this change would not address the potential decline in jobs due to automation, it would minimize the tax law's influence on promoting automation at the expense of human workers and distorting employers' hiring choices.[268] Thus, this change would address some of the concerns raised by the robot tax, but without the robot tax's insurmountable administrative issues and its accompanying attempts to hinder certain technological advancements.

2. Proposals to Tax Capital Income

The above discussion gives rise to the question: how should we tax capital income?[269] Although an analysis of the numerous ways to implement a capital tax is outside the scope of this article, this Article argues that, for the reasons described above, Congress should consider eliminating the distinction between labor and capital income for tax purposes and curtailing certain tax expenditures that significantly subsidize the creation of capital income.[270] It

However, a consumption tax would not solve many of the concerns raised by the automation revolution. *See* James Kwak, *Reducing Inequality with a Retrospective Tax on Capital*, 25 CORNELL J.L. & PUB. POL'Y 191, 215–16 (2015). For instance, "[d]espite its theoretical advantage in economic efficiency, a consumption tax is not an adequate vehicle to address the problem of growing wealth inequality" because it would not significantly impact the accumulation and transmission of wealth. *Id.*

267. *See* FORD, *supra* note 2, at 277–78; PIKETTY, *supra* note 52, at 373–74; *supra* note 242 and accompanying text.

268. *See* FORD, *supra* note 2, at 277–78 (noting that the current labor-focused tax system increases the cost of human workers relative to automation technology).

269. *See supra* Section IV.B.1. For purposes of this article, "capital income" generally refers to returns on investments, which are often viewed as comprised of "the real risk-free rate of return, the risk premium, and inframarginal return." *See* Noel B. Cunningham, *The Taxation of Capital Income and the Choice of Tax Base*, 52 TAX L. REV. 17, 23 (1996). More generally, it includes: (i) the capital income of individual investors, which comes in the form of interest, dividends, rental income, royalties, and capital gains; (ii) the capital income of firms, which includes most net business income; and (iii) imputed rental income from owner-occupied housing. *See* CONG. BUDGET OFFICE, TAXING CAPITAL INCOME: EFFECTIVE MARGINAL TAX RATES UNDER 2014 LAW AND SELECTED POLICY OPTIONS 4–6 (2014), https://www.cbo.gov/publication/49817; Kleinbard, *supra* note 12, at 602.

270. *See supra* Section IV.B.1. Other scholars have persuasively argued for the need to abolish the distinction between labor and capital income in contexts outside of the automation discussion. *See, e.g.*, Fleischer, *supra* note 12, at 1–6 (concluding that because capital income is often a disguised form of labor income by wealthy taxpayers, Congress should tax capital and labor income at a uniform rate to improve income equality in the United States); Kahng, *supra* note 227, at 644–48 (arguing for the elimination of the tax preference for capital gains and dividend income because capital and labor often work interdependently in creating economic income and should be taxed equally on the return of their investment); Simkovic, *supra* note 179, at 1985 (suggesting that harmonizing the different tax rates imposed on capital and labor may be necessary in order to minimize the tax system's effect on distorting investment decisions and contributing to an underinvestment in education). In addition, recent scholarship is beginning to recognize that the rise in robotics creates an additional need to abolish tax

supports taxing all capital more in parity with labor, rather than singling out robots or certain types of capital for taxation as suggested by the robot tax.[271]

In particular, Congress should eliminate the major tax preferences granted to capital income. Given the questionable rationales given for the preferential capital gains tax rate and the reasons above for taxing capital income, Congress should give serious consideration to increasing the low tax rate currently imposed on capital gains and dividend income so that income produced by capital is taxed at the same rate as income produced by labor. To accomplish this change, Congress could simply abolish the distinction between capital gains and ordinary income and apply a single, progressive tax rate schedule to all income.[272] "Doing so would reduce inequality at the very top, and it would cost little in terms of efficiency."[273] It would also minimize significant economic distortions, simplify the tax code, and minimize the tax preference for robots over human workers.[274] Moreover, this type of change is not unprecedented. In fact, the Tax Reform Act of 1986 taxed capital gains in parity with ordinary income, at rates up to 28%.

Congress should also target the tax code provisions that enable taxpayers to expense or deduct the cost of a capital investment prior to the time that they are economically used, such as the accelerated depreciation deduction provision and bonus expensing.[275] This is one of the most significant benefits

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preferences related to capital income. *See, e.g.*, Abbott & Bogenschneider, *supra* note 8, at 150–51; Soled & Thomas, *supra* note 8, at 25–26, 34–39.

271. *See supra* note 270 and accompanying text. For a discussion and critique of the robot tax, see *supra* Part III.

272. *See infra* notes 273–74 and accompanying text. Other methods also exist for minimizing the tax preference currently granted to capital gains. For instance, instead of abolishing the capital gains tax, Congress could raise the tax rate on capital gains so that it is the same as the top rate on ordinary income, as it did in the Tax Reform Act of 1986, and include additional measures to minimize the lock-in effect, bunching, cherry-picking of losses, and avoidance of unrealized gains. *See* Avi-Yonah & Zelik, *supra* note 12, at 59–60 (suggesting adopting a single tax rate for all income, but including certain caveats to make up for the fact that we have a realization-based system). Alternatively, Professor Kleinbard recommends retaining a dual income tax structure and using a special tax tool to separate labor and capital income when intermingled. Kleinbard, *supra* note 12, at 593, 612–21. According to Kleinbard, even though the tax applied to capital gains would be a flat tax, it would be progressive, because it would be measured and imposed annually. *See id.* at 666–74.

273. Fleischer, *supra* note 12, at 42.

274. *See Tax Reform and the Tax Treatment of Capital Gains: Joint Hearing Before the H.R.Comm. on Ways & Means and the S. Fin. Comm.*, 112th Cong. 36–50 (2012) (statement of Leonard E. Burman, Professor, Syracuse University), https://waysandmeans.house.gov/wp-content/uploads/2017/07/20120920FC.pdf.

275. I.R.C. §§ 168, 179, 197 (2018). This approach is comparable to the approach taken by South Korea with the introduction of its "robot tax." *See* Hoke, *supra* note 46, at 15. Instead of taxing robots, the South Korean legislation reduces the tax deductions available to companies investing in

afforded to businesses and investors, which has become even more significant in light of the changes made by the recent Tax Act.[276] These provisions enable a company to deduct the cost of automation technology and other capital investments prior to the time the asset economically declines in value, whereas the cost of human labor is only deductible at the time the worker's wages are paid.[277] Although this current tax incentive may increase worker productivity and potentially also increase wages for workers that remain in the labor force, this benefit is distortionary and is more likely to be recouped by businesses in the form of higher profits.[278] In addition, this incentive is both costly and, in many cases, unnecessary. As Lily Batchelder points out, the behavioral considerations of firms suggest that "economic cost recovery coupled with a lower statutory rate would induce a larger increase in US investment among public and very large companies than . . . expensing."[279]

Certain provisions that enable capital owners to defer or even completely escape taxation entirely should also be reconsidered. In particular, the realization principle, which allows capital owners to defer gains until they dispose of the asset or otherwise engage in another realization event, is one such provision.[280] The realization principle provides capital owners with a substantial benefit: it enables investors to indefinitely defer taxes on capital gains, thereby enabling them to considerably reduce their effective tax rates with respect to that investment, whereas income generated from labor is generally taxed immediately.[281] To tax these two streams of income in parity, one option would be to adopt mark-to-market or an accrual-based tax in place of the realization requirement.[282] Numerous proposals exist for taxing capital on an accrual-

automation technology. *See id.*

276. *See* Tax Cuts and Jobs Act, Pub. L. No. 115-97, § 13201, 131 Stat. 2054, 2105–09 (2017) (codified at I.R.C. § 168(k) (2018)). The 2017 Tax Act temporarily increases the benefits to capital owners by allowing taxpayers to immediately deduct the *entire* cost of an asset placed in service after September 27, 2017, and before January 1, 2023. *See id.* After the taxable year 2022, the 100% allowance is phased down by 20% per calendar year. *Id.* The new Tax Act also expands this bonus depreciation deduction to include used assets as well as new assets. *Id.*

277. *See* Abbott & Bogenschneider, *supra* note 8, at 163–65.

278. *See* Lee Fang, *Tax Bill Will Lead to More Automation, Executives Boast to Wall Street Investors*, THE INTERCEPT (Dec. 14, 2017, 10:52 AM), https://theintercept.com/2017/12/14/tax-bill-provision-will-lead-to-more-automation-executives-boast-to-wall-street-investors/; Nicole Goodkind, *Trump Tax Plan Gives Jobs Away to Robots and Will Increase Unemployment*, NEWSWEEK (Nov. 15, 2017, 6:59 PM), http://www.newsweek.com/tax-plan-robots-jobs-senate-republicans-712930.

279. Batchelder, *supra* note 247, at 35.

280. *See* I.R.C. § 1001 (2018); *supra* note 96 (explaining the realization principle).

281. *See* Avi-Yonah & Zelik, *supra* note 12, at 13–14 (explaining how the realization principle encourages deferral, which reduces the effective tax rate); *supra* notes 70–76 and accompanying text.

282. Avi-Yonah & Zelik, *supra* note 12, at 2, 58–60.

basis instead of on a realization-basis.[283] However, many of these methods are politically unpopular and would potentially involve an additional element of complexity.[284] Other methods also exist for eliminating the benefits of the realization requirement for taxing capital gains that do not involve accrual-based taxation, such as a retrospective capital tax[285] or adding an interest charge upon realization.[286]

In addition to minimizing the benefits that a realization-based tax system provides to capital owners, Congress should also eliminate the step-up in an asset's basis that capital owners receive upon the death of the transferor.[287] This provision enables capital owners to completely avoid taxation of gains, which is yet another expensive and unnecessary subsidy for capital owners.[288]

In short, the current tax code contains many provisions that allow capital income to partially or completely escape taxation. However, investing in human capital and making other targeted government investments that increase the value of human workers to the economy may be more beneficial to the economy overall than using limited resources to provide many of these capital incentives.[289] Thus, Congress should reevaluate the continued necessity of many of these capital tax preferences in an effort to more fully tax capital income.

C. Additional Policy Options

Despite the foregoing, even if the changes proposed above to reform the payroll and income tax system are adopted, not all of the problems raised by the automation revolution are resolved. The proposed tax changes will likely generate additional tax revenues, minimize economic inequality, and may

283. *See id.* at 2.

284. *See id.* at 2–3.

285. *See* Kwak, *supra* note 266, at 221 (suggesting that "[s]uch a system assesses tax liabilities only when an investor receives cash flows from investments, but calculates those liabilities based on the imputed historical value of those investments").

286. *See* Avi-Yonah & Zelik, *supra* note 12, at 3. If the realization principle remains, additional measures may need to be taken to address the problem of the lock-in effect arising from an increase in the capital gains tax rate. *See, e.g.*, Avi-Yonah & Zelik, *supra* note 12, at 59 (recommending taxing capital gains at the same rate as ordinary income but excluding principal residences from taxation and not setting the combined tax rate too high); Fleischer, *supra* note 12, at 42 (suggesting a revision of § 1202 of the tax code to "mitigate the lock-in effect on small business owners").

287. *See* I.R.C. § 1014 (2018).

288. *See* Avi-Yonah & Zelik, *supra* note 12, at 14.

289. *See* Brian E. Lebowitz, *On the Mistaxation of Investment in Human Capital*, 52 TAX NOTES 825 (1991); Simkovic, *supra* note 179, at 1981–85.

increase the use of human labor; but the changes will not sufficiently counteract the predicted disruption of the current workforce, the negative social and personal welfare implications associated with unemployment, and the growing inequality gap. Accordingly, tax policy alone cannot solve all of the issues raised by the robotics revolution.[290] Instead, tax policy needs to be taken into account together with government regulation and targeted government spending to better address some of these concerns.[291] Of course, achieving these types of changes in the current environment also brings up political economy concerns which would need to be addressed.[292]

Existing scholarship sets forth a plethora of proposals for how to address the issues presented by the current automation revolution.[293] Each of these proposals will require an additional source of tax revenues to finance, which further supports reforming our current tax system to tax capital and add additional sources of tax revenue.[294] Although this Article does not undertake a full normative analysis of these additional policy proposals, it sets forth some public policy options for the purpose of illustrating the potential type of government action that is necessary to address these issues and why these options are preferable to a robot tax.

One common proposal is to increase the government's investment in human capital.[295] In particular, the government could provide additional funds

290. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 3–4 (suggesting various nontax strategies to address the automation issue).

291. *See id.*; Simkovic, *supra* note 179, at 1981–85. A thorough analysis of these regulatory and spending changes is beyond the scope of this Article. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 4 (noting that automation raises several policy questions and that addressing them "will be a significant policy challenge for the next Administration and its successors").

292. *See* Fleischer, *supra* note 12, at 7 n.8 (observing that political institutions are imperfect and that the "political preferences of voters" should be accounted for in the scholarly debate of tax reform). In particular, as labor's share of income continues to decline, so does its bargaining power. *See* Yasser Abdih & Stephan Danninger, *What Explains the Decline of the U.S. Labor Share of Income?: An Analysis of State and Industry Level Data* 11, 21 (IMF, Working Paper No. 17/167, 2017), https://www.imf.org/en/Publications/WP/Issues/2017/07/24/What-Explains-the-Decline-of-the-U-S-45086; Fleischer, *supra* note 12, at 6 (observing that income inequality "threatens the democratic political process"). Thus, to effectively counter inequality and enhance the likelihood that pro-labor policies are implemented, we would need to strengthen the economic position of labor, through labor unions or other methods, to give it a political voice. *See* Abdih & Danninger, *supra*, at 11, 21. A full discussion of these political concerns is outside the scope of this Article. *See generally id.*

293. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 3–4.

294. *See* Abbott & Bogenschneider, *supra* note 8, at 175; *supra* Sections IV.A–B.

295. *See, e.g.*, NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 1–3; IMF, *supra* note 230, at 21–31; THE SECOND MACHINE AGE, *supra* note 1, at 208–12; Abbott & Bogenschneider, *supra* note 8, at 161; Hoke, *supra* note 46, at 13–14; Soled & Thomas, *supra* note 8, at 46–49; *California Tax on Robots, Automation Equals a Tax on Innovation*, *supra* note 131; Cousins, *supra* note 127; De Chant, *supra*

to improve the quality, effectiveness, and access to education and worker retraining systems.[296] This change may come in the form of direct government spending, such as increasing federally funded education grant programs, reducing interest rates on student loans, and increasing loan limits on federal student loans.[297] Alternatively, the investment can be made through increased tax expenditures related to labor, such as training and hiring incentives for employers and more expansive tuition credits and deductions.[298]

Although unlikely to prevent a labor market disruption, this policy change is critical to increasing the likelihood that the labor force is able to acquire the skills necessary to complement automation's role in the economy.[299] As noted in a report prepared by the Executive Office of the President, "While relative wages depend on the demand for different levels of skill, which is partially a function of technology, wages also depend on the supply of labor at various skill levels, which is influenced by the distribution of educational opportunity and attainment."[300]

As in past periods of technological advancement, investing in human capital can help mitigate (but not prevent) the effects of technological unemployment resulting from the increased use of robotics and other artificial intelligence—and it can do so without impeding innovation.[301] Moreover, increasing tax expenditures related to labor could help equalize the treatment of capital and labor income far better than a robot tax with its penalizing effect on innovation.[302] It may also help reduce income inequality by potentially

note 67.

296. *See* NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 2, 26; THE SECOND MACHINE AGE, *supra* note 1, at 208–12; Gary E. Marchant, Yvonne A. Stevens & James M. Hennessy, *Technology, Unemployment & Policy Options: Navigating the Transition to a Better World*, J. EVOLUTION & TECH., Feb. 2014, at 26, 30.

297. *See* Simkovic, *supra* note 179, at 2031–32.

298. *See id.* at 2031.

299. *See* NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 2; THE SECOND MACHINE AGE, *supra* note 1, at 208–12; Hoke, *supra* note 46, at 13–14.

300. EXEC. OFFICE OF THE PRESIDENT, supra note 21, at 23 (noting that "[r]elative wages also depend on collective bargaining, minimum wage laws, and other institutions and policies that affect wage setting" (footnote omitted)).

301. *See* De Chant, *supra* note 67 (quoting professor David Autor that "U.S. economic preeminence in [the] 20th century had a lot to do with ours being the most skilled and flexible workforce in the world" (alteration in original)). *But see* Perry & Kupper, *supra* note 58 (expressing skepticism at the ability of improved education and training to adequately solve workforce disruptions caused by this new wave of automation).

302. *See* Soled & Thomas, *supra* note 8, at 40–42; Chris Arnold, *Tax Bill Favors Adding Robots Over Workers, Critics Say*, NPR (Dec. 8, 2017), https://www.npr.org/2017/12/08/569118310/tax-bill-favors-adding-robots-over-workers-critics-say; Kovacev, *supra* note 126.

increasing wages of both skilled and unskilled workers, thereby "empower[ing] workers to ensure broadly shared growth" created by technology advances.[303] In short, by seeking to fill existing and new jobs, rather than prolonging the inefficient use of human labor in unnecessary tasks, this direct spending of resources is superior to using a robot tax to address the harmful effects of automation and is a positive complement to the tax policy changes suggested above.

Similarly, another human capital investment that is worth considering is an investment in the development of technology that matches displaced workers to vacant and newly created jobs.[304] This type of investment can also help minimize the negative effects of a labor market disruption by maximizing employment in existing jobs.[305] However, this proposal assumes that jobs will exist for which humans can train and be matched. In the event that full automation were to occur in the future, it would be an inadequate solution. Nevertheless, these policy options are useful short-term and medium-term tools for preparing workers for the new labor market and mitigating the impact of technological unemployment.[306]

Other proposals focus on the need to strengthen social benefit systems, which are necessary components of a public policy that seeks to effectively prepare for growing technological change and minimize its negative impact on displaced workers.[307] One government policy idea increasingly suggested worldwide in response to these automation concerns is an old idea: that of universal basic income.[308] Universal basic income refers to the idea that all

303. EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 30–37; *see* NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 1–2; IMF, *supra* note 230, at 1, 21–22; THE SECOND MACHINE AGE, *supra* note 1, at 208–12 (suggesting that if the supply of unskilled labor decreases, then wages may increase).

304. *See* THE SECOND MACHINE AGE, *supra* note 1, at 217–18; David Nordfors, *How to Disrupt Unemployment*, HUFFINGTON POST (July 25, 2014, 1:49 PM), https://www.huffingtonpost.com/david-nordfors/how-innovation-can-disrup-unemployment_b_5616562.html; Vivek Wadhwa, *We Need a New Version of Capitalism for the Jobless Future*, WASH. POST (July 20, 2015), https://www.washingtonpost.com/news/innovations/wp/2015/07/20/we-need-a-new-version-of-capitalism-for-the-jobless-future/. This investment can provide funding to support either a public or private creation of such a database. THE SECOND MACHINE AGE, *supra* note 1, at 217–18.

305. *See* THE SECOND MACHINE AGE, *supra* note 1, at 217–18; Nordfors, *supra* note 304.

306. *See* THE SECOND MACHINE AGE, *supra* note 1, at 217; Marchant, Stevens & Hennessy, *supra* note 296, at 36.

307. *See, e.g.*, EXEC. OFFICE OF THE PRESIDENT, supra note 21, at 3; NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 2; Abbott & Bogenschneider, *supra* note 8, at 162; Cousins, *supra* note 127.

308. *See, e.g.*, IMF, *supra* note 230, at 1–2; FORD, *supra* note 2, at 249–80; Abbott & Bogenschneider, *supra* note 8, at 162; Solomon, *supra* note 31, at 89; Guerreiro et al., *supra* note 53, at 22; Scott Santens, *What if You Got $1,000 a Month, Just for Being Alive? I Decided to Find Out*, CNBC (Nov. 15, 2016, 1:39 PM), https://www.cnbc.com/2016/11/15/what-if-you-got-1000-a-month-just-for-

citizens—regardless of their employment, wealth, or status—would receive a fixed, periodic sum of money from the government in order to cover basic living expenses.[309] Proponents argue that universal basic income would address the wage decreases and job insecurity created by automation and would enable individuals to pursue social development and more creative, innovative pursuits.[310] This system has its benefits, but it is also extremely costly, risks using funds that could otherwise be deployed to create more inclusive growth, may dis-incentivize the desire to work, increases benefits for wealthy individuals at the expense of lower-income households, does not replace the physical and emotional benefits that working provides to individuals, and is not currently a politically viable solution in the United States.[311] For these reasons, universal basic income should not be considered as a policy tool at this time. Given that we do not yet have full automation of the job market and it is uncertain whether future advances in technology will create full automation, investing in other social benefit programs to strengthen the social safety net for workers impacted by automation is preferable.

For instance, better options to strengthen social benefits and redistribute wealth include increasing spending on unemployment benefits for workers that have been laid off; providing wage subsidies to help improve wages or

being-alive-i-decided-to-find-out.html. Universal basic income is commonly also referred to as basic minimum income, guaranteed minimum income, basic income guarantee, and other similar variations. *See generally* Kate McFarland, *Basic Income's Terminological Quagmire*, BASICINCOME.ORG (Mar. 20, 2017), https://basicincome.org/news/2017/03/opinion-basic-incomes-terminological-quagmire/.

309. *See* IMF, *supra* note 230, at 15–17; Rich Haridy, *Robot Taxes and Universal Basic Income: How Do We Manage Our Automated Future?*, NEW ATLAS (Feb. 20, 2017), https://newatlas.com/robot-tax-universal-basic-income-future-work/48014/. Proponents differ on their view as to whether basic universal income would replace or supplement existing social benefit payments. *See* Solomon, *supra* note 31, at 89–90; Clifford, *supra* note 64; Haridy, *supra*. Although various governments have experimented with small-scale universal basic income or components of this type of social benefit payment, no country has yet adopted universal basic income that covers its entire population. *See* IMF, *supra* note 230, at 15–17, 29; Abbott & Bogenschneider, *supra* note 8, at 162 (noting that Finland has initiated a pilot program that provides basic income to a small subset of the population and a Silicon Valley startup incubator plans to launch a private program that provides basic income to some residents); Haridy, *supra* (citing to other pilot studies that implement some form of universal basic income). Most recently, Swiss voters rejected a proposal to introduce universal basic income to all Swiss residents. Silke Koltrowitz & Marina Depetris, *Swiss Reject Free Income Plan After Worker Vs. Robot Debate*, REUTERS (June 5, 2016, 3:37 AM), https://www.reuters.com/article/us-swiss-vote/swiss-reject-free-income-plan-after-worker-vs-robot-debate-idUSKCN0YR0CW.

310. *See* FORD, *supra* note 2, at 257–64; Clifford, *supra* note 64.

311. *See* IMF, *supra* note 230, at 1–2, 15–18; THE SECOND MACHINE AGE, *supra* note 1, at 234–37; Abbott & Bogenschneider, *supra* note 8, at 162; Solomon, *supra* note 31, at 89–90; Philip Aldrick, *Robots May Be Taking Our Jobs, But That Is No Reason to Tax Them*, TIMES (Feb. 21, 2017, 12:01 AM), https://www.thetimes.co.uk/article/robots-may-be-taking-our-jobs-but-that-is-no-reason-to-tax-them-lf9bfhhx0; Clifford, *supra* note 64; Haridy, *supra* note 309.

subsidize reductions in working hours; implementing wage insurance to encourage employment and on-the-job training in new fields;[312] enhancing the availability of Social Security, Medicare, and Medicaid benefits; and increasing spending on infrastructure and other public investment projects.[313] These changes can help provide relief to individuals negatively affected by the automation of their jobs and also improve the value of the labor force without introducing as many inefficiencies into the market as a robot tax.[314] Tax policy can also help in this regard through mechanisms such as enhancing the amount of and access to the earned income tax credit[315]—which provides support to low-income workers and is essentially a subsidy on labor—or, alternatively, enacting a universal refundable wage tax credit on a capped amount of every worker's earnings.[316]

Finally, public policy should also include measures that promote innovation.[317] Past experience has proven that innovation and technological progress are essential for economic growth and the advancement of society.[318] The

312. *See* ROBERT LITAN, BROOKINGS INST., WAGE INSURANCE: A POTENTIALLY BIPARTISAN WAY TO HELP THE MIDDLE CLASS (2015), https://www.brookings.edu/wp-content/uploads/2016/06/24_wage_insurance_litan.pdf. The goal of wage insurance is to help with a skills mismatch in the labor market by incentivizing unemployed workers to accept a lower-paying job where they may learn new skills by providing these workers with a portion of their lost wages for a period of time once they find a new job. *Id.* at 2. Thus, it helps fund on-the-job training, which may be especially beneficial in periods were technological change eliminates or creates new jobs. *See id.* at 1–3.

313. *See* IMF, *supra* note 230, at x; Abbott & Bogenschneider, *supra* note 8, at 160–61; Marchant, Stevens & Hennessy, *supra* note 296, at 34–35; Summers, *supra* note 126.

314. *See* RACE AGAINST THE MACHINE, *supra* note 1, at 64, 67; Stevens, *supra* note 21, at 371–72.

315. *See* I.R.C. § 32 (2018). Some commentators have also proposed converting the earned income tax credit into a negative income tax by making it larger and universal. *See* THE SECOND MACHINE AGE, *supra* note 1, at 238. A negative income tax essentially provides basic income through the tax system. *See* MILTON FRIEDMAN, CAPITALISM AND FREEDOM 191–92 (1962).

316. *See* American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 1001, 123 Stat. 115, 309–12 (codified as amended at I.R.C. 36A (2018)) (repealed 2014); Burman, *supra* note 192.

317. *See generally* PRICEWATERHOUSECOOPERS, GOVERNMENT'S MANY ROLES IN FOSTERING INNOVATION (2010), https://www.pwc.com/gx/en/technology/pdf/how-governments-foster-innovation-2010.pdf (discussing how governments implement policies encouraging innovation). Other policy options, in addition to those set forth above, have also been proposed by commentators. For instance, there have been proposals that seek to improve the distribution of benefits by creating a sovereign wealth fund that pays out any returns as dividends to its citizens. Smith, *supra* note 151; Varoufakis, *supra* note 145. Other proposals have focused on changing the existing social model, which focuses on employment by decoupling healthcare insurance from employment and creating an alternative valuation system that does not rely on income from employment. Marchant, Stevens & Hennessy, *supra* note 296, at 39–40; *see* FORD, *supra* note 2, at 268–69. Proposals have also focused on additional methods to improve employment by sharing work or imposing special government regulations, among other measures. *See* Marchant, Stevens & Hennessy, *supra* note 296, at 33–36.

318. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 6–7; MANYIKA ET AL., *supra* note 31,

development of artificial intelligence, robotics, and other technology is no exception.[319] These technologies have already had positive, transformative impacts in many fields, such as health care, criminal justice, and transportation, and have the potential to improve workplace conditions and enhance the quality of our lives.[320] Thus, proposals that promote technological progress and entrepreneurship are beneficial provided that they are designed and implemented in a manner that considers any adverse employment effects and other implications.[321] For instance, noteworthy, non-tax policy options include increasing government funding for basic research, granting prizes to support specific innovations, reducing ineffective regulatory burdens,[322] and creating direct financial incentives for small business entrepreneurs and other job-creating businesses and activities.[323] Unlike a robot tax, these policy options promote, rather than curtail, technological progress and can be evaluated and modified as necessary to improve their effectiveness.

V. CONCLUSION

In conclusion, there is no easy answer to the difficult questions of how to minimize unemployment, improve economic equality, and raise a sufficient amount of government tax revenues in an equitable and effective manner—especially in this new automation era. Although it is clear that a robot tax is not the answer, the optimal mixture of tax and public policy options is impossible to predict. Nevertheless, it is critical to take action now to search for solutions that minimize automation's inevitable disruption while maximizing its benefits. Thus, this Article argues that policymakers should modify the payroll tax system, introduce a less labor-focused tax system to fund social insurance programs, tax capital income, and implement a variety of additional tax and non-tax policy proposals. These policy options provide short- and medium-term tools that can potentially mitigate the risks of automation as we

at 4; Stevens, *supra* note 21, at 368.

319. *See* EXEC. OFFICE OF THE PRESIDENT, *supra* note 21, at 6–7.

320. *See* THE SECOND MACHINE AGE, *supra* note 1, at 14–37; NAT'L SCI. & TECH. COUNCIL, *supra* note 21, at 7–11, 13–14; Marchant, Stevens & Hennessy, *supra* note 296, at 27.

321. *See* Stevens, *supra* note 21, at 369.

322. However, some regulation is necessary and may even encourage innovation. *See* Michael Simkovic, *Limited Liability and the Known Unknown*, 68 DUKE L.J. (forthcoming 2018) (manuscript 1) (available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3121519) (arguing that a limited liability tax can help improve regulatory responses by revealing valuable information to policymakers).

323. *See* THE SECOND MACHINE AGE, *supra* note 1, at 215–20; Marchant, Stevens & Hennessy, *supra* note 296, at 31, 34; Stevens, *supra* note 21, at 369, 381.

transition into this new era. However, as advances in technology and automation continue to evolve in unpredictable ways, the effectiveness of these responses will need to be periodically reevaluated. Ultimately, more radical solutions may be necessary if the pessimists are correct and these technological advances result in a fully automated economy.

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