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## Incentivizing Innovation

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# Incentivizing Innovation

XUAN-THAO NGUYEN\*

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## Abstract

This Article advocates for a new approach to incentivizing innovation through the design of *ex post* tax incentives for research and development (R&D) investment. In contrast to many nations, the United States relies largely on *ex ante* tax incentives, namely a tax deduction and tax credit for qualified R&D spending. Fundamental design flaws exist with these *ex ante* incentives; moreover, innovation occurs continuously and yields results at the back end of the innovation cycle. An appropriate framework should take into consideration the key players in the innovation landscape. These players are often treated differently under the tax laws such that incentives for each may be justified. This Article fills a void in the literature, which focuses mostly on *ex ante* R&D tax incentives, and proposes several new *ex post* tax incentive options for both corporations and individual inventors. Moreover, this Article redirects the renewed attention focusing on the proper role of government in supporting risky R&D in response to pandemics and the race for future vaccines.

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## I. Introduction

In *Attacking Innovation*,<sup>1</sup> we forewarned of an innovation crisis in the United States caused, in recent years, by a decline in direct government funding of basic research and a weakening of both the patent system and tax policy tools used to encourage research and development (R&D). Shortly after we called for changes in order to instill confidence in the R&D landscape, the United States was hit with the coronavirus pandemic, the country’s greatest public health crisis in 100 years.

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<sup>1</sup>Xuan-Thao Nguyen & Jeffrey A. Maine, *Attacking Innovation*, 99 B.U. L. REV. 1687 (2019).

The government's initial response to the pandemic was to provide direct economic assistance to various sectors of the economy impacted by the pandemic.<sup>2</sup> In addition to delivering cash payments to Americans to prevent a decline in spending, the government offered financial assistance to millions of businesses which would have closed otherwise. The government also provided relief from taxation for these various forms of government assistance.<sup>3</sup>

While many sectors of the health community were also provided resources to contain and combat the virus, the biotechnology and pharmaceutical companies developing a COVID-19 vaccine candidate were largely ignored. While the government provided necessary liquidity for a struggling economy, it did not directly fund vaccine development on a wide scale as was seen in other countries.<sup>4</sup> Indeed, Pfizer announced that it developed its COVID-19 vaccine with its own resources, not U.S. government financial support.<sup>5</sup>

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<sup>2</sup> See Families First Coronavirus Response Act, Pub. L. No. 116-127, 134 Stat. 178 (2020) (providing resources to the health community to combat the virus and guaranteed paid sick leave to employees affected by the pandemic); Coronavirus Aid, Relief, and Economic Security Act, Pub. L. No. 116-136, 134 Stat. 281 (2020) [hereinafter CARES Act] (providing economic assistance to many sectors of the economy).

<sup>3</sup> The CARES Act provided cash payments to many Americans (up to \$1,200 for an eligible individual plus \$500 for a qualifying child). These economic impact payments were nontaxable as they were really advanced refunds of a fully refundable tax credit. I.R.C. § 6428, as added by the CARES Act, § 2201(a), 134 Stat. at 335–40. The CARES Act also expanded an SBA loan program to include forgivable loans made to help small businesses to pay necessary expenses and declared the amounts when forgiven as nontaxable. CARES Act, § 1106(i), 134 Stat. at 301. References to a “section” are to a section of the Internal Revenue Code of 1986, as amended (Code), and the regulations thereunder, unless otherwise indicated.

<sup>4</sup> For a summary of countries' funding announcements, see Lisa Cornish, *Funding COVID-19 Vaccines: A Timeline*, DEVEX (Aug. 21, 2020), <https://www.devex.com/news/funding-covid-19-vaccines-a-timeline-97950> [<https://perma.cc/YS6C-RVQV>].

<sup>5</sup> See Denise Grady, *Early Data Show Moderna's Coronavirus Vaccine Is 94.5% Effective*, N.Y. TIMES (Nov. 16, 2020), <https://www.nytimes.com/2020/11/16/health/Covid-moderna-vaccine.html> [<https://perma.cc/FG26-FP2H>] (noting that “Pfizer did not take any money from the U.S. government to develop or test its vaccine” but that the United States “committed about \$2.5 billion to help develop Moderna's vaccine and buy doses”); *but see* Neil Irwin, *The Pandemic Is Showing Us How Capitalism Is Amazing, and Inadequate*, N.Y. TIMES (Nov. 14, 2020), <https://www.nytimes.com/2020/11/14/upshot/coronavirus-capitalism-vaccine.html> [<https://perma.cc/GF7G-8592>] (explaining that an “advance purchase” agreement with the United States government [ensured] it would be well compensated . . . [T]hough the government did not directly fund the drug development, it created the groundwork in which the pharmaceutical company could spend research dollars with abandon, knowing that success would be financially rewarded.”). *See also* Press Release, U.S. Dep't of Health & Human Serv. and Dept. of Defense, U.S. Government Engages Pfizer to Produce Millions of Doses of COVID-19 Vaccine (July 22, 2020), <https://www.defense.gov/News/Releases/Release/Article/2310994/us-government-engages-pfizer-to-produce-millions-of-doses-of-covid-19-vaccine/> [<https://perma.cc/454M-6X8G>] (acknowledging that “Pfizer is collaborating with BioNTech, a German biotechnology company, to develop COVID-19 investigational vaccines without U.S. government financial support”).

The government relied heavily on private investment in fighting the pandemic. Most notably, the government relied on the strong financial position of big pharmaceutical companies themselves to fund critical R&D. It has been suggested that the “deep pockets” of big pharma were a key to rapid vaccine development.<sup>6</sup> “On average, pharmaceutical companies spend about one-quarter of revenues on R&D.”<sup>7</sup> In addition, the government relied on charitable dollars from private donors to play a role. Philanthropic organizations, such as the Gates Foundation, and individual donors, such as Alibaba founder Jack Ma and country music star Dolly Parton, all contributed to the cause.<sup>8</sup>

To say the government relied solely on private investment to fund vaccine development would be misleading. Historically, the government has funded some basic scientific research, conducted in government and university labs, which may be relied upon by pharmaceutical companies in developing innovative drugs.<sup>9</sup> Indeed, the United States “has invested in basic scientific re-

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<sup>6</sup> Irwin, *supra* note 5. These companies with deep pockets decided to risk the investment and avoid government funding, believing the added bureaucracy would slow the development of the vaccine. John LaMattina, *Taxpayer Funded Research and the Covid-19 Vaccine*, FORBES (Mar. 31, 2021, 3:11 PM), <https://www.forbes.com/sites/johnlamattina/2021/03/31/taxpayer-funded-research-and-the-covid-19-vaccine/?sh=779c51961c42> [<https://perma.cc/E95J-6GP5>].

<sup>7</sup> Erica York, *CBO Report on R&D and Tax Policy in the Pharmaceutical Industry*, TAX FOUND. (May 25, 2021), <https://taxfoundation.org/pharmaceutical-industry-rd-spending/> [<https://perma.cc/A38G-XW6H>].

<sup>8</sup> Gates Foundation \$1.75 billion (representing funding for vaccine R&D as well as vaccine distribution); Jack Ma \$14.4 million; Dolly Parton \$1 million. Mark Suzman, *Why We're Giving \$250 Million More to Fight COVID-19*, GATES FOUND. (Dec. 9, 2020), <https://www.gatesfoundation.org/ideas/articles/coronavirus-funding-additional-250-million-suzman> [<https://perma.cc/CV6K-6WSP>] (noting that the Gates Foundation’s goal of “fair access to vaccines” inspired the foundation’s latest contribution); Laura He & Hanna Ziady, *Jack Ma Donates \$14 Million to Develop Coronavirus Vaccine*, CNN BUSINESS (Jan. 29, 2020, 12:03 PM), <https://www.cnn.com/2020/01/29/business/jack-ma-coronavirus-vaccine/index.html> [<https://perma.cc/2GRU-KC4D>]; Lucy Hooker & Daniele Palumbo, *Covid Vaccines: Will Drug Companies Make Bumper Profits?*, BBC NEWS (Dec. 18, 2020), <https://www.bbc.com/news/business-55170756> [<https://perma.cc/W5UP-TB34>]; Allie Clouse, *Fact Check: Moderna Vaccine Funded by Government Spending, with Notable Private Donation*, USA TODAY (Nov. 24, 2020, 8:37 PM), <https://www.usatoday.com/story/news/factcheck/2020/11/24/fact-check-donations-research-grants-helped-fund-moderna-vaccine/6398486002/> [<https://perma.cc/6ZEA-JVAL>] (noting Parton’s COVID-19 research fund was included on a list of supporters for the vaccine in *The New England Journal of Medicine*); see also Marissa Shapiro, *Vanderbilt Researchers Take Leadership Role in Covid-19 Vaccine Development*, VANDERBILT UNIV. RESEARCH NEWS (Dec. 18, 2020, 11:55 AM), <https://news.vanderbilt.edu/2020/12/18/vanderbilt-researchers-take-leadership-role-in-covid-19-vaccine-development/> [<https://perma.cc/3FAW-8693>].

<sup>9</sup> “The National Institutes of Health budget, devoted to medical research of all types, is [about \$40 billion a year].” Irwin, *supra* note 5.

search” over the years “for a number of reasons[,] including defense, technology development, and health.”<sup>10</sup> And these investments are crucial for generating “hypotheses for understanding the fundamental causes of disease or to developing new technologies.”<sup>11</sup> Thus, while Pfizer argues that it received no financial support for the development of its vaccine, we cannot ignore the fact that the U.S. government has invested in mRNA vaccine technology (via the National Institutes of Health and the Defense Advanced Research Projects Agency) that ultimately allowed companies like Pfizer and Moderna to develop the vaccine as quickly as they did.<sup>12</sup>

In addition, the government occasionally subsidizes drug acquisitions, which provides a market for drug makers. Indeed, in the recent COVID-19 pandemic, the United States purchased millions of doses of vaccines from drug makers in “advance purchase” agreements.<sup>13</sup> So, while private industry bore the costs to produce a vaccine that is cheap, highly effective, and available to everyone in the shortest time possible, the government contributed funds, through Operation Warp Speed, to enable companies to build the capacity to produce millions of doses of their vaccines.<sup>14</sup>

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<sup>10</sup> LaMattina, *supra* note 6 (noting “for over 100 years, the U.S. has invested in basic scientific research for a number of reasons including defense, technology development, and health”).

<sup>11</sup> *Id.*

<sup>12</sup> See David E. Mitchell, *Taxpayers Fund Research and Drug Companies Make a Fortune*, N.Y. TIMES (Mar. 24, 2021), <https://www.nytimes.com/2021/03/24/opinion/coronavirus-vaccine-cost-pfizer-moderna.html> [<https://perma.cc/NDK7-MUBE>] (“Over the past several decades, as private companies invested less in vaccines, the government, fearing a pandemic, took up the slack. Scientific advances in mRNA vaccine technology that were funded by the National Institutes of Health and the Defense Advanced Research Projects Agency enabled Pfizer and Moderna to start working on a coronavirus vaccine as soon as the virus’s genetic sequence was available.”); see also LaMattina, *supra* note 6 (crediting Pfizer and BioNTech for their foresight into the importance of mRNA vaccines all the way back to 2018).

<sup>13</sup> For example, the United States agreed to purchase millions of doses from Pfizer in a \$1.95 billion “advance purchase” agreement. See Press Release, U.S. Dep’t of Health & Human Serv. and Dept. of Defense, *supra* note 5. After the Food and Drug Administration authorized the vaccine on December 11, 2020, the government agreed to purchase additional doses. See Press Release, U.S. Dep’t of Health & Human Serv. and Dept. of Defense, *Trump Administration Purchases Additional 100 Million Doses of COVID-19 Investigational Vaccine from Pfizer* (Dec. 23, 2020), <https://www.defense.gov/News/Releases/Release/Article/2455698/trump-administration-purchases-additional-100-million-doses-of-covid-19-investi/> [<https://perma.cc/99LB-QQW8>]; Irwin, *supra* note 5 (noting the \$1.95 billion “advance purchase” agreement, ensuring Pfizer “would be well compensated for eventually delivering 100 million doses of vaccine”).

<sup>14</sup> LaMattina, *supra* note 6 (“Operation Warp Speed (OWS) contributed funds to enable Moderna to build the capacity to produce its vaccine. Moderna is a small company and its Covid-19 vaccine is its first product to make it to patients. Moderna didn’t have anywhere near enough capacity to build manufacturing plants. By helping to finance Moderna’s efforts, as well as those of Johnson & Johnson, Novavax, etc., the U.S. government helped to create the situation where we will have over 600 million doses of Covid-19 vaccines by summer.”).

It is hard, however, to measure the impact of these forms of government spending. The role that government-funded basic research actually plays in technology development and health is unclear, as we have seen a dramatic decline in government funding of basic research for quite some time.<sup>15</sup> In the 1960s and 1970s, the government shouldered 70% of the funding for basic research.<sup>16</sup> This amount was cut back to 61% as of 2004, and then again to below 50% in 2013.<sup>17</sup> In 2015, the government provided only 44% of the total amount spent on basic research, or \$38 billion.<sup>18</sup> Again in 2017, the number dropped to \$34.9 billion.<sup>19</sup> There are some hopeful signs, however, that this decline in investment in pure forms of research may soon end.<sup>20</sup>

In addition, the role that “advance purchase” agreements play in the development of drugs or vaccines is questionable. Indeed, the purchase agreement with Pfizer occurred only after Pfizer had already invested significantly in R&D,<sup>21</sup> and it was one of many supply deals with a number of countries,

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<sup>15</sup> Corporate funding of fundamental scientific research is likewise in decline as there is no stock market value in basic research. See Ashish Arora et al., Presentation at the Center for Innovation Policy at Duke Law: The Decline of Research in Corporate R&D (Apr. 2, 2017), [https://law.duke.edu/sites/default/files/centers/cip/changing-innovation\\_arora-and-belenzon-final.pdf](https://law.duke.edu/sites/default/files/centers/cip/changing-innovation_arora-and-belenzon-final.pdf) [<https://perma.cc/6BTZ-E4X4>] (describing corporate shift from fundamental research to applied research).

<sup>16</sup> Jeffrey Mervis, *Data Check: U.S. Government Share of Basic Research Funding Falls Below 50%*, SCI. MAG. (Mar. 9, 2017, 1:15 PM), <http://www.sciencemag.org/news/2017/03/data-check-us-government-share-basic-research-funding-falls-below-50> [<https://perma.cc/M7SC-F2A8>] (“The federal share, which topped 70% throughout the 1960s and ‘70s, stood at 61% as recently as 2004 before falling below 50% in 2013.”).

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

<sup>19</sup> Science News Staff, *How Science Fares in the U.S. Budget Deal*, SCI. MAG. (May 1, 2017, 11:15 AM), <http://www.sciencemag.org/news/2017/05/how-science-fares-us-budget-deal> [<https://perma.cc/J9EC-27VD>].

<sup>20</sup> President Biden’s infrastructure plan (the American Jobs Plan) would make significant contributions to R&D funding, expanding the mission of the National Science Foundation to include funding for technological innovation and authorizing large funding increases for NSF. Press Release, The White House, Fact Sheet: The American Jobs Plan (Mar. 31, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/> [<https://perma.cc/3NS2-NJFK>] (“calling on Congress to make smart investments in research and development;” laying out a three-point plan for investing in R&D and the “technologies of the future” by investing \$180 billion in researchers, laboratories, and universities across the nation). See Dan Lips, *Before Investing More in R&D, We Must Secure Research Institutions from Outside Threats*, THE DISPATCH (May 26, 2021), <https://thedispatch.com/p/before-investing-billions-in-r-and> [<https://perma.cc/Q5QS-XG85>]. See also David E. Sanger et al., *Senate Poised to Pass Huge Industrial Policy Bill to Counter China*, N.Y. TIMES (June 7, 2021), <https://www.nytimes.com/2021/06/07/us/politics/senate-china-semiconductors.html> [<https://perma.cc/9PJ7-QGDB>].

<sup>21</sup> Julia Kollewe, *Pfizer and BioNTech Could Make \$13bn From Coronavirus Vaccine*, THE GUARDIAN (Nov. 10, 2020, 2:45 PM), <https://www.theguardian.com/business/2020/nov/10/>

including the United Kingdom, Canada, Japan, and the European Union.<sup>22</sup> Furthermore, that financial incentive was itself contingent on the success of Pfizer's research (*i.e.*, receiving Emergency Use Authorization or licensure from the U.S. Food and Drug Administration).<sup>23</sup>

Aside from indirect spending measures, the government has in place two long-standing public policy tools designed to incentivize private investment in R&D. As an *ex ante* policy tool, the government provides firms an up-front tax incentive—either a tax deduction or tax credit—for qualified R&D spending.<sup>24</sup> In theory, these tax benefits lower the cost of R&D (and increase the expected after-tax return on successful R&D), and firms respond by spending more. Indeed, there is some data and economic research on the tax credit's effectiveness in increasing research spending by private businesses.<sup>25</sup> As an *ex post* policy tool, the government provides patent protection for innovative drugs. The government does not provide patent protection for basic scientific research, which explains why private industry does not focus on

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pfizer-and-biotech-could-make-13bn-from-coronavirus-vaccine [https://perma.cc/7R83-97EX] (reporting that Pfizer spent \$2 billion of its own money to develop the COVID-19 vaccine instead of relying on public funding); Noah Weiland, Denise Grady & David E. Sanger, *Pfizer Gets \$1.95 Billion to Produce Coronavirus Vaccine by Year's End*, N.Y. TIMES (July 22, 2020), https://www.nytimes.com/2020/07/22/us/politics/pfizer-coronavirus-vaccine.html [https://perma.cc/8778-3PBZ] (reporting that after developing its version of the vaccine, Pfizer then would need to conduct safety and efficacy trials before seeking regulatory approval).

<sup>22</sup> Kollwe, *supra* note 21 (reporting that in addition to signing the advance purchase agreement with the U.S. government, Pfizer agreed to supply the European Union with 200 million doses and the UK with 40 million doses). Pfizer signed an agreement to supply 120 million doses to Japan. See Press Release, Pfizer, Pfizer and BioNTech to Supply Japan with 120 Million Doses of their mRNA-Based Vaccine Candidate (July 31, 2020, 5:15 AM), https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biotech-supply-japan-120-million-doses-their [https://perma.cc/3EQ7-782M]; see also Press Release, Pfizer, Pfizer and BioNTech to Supply Canada with their BNT162 mRNA-Based Vaccine Candidate (Aug. 5, 2020, 8:00 AM), https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biotech-supply-canada-their-bnt162-mrna-based [https://perma.cc/54YA-4BHY].

<sup>23</sup> See Weiland, *supra* note 21 (noting that Pfizer's vaccine, if it could be developed successfully, would need emergency approval). See also *Pfizer Sees Emergency Use Filing for Covid-19 Vaccine After U.S. Election*, CNBC (Oct. 16, 2020), https://www.cnbc.com/2020/10/16/pfizer-says-could-apply-for-us-emergency-use-approval-for-vaccine-in-late-november.html [https://perma.cc/V7NB-RTR4]; Press Release, Pfizer, Pfizer and BioNTech to Submit Emergency Use Authorization Request Today to the U.S. FDA for COVID-19 Vaccine (Nov. 20, 2020, 6:45 AM), https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biotech-submit-emergency-use-authorization [https://perma.cc/RF6D-RZ4C].

<sup>24</sup> I.R.C. §§ 41, 174.

<sup>25</sup> One study found that for every dollar of the credit, firms spend an additional dollar or more on research. See GARY GUENTHER, CONG. RESEARCH SERV., RL31181, RESEARCH TAX CREDIT: CURRENT LAW AND POLICY ISSUES FOR THE 114TH CONGRESS 19 (2015), https://fas.org/sgp/crs/misc/RL31181.pdf [https://perma.cc/3B64-SJBX] (noting that public policy must supplement private investment in technological R&D).

fundamental discoveries. But the government does grant a 20-year monopoly to the drug companies that develop an innovative drug that relies on that basic research.<sup>26</sup>

These current policy tools (*ex ante* tax incentive to encourage new R&D followed by *ex post* patent protection to reward successful R&D) are the bedrock for innovation in the United States.<sup>27</sup> And they are becoming increasingly significant in the wake of declining direct and indirect funding of R&D by the government. Their role has become highlighted in the wake of the recent coronavirus pandemic and in the debate about how to prepare for the next health care crisis. What happens if, during the next epidemic or pandemic, relevant basic scientific research is nonexistent due to both a decline in government funding of such research and a shift in corporate funding from fundamental research to applied research? What happens next time if a few big firms lack the multi-billion-dollar balance sheets and the deep pockets to fund and protect their own research? Or, even if they do have deep pockets, what if they choose not to fund research because the potential rewards fail to justify the spending?

An enhanced patent system is not a likely government response in preparing for the next health crisis. The trend in recent years has been in the opposite direction—to weaken the patent system and “close the door on patent inclusion.”<sup>28</sup> Moreover, some commentators suggest that patent monopolies might not even be justified in times of humanitarian crises and have called for the sharing or pooling of know-how and other intellectual property in such times.<sup>29</sup>

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<sup>26</sup> 35 U.S.C. § 154(a)(2) (2012).

<sup>27</sup> Erica York, *CBO Report on R&D and Tax Policy in the Pharmaceutical Industry*, TAX FOUND. (May 25, 2021), <https://taxfoundation.org/pharmaceutical-industry-rd-spending/> [<https://perma.cc/N3JA-HFBK>] (highlighting how taxes affect R&D investment incentives and underscoring the importance of structuring the Code so that it is not biased against investment).

<sup>28</sup> See Nguyen & Maine, *supra* note 1, at 1721.

<sup>29</sup> See generally Ed Silverman, *The WHO Launched a Voluntary Covid-19 Product Pool. What Happens Next?*, STAT (May 29, 2020), <https://www.statnews.com/pharmalot/2020/05/29/who-covid19-coronavirus-patents/> [<https://perma.cc/JFG7-6RLN>]; William Worley, *Covid-19 Puts a Spotlight on the Medicines Patent Pool*, DEVEX (June 22, 2020), <https://www.devex.com/news/covid-19-puts-a-spotlight-on-the-medicines-patent-pool-97461> [<https://perma.cc/K7NB-RP4M>]; Niti Dewan & Ashima Sobti, *Make Patent Pools to Drown COVID-19*, LEXOLOGY (Aug. 25, 2020), <https://www.lexology.com/library/detail.aspx?g=15b50364-3e49-493a-84de-f63370204dee> [<https://perma.cc/E4VL-4WMW>]; Bashar Malkawi, *Patent Pools and the Pandemic—A Renewed Debate*, THINK GLOBAL HEALTH (Aug. 14, 2020), <https://www.thinkglobalhealth.org/article/patent-pools-and-pandemic-renewed-debate> [<https://perma.cc/SQ9M-HRT3>] (“In light of COVID-19 we need to revisit patent pools and their potential for pro-competitive and anticompetitive effects.”); David Lawder & Susan Heavey, *U.S. Says It Will Push Covid Vaccine Waivers, But “May Take Time”*, REUTERS (June 10, 2021), <https://www.reuters.com/business/healthcare-pharmaceuticals/us-raise-covid-19-vaccine-intellectual-property-issues-with-wto-may-take-time-2021-06-10/> [<https://perma.cc/X4EU-C8C6>].

Enhanced tax policy tools to incentivize new R&D, however, should be seriously considered. As history has shown, the government modifies tax laws often as they are important tools for shaping economic behavior.<sup>30</sup> Whenever Congress wants to stimulate the economy, encourage private investment in distressed communities, or reward charitable giving, as just a few examples, it enacts special tax incentives designed to achieve the desired economic outcome. Recent examples of economic or social engineering can be seen in Congress's immediate response to the coronavirus pandemic. In March 2020, shortly after the pandemic hit the United States, Congress quickly passed several tax law changes to inject liquidity into the economy. Most notably, the economic impact payments that many Americans received were actually in the form of refundable tax credits.<sup>31</sup> Other tax law changes, seemingly enacted overnight, eliminated tax penalties for coronavirus-related distributions and loans from retirement plans,<sup>32</sup> modified tax rules governing discharged loans used for payroll costs,<sup>33</sup> suspended limitations on certain business deductions,<sup>34</sup> and enacted refundable payroll tax credits for employers who retained employees.<sup>35</sup> Congress even changed the charitable tax deduction rules to encourage gifts to charity during the health crisis.<sup>36</sup>

### A. *The Role of Tax Policy in Incentivizing Innovation*

Tax policy tools have several advantages. First, tax incentives for R&D can be designed to be easily accessible by taxpayers. In many cases, a firm merely needs to claim a particular tax benefit on the firm's annual tax return, and in some cases submit a separate form.<sup>37</sup> There are few hurdles in claiming many

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<sup>30</sup> An ideal tax system should be neutral and "avoid unnecessarily shaping economic behavior." JOHN A. MILLER & JEFFREY A. MAINE, *THE FUNDAMENTALS OF FEDERAL TAXATION: PROBLEMS AND MATERIALS* 5 (5th ed. 2018). But this neutrality principle has lost ground to what might be termed "social engineering"—now a prominent feature of the current tax system. *Id.*

<sup>31</sup> I.R.C. § 6428, as added by the CARES Act, § 2201(a), 134 Stat. at 335–40.

<sup>32</sup> CARES Act, § 2202, 134 Stat. at 340–43.

<sup>33</sup> CARES Act, § 1106(i), 134 Stat. at 301.

<sup>34</sup> I.R.C. §§ 172(b)(1)(D) (as added by the CARES Act, § 2303(b)(1), 134 Stat. at 353–54); 172(a)(1) (as amended by the CARES Act, § 2303(a)(1), 134 Stat. at 353); 461(l)(1) (as amended by the CARES Act, § 2304(a), 134 Stat. at 356); 163(j)(10)(A)(i) (as added by the CARES Act, § 2306(a), 134 Stat. at 358–59).

<sup>35</sup> CARES Act, § 2301, 134 Stat. at 347–51.

<sup>36</sup> See I.R.C. § 62(a)(22) (as added by the CARES Act, § 2204(a), 134 Stat. at 345) (for 2020 only allowing an eligible individual to claim an above-the-line deduction of up to \$300 for any qualified contribution in response to the COVID-19 crisis); see also CARES Act, § 2205(a)(1), 134 Stat. at 345–46 (allowing an individual to deduct any qualified cash contribution made in 2020 as long as it does not exceed 100% of the individual's income).

<sup>37</sup> To claim the section 41 research tax credit, IRS Form 6765, "Credit for Increasing Research Activities," must be submitted along with the firm's annual tax filing. See I.R.M. 21.7.4.4.8.3.5; Internal Revenue Serv., About Form 6765, Credit for Increasing Research Activities (2021), <https://www.irs.gov/forms-pubs/about-form-6765> [<https://perma.cc/8F6C-QQCA>].

tax breaks, which is not the case in receiving other forms of government support. Government grants, for instance, often involve convoluted grant applications, bureaucracy, and long timelines for grant review and award.<sup>38</sup> And patents are expensive, costing thousands of dollars and taking years to receive.<sup>39</sup>

Second, because tax returns are not publicly available, R&D tax incentives are largely invisible rewards for important research. This might be important to some pharmaceutical companies that do not want to be seen as profiting too much from drugs or vaccines, especially in the midst of a health crisis. Even if a drug company sold its vaccine at a price that just covered its costs,<sup>40</sup> an R&D tax incentive, such as a tax credit, would still provide some financial reward to the company unbeknownst to the public.

Third, tax incentives for R&D also provide the added benefit of certainty for firms; a firm should know at the outset whether its R&D spending will qualify for the benefit. Indeed, firms can take available tax incentives into account when setting their annual research budgets and deciding on the research projects to undertake. In contrast, nothing is certain about grants or patent applications.

A final benefit of R&D tax incentives is that they can be designed to benefit both small and large firms alike. In times of health crises, attention usually focuses on the large R&D firms with deep pockets—the giants in the field such as GlaxoSmithKline, Pfizer, Moderna, and Johnson & Johnson (J&J). As noted above, the U.S. government relied heavily on the deep pockets of big pharmaceutical companies to fund COVID-19 vaccine development. But this ignores the important role small biotechnology companies can play in developing the underlying technology, and thus the important role of partnerships between such companies and larger pharmaceutical companies. Indeed, one lesson learned from the coronavirus pandemic is that the government must rely less on large drug manufacturers and look more to smaller

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<sup>38</sup> For some of the high risks of working under government contracts, see Kelly L. Warfield & M. Javad Aman, *Role of Small Biotechnology Companies in the Fledgling Biodefense Vaccine Industry*, TAYLOR & FRANCIS ONLINE (Apr. 11, 2016), <https://www.tandfonline.com/doi/full/10.1586/14760584.2016.1168702> [<https://perma.cc/59SY-3X2W>].

<sup>39</sup> “According to the United States Patent and Trademark Office (USPTO), the average time it takes to get a patent is about 25 months.” *How Long and How Much to Get a Patent?*, MILLER IP LAW, <https://milleripl.com/blogs/patents/how-long-does-it-take-to-get-a-patent> [<https://perma.cc/FB9J-7W9A>]. The cost is about \$12,000–\$14,000. *Id.*

<sup>40</sup> Johnson & Johnson pledged to sell its vaccine at a price that just covers its costs. See Lucy Hooker & Daniele Palumbo, *Covid Vaccines: Will Drug Companies Make Bumper Profits?*, BBC NEWS (Dec. 18, 2020), <https://www.bbc.com/news/business-55170756> [<https://perma.cc/Y7HG-Z2HD>] (noting the same for the UK’s AstraZeneca, which worked with a University of Oxford-based biotech company).

biotechnology companies to help develop vaccines.<sup>41</sup> Appropriately designed tax incentives can encourage more small and mid-size firms to work in this space—an environment in which government funding is unreliable and private investors cannot anticipate a return on investment.<sup>42</sup>

One might make the argument that R&D tax incentives are inappropriate—specifically, that they reward spending that would have occurred even without the tax break.<sup>43</sup> This might be true for some R&D spending, for example, R&D directed at producing huge profit-making medications that require daily doses for common ailments and that are wanted by wealthy nations. But this is not true with respect to all R&D spending, especially R&D spending on vaccine development, which can be a long, complex, and costly process. Vaccine development differs from other drug development; with vaccine development, we cannot assume that the market will work. The truth is that vaccine development, especially in the midst of a humanitarian crisis, “hasn’t proved very profitable in the past.”<sup>44</sup> Profitability depends on a number of factors (*e.g.*, production speed, how long immunity lasts, and how many other vaccines are brought to the market).<sup>45</sup> For Pfizer, the first to file for approval of a COVID-19 vaccine, the profits were predicted to be short-lived. While sales potential existed for the first two years, long-term profits were never expected to be dramatic.<sup>46</sup> Indeed in early 2021, just months after its vaccine was approved, the value of Pfizer’s shares fell amid questions about the durability of the market for the vaccine.<sup>47</sup>

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<sup>41</sup> Jodi Xu Klein, *Coronavirus: In Search for Vaccine, US Small Firms Take a Leading Role*, S. CHINA MORNING POST (Apr. 21, 2020, 3:30 PM), <https://www.scmp.com/news/world/ united-states-canada/article/3080789/coronavirus-search-vaccine-us-small-firms-take> [<https://perma.cc/8WJJ-2VVL>].

<sup>42</sup> Warfield & Aman, *supra* note 38. In one study, only 20% of small biotechnology companies were primarily focused on vaccines, “which is not surprising given the long and complex development path for vaccines.” *Id.*

<sup>43</sup> See, *e.g.*, David Hasen, *Taxation and Innovation—A Sectorial Approach*, 2017 U. ILL. L. REV. 1043 (arguing that special tax rules for innovation generally are inappropriate).

<sup>44</sup> Hooker & Palumbo, *supra* note 40 (“The discovery process takes time and is far from certain. Poorer nations need large supplies but can’t afford high prices. And vaccines usually need to be administered just once or twice.”).

<sup>45</sup> *Id.* (noting that “[i]n two years’ time, there could be 20 vaccines on the market”).

<sup>46</sup> Michael Gibney, *Pfizer May Be 1st to File for COVID-19 Vaccine, But Profits Likely Short-Lived*, S&P GLOBAL MARKET INTELLIGENCE (Nov. 18, 2020), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/pfizer-may-be-1st-to-file-for-covid-19-vaccine-but-profits-likely-short-lived-61287896> [<https://perma.cc/9KXL-U39W>] (“Even though the initial windfall from the respective COVID-19 vaccines is likely to be a shot in the arm for companies through 2021, the candidates are less likely to be the massive blockbusters these companies are used to marketing.”).

<sup>47</sup> Riley Griffin, *Pfizer Projects \$15 Billion in 2021 Sales of Covid Vaccine*, BLOOMBERG (Feb. 2, 2021), <https://www.bloomberg.com/news/articles/2021-02-02/pfizer-forecasts-15-billion-in-covid-vaccine-sales-for-2021> [<https://perma.cc/D8N6-HBH5>].

The global community has recognized that “market incentives alone are insufficient to produce an adequate supply of R&D, making it crucial for governments to stimulate private R&D spending.”<sup>48</sup> So, too, has the United States. According to the Treasury Department, the current R&D tax credit was designed to address the underinvestment in R&D and to increase the total amount of research activity undertaken in the United States.<sup>49</sup> Why are markets insufficient and why do firms underinvest in R&D? Through the lens of economic theory, firms underinvest in R&D because they cannot capture all the benefits of their private investment due to the spillover effects of research (*i.e.*, the social returns to private spending greatly exceed the average private returns).<sup>50</sup> This excess (the spillover effects or external benefits) takes on the appearance of market failure; specifically, too few resources are being spent on R&D. To remedy this market failure, the government must step in to support R&D. In short, public policy must supplement private investment in R&D.<sup>51</sup>

### B. *The Appropriate Design of R&D Tax Incentives*

The question still remains, however, as to the appropriate design of R&D tax incentives. A one-size-fits-all R&D tax break may not be warranted across the innovation spectrum. And that is fine, as tax rules are malleable and can be specifically crafted to target different taxpayers and specific spending. R&D tax incentives can fall on the development side of innovation (*ex ante* incentives), on the back end of the innovation cycle (*ex post* incentives), or both. A combination of the two can be a powerful incentive to R&D. Unfortunately, in the United States, individual and corporate inventors have historically benefited from front-end tax incentives only—a tax deduction or tax

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<sup>48</sup> ORG. FOR ECON. COOPERATION & DEV., TAX INCENTIVES FOR RESEARCH AND DEVELOPMENT: TRENDS AND ISSUES 7 (2002), <http://www.oecd.org/sti/inno/2498389.pdf> [<https://perma.cc/325V-EXKH>] [hereinafter OECD, TAX INCENTIVES].

<sup>49</sup> OFFICE OF TAX POLICY, U.S. DEP'T OF THE TREASURY, INVESTING IN U.S. COMPETITIVENESS: THE BENEFITS OF ENHANCING THE RESEARCH AND EXPERIMENTATION (R&E) TAX CREDIT 1 (2011), <https://www.treasury.gov/resource-center/tax-policy/Documents/Report-Investing-in-US-Competitiveness-2011.pdf> [<https://perma.cc/BCE7-W8R5>].

<sup>50</sup> See Edwin Mansfield, *Microeconomics of Technological Innovation*, in THE POSITIVE SUM STRATEGY: HARNESSING TECHNOLOGY FOR ECONOMIC GROWTH 309 (Ralph Landau & Nathan Rosenberg eds., 1986) (noting that social rates of return on technological innovation tend to be higher than private rates of returns); Charles I. Jones & John C. Williams, *Measuring the Social Return to R&D*, 113 Q. J. ECON. 1, 16 (1998) (“A number of studies in [the] literature purport to find large rates of return to R&D, suggesting substantial underinvestment.”).

<sup>51</sup> See GARY GUENTHER, CONG. RESEARCH SERV., RL31181, RESEARCH TAX CREDIT: CURRENT LAW AND POLICY ISSUES FOR THE 114TH CONGRESS 1–2 (2015), <https://fas.org/sgp/crs/misc/RL31181.pdf> [<https://perma.cc/3B64-SJBX>] (noting that public policy must supplement private investment in technological R&D).

credit for qualified R&D spending.<sup>52</sup> Back-end tax incentives, in contrast, are used less as a tax policy tool to incentivize or reward R&D. Indeed, corporations do not receive any *ex post* tax break (e.g., a reduced rate) on income from successful R&D.<sup>53</sup> Individual inventors can qualify for an *ex post* tax break, but qualification is often difficult due to flaws in the benefit's design.<sup>54</sup>

In the Tax Cuts and Jobs Act of 2017 (TCJA), Congress eliminated the 100% tax deduction for R&D for research expenditures after 2021 without explanation.<sup>55</sup> The change makes the United States an outlier internationally and reduces its international competitiveness in R&D.<sup>56</sup> Moreover, the TCJA failed to enhance the research tax credit, which some had predicted and argued was necessary to enhance its effectiveness.<sup>57</sup> Indeed, many companies, including pharmaceutical companies, fail to take advantage of the credit either because they do not sufficiently understand its requirements or do not have the necessary documentation to support credit claims.<sup>58</sup> In the wake of the COVID-19 crisis, some have argued that Congress should enhance the

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<sup>52</sup> Tax deductions are historically justified as a means to tax only the net income of a taxpayer, whereas tax credits are typically driven from political judgments to subsidize or encourage certain activities. But today, both deductions and credits are used to deliberately drive economic decision making and promote socially desirable activities.

<sup>53</sup> Corporate taxable income is currently taxed at a flat 21% rate. I.R.C. § 11.

<sup>54</sup> I.R.C. § 1235 (providing capital-asset treatment to individual inventors in limited circumstances).

<sup>55</sup> I.R.C. § 174(a), as amended by the TCJA, Pub. L. No. 115-97, § 13206(a), 131 Stat. 2054, 2111–13. Since 1954, the government has permitted 100% expensing for qualified R&D. Under the TCJA, amounts paid or incurred for R&D after 2021 must be capitalized and amortized ratably over five years. The delayed effective date may signal that the change was more about meeting the revenue goals of the TCJA than an actual change in policy. Whether Congress will act before 2022 to resurrect 100% deductibility of R&D expenses under section 174 remains to be seen. Currently, bipartisan support appears to favor continuing 100% expensing. Doug Sword, *Democrats May Resurrect Tax Breaks TCJA Targeted*, 171 TAX NOTES FED. (TA) 1488 (May 31, 2021).

<sup>56</sup> See Nguyen & Maine, *supra* note 1, at 1693; see also Alex Muresianu & Garrett Watson, *Reviewing the Federal Tax Treatment of Research & Development Expenses*, TAX FOUND. (Apr. 13, 2021), <https://taxfoundation.org/research-and-development-tax/> [https://perma.cc/5ZV3-HXT3].

<sup>57</sup> The research tax credit is not available for many firms, and the credit's reformulation over the years has limited the types of research for which it is available. In addition, the incremental nature of the credit prevents many small innovators from using the credit. See Nguyen & Maine, *supra* note 1, at 1734.

<sup>58</sup> *Capturing Pharmaceutical R&D Tax Credits: To Fund New Drug Discovery and Development*, CORP. TAX INCENTIVES (2016), [https://cdn2.hubspot.net/hubfs/432161/offers/phase2/camp\\_nro\\_2/CTI\\_NRO2\\_PharmaceuticalRD.pdf?ft=1476467594349](https://cdn2.hubspot.net/hubfs/432161/offers/phase2/camp_nro_2/CTI_NRO2_PharmaceuticalRD.pdf?ft=1476467594349) [https://perma.cc/7C5G-GBNB]. One criticism of the credit is that it is complicated for firms to claim, and smaller firms sometimes have difficulty accessing the credit. Muresianu & Watson, *supra* note 56.

research tax credit.<sup>59</sup> Professors Eyal-Cohen and Rutschman, for example, propose purposeful *ex ante* tax subsidies for vaccine research that can complement *ex post* intellectual property incentives for vaccine innovation.<sup>60</sup> They suggest, more specifically, combining tax and grant-like mechanisms in the form of tax incentives for a predetermined list of qualified underfunded diseases (*i.e.*, tax credits refundable on a tiered basis for specifically designated underfunded diseases).<sup>61</sup>

In contrast to proposals for enhanced *ex ante* R&D tax incentives, we explore in this Article the possibility of *ex post* tax subsidies for R&D to complement other *ex post* intellectual property and non-intellectual property incentives. Enhanced *ex ante* R&D tax incentives proposed by commentators would be most effective if paired with a more competitive business tax system, which includes *ex post* R&D tax incentives.<sup>62</sup> Currently, the government does not provide *ex post* R&D tax incentives to corporate innovators and provides a very limited *ex post* R&D tax incentive to individual inventors. We explore here a change to these schemes and recommend several alternative approaches.

To begin with, this Article accepts several premises. No attempt is made here to debate the following, which have previously been vetted in the literature. First, R&D is important to economic growth and building national wealth.<sup>63</sup> Second, government support of R&D is important.<sup>64</sup> Third, government support for R&D can be provided not only directly (*e.g.*, legal protections for intellectual property, grants, direct loans, and loan guarantees), but also indirectly through tax incentives. Fourth, tax incentives for R&D

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<sup>59</sup> See, *e.g.*, Muresianu & Watson, *supra* note 56 (proposing that the credit be simplified to ensure broad accessibility in order to make the U.S. more attractive for R&D investment).

<sup>60</sup> Mirit Eyal-Cohen & Ana Santos Rutschman, *Tax Policy and Pharmaceutical Innovation* 30–44 (St. Louis U. Legal Studies Research Paper No. 2020-34, Nov. 20, 2020), <https://ssrn.com/abstract=3732567> or <http://dx.doi.org/10.2139/ssrn.3732567> (proposing “ways by which the tax system can be redesigned more effectively in the vaccine context than direct subsidies”).

<sup>61</sup> *Id.* at 33–34.

<sup>62</sup> Muresianu & Watson, *supra* note 56 (“Making the R&D credit more generous is unlikely to be an effective tool for greater R&D investment unless paired with a more competitive business tax system.”).

<sup>63</sup> See, *e.g.*, Michael J. Graetz & Rachel Doud, *Technological Innovation, International Competition, and the Challenges of International Income Taxation*, 113 COLUM. L. REV. 347, 348 (2013) (noting that the importance of innovation to economic growth is “essentially uncontested among economists”) (citing Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. OF ECON. & STAT. 312, 320 (1957); Joseph F. Brodley, *The Economic Goals of Antitrust, Efficiency, Consumer Welfare, and Technological Progress*, 62 N.Y.U. L. REV. 1020, 1026 (1987); Herbert Hovenkamp, *Restraints on Innovation*, 29 CARDOZO L. REV. 247, 253 (2007)).

<sup>64</sup> See Graetz & Doud, *supra* note 63, at 349 (noting that R&D “is underproduced in the absence of government support”) (citing Jones & Williams, *supra* note 50, at 1133; OECD, TAX INCENTIVES, *supra* note 48, at 7; OFFICE OF TAX POLICY, *supra* note 49, at 1).

can fall within one of two categories—*ex ante* incentives and *ex post* incentives. Finally, because of design flaws in current *ex ante* R&D tax incentives, *ex post* R&D tax incentives should play an important role in R&D tax policy.<sup>65</sup>

In exploring options for *ex post* R&D tax incentives, however, consideration must be given to the key players in the R&D landscape. On the one hand, enterprises play a vital role in facilitating innovations in the workplace, innovations that lead to the procurement of patents and the development and distribution of products in the marketplace. On the other hand, individual inventors play a valuable role in generating ideas, experimenting, and perfecting the ideas that lead to patentable inventions and the development of patented products. Both enterprises and individual inventors are the two inseparable sides of the innovation space. These important, dual roles were evident in the recent COVID-19 vaccination R&D efforts. The researchers at BioNTech and Pfizer perfected their efforts in developing the mRNA vaccines while the corporate enterprises utilized their resources and expertise to conduct testing and obtain necessary regulatory approval in order to finally deliver the vaccines into the arms of the people. Part II of this Article examines these distinct roles, as the tax laws often treat individuals and entities differently.

Part III focuses on corporate players in the R&D landscape. Because no *ex post* R&D tax incentives are currently available to corporations, Part III explores several options. One possibility is a complete exemption from taxation of intellectual property income. Another is a low effective tax rate applicable to intellectual property income. A third option is postponement, or deferral, of taxation of intellectual property income. While the first two options would face substantial hurdles, the third—deferral of taxation of profits from successful R&D if such profits are reinvested in specifically defined categories of underfunded research—is worthy of serious consideration. Part IV of the Article shifts focus to individual inventors, who play more of a silent role in the R&D landscape. This Part explores the limited *ex post* tax reward for R&D currently available to certain individual inventors and recommends several changes to enhance the tax benefit. Specifically, Part IV recommends expanding the group of taxpayers eligible for the benefit and adding three additional patent transfers to the list of eligible transactions that qualify.

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<sup>65</sup> For criticisms of current *ex ante* R&D tax incentives (*i.e.*, the R&D tax deduction and the R&D tax credit), see Nguyen & Maine, *supra* note 1, at 1736.

## II. The Important Roles of Corporations and Individuals in R&D

### A. Corporate “Inventors” and Developers

In the United States, corporations cannot be inventors under patent law. The Supreme Court in *Stanford v. Roche Molecular Systems, Inc.* emphasized that patents can only be issued to individual inventors.<sup>66</sup> Generally, the named inventors on patents are presumed to be the true and only inventors.<sup>67</sup> Nevertheless, enterprise entities exist as the creators of inventions because they recruit and hire researchers, scientists, and other talent to invent. In turn, their inventor-employees are obliged to assign patents and other intellectual property to the enterprises in accordance with their employment agreements.<sup>68</sup> Routinely, individual inventors’ employers file the patent application and spend resources to prosecute the application.<sup>69</sup> At the end of the prosecution period, if the USPTO grants the patents, the USPTO lists the employer enterprises, not the inventor-employees, as the assignees. Annually, the list of companies with the most patents obtained generates the bragging rights and prestige of being leaders in innovation.<sup>70</sup> Patents are often viewed

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<sup>66</sup> 563 U.S. 776 (2011).

<sup>67</sup> See *Drone Tech. v. Parrott S.A.*, 838 F.3d 1283, 1292 (Fed. Cir. 2016).

<sup>68</sup> See *IBM Tops US Patent List for 28th Consecutive Year with Quantum Computing, AI, Hybrid Cloud Innovations*, HPC WIRE (Jan. 12, 2021), <https://www.hpcwire.com/off-the-wire/ibm-tops-us-patent-list-for-28th-consecutive-year-with-quantum-computing-ai-hybrid-cloud-innovations/> [<https://perma.cc/MMU2-XJBU>] (“IBM scientists and researchers received 9,130 U.S. patents in 2020, the most of any company, marking 28 consecutive years of IBM patent leadership. IBM led the industry in the number of artificial intelligence (AI), cloud, quantum computing and security-related patents granted.”). Moreover, 8,500 IBM inventors reside in 47 states and territories and 47 countries, contributing to IBM’s patent procurements and leadership. See *IBM Inventors Receive Record-Breaking 8,000+ U.S. Patents in 2016*, PR NEWSWIRE (Jan. 9, 2017, 9:00 AM), <https://www.prnewswire.com/news-releases/ibm-inventors-receive-record-breaking-8000-us-patents-in-2016-300387665.html> [<https://perma.cc/TE6V-T3Q3>].

<sup>69</sup> See *Filing by Other Than Inventor*, 35 U.S.C. 118 (“A person to whom the inventor has assigned or is under an obligation to assign the invention may make an application for patent. A person who otherwise shows sufficient proprietary interest in the matter may make an application for patent on behalf of and as agent for the inventor on proof of the pertinent facts and a showing that such action is appropriate to preserve the rights of the parties. If the Director grants a patent on an application filed under this section by a person other than the inventor, the patent shall be granted to the real party in interest and upon such notice to the inventor as the Director considers to be sufficient.”).

<sup>70</sup> Gene Quinn, *With 9,043 U.S. Patents, IBM Tops for 25th Consecutive Year*, IP WATCHDOG (Jan. 9, 2018), <https://www.ipwatchdog.com/2018/01/09/ibm-tops-u-s-patent-list/id=92016/> [<https://perma.cc/M5KG-XUUZ>]; *Companies With Most Patents: Everything You Need to Know*, UPCOUNSEL, <https://www.upcounsel.com/companies-with-most-patents> [<https://perma.cc/TPN8-U45J>]; Prableen Bajpai, *Patent Dominance: Top 5 Companies Leading the Charge*, NASDAQ (Jan. 17, 2020, 11:11 AM), <https://www.nasdaq.com/articles/patent-dominance%3A-top-5-companies-leading-the-charge-2020-01-17>.

as the reward for devoting significant investment dollars in R&D by companies.<sup>71</sup> The number of patents granted also represents the fact that these enterprises have cultivated a corporate culture and provided conditions conducive for innovation and the creation of intellectual property.<sup>72</sup>

In startups, founders and employees work tirelessly to reach milestones in order to obtain necessary funding to scale to the next stage.<sup>73</sup> Startups burn cash because they compete at a breakneck pace of innovation to develop their products or services to capture the market.<sup>74</sup> The intellectual property creation and ownership distinguish each startup from the others.<sup>75</sup> In more than

<sup>71</sup> Robert Hackett, *These Tech Companies Scored the Most Patents in 2014*, FORTUNE (Feb. 24, 2015, 3:20 AM), <https://fortune.com/2015/02/24/most-patents-companies-2014/> [<https://perma.cc/3PRZ-ZPBS>] (“Patents are the lifeblood of the tech industry—and if last year’s numbers are any indication, that sector is performing with vigor. More than 300,000 utility patents—those are the ones for inventions, rather than designs—were issued by the United States Patent and Trademark Office last year, a record high. Such patents allow companies to put their inventions on lockdown for up to two decades, reaping rewards for significant R&D investments.”).

<sup>72</sup> See, e.g., Steven Overly, *How Ford Turned Thousands of Employees into Inventors*, WASH. POST (Dec. 14, 2016), <https://www.washingtonpost.com/news/innovations/wp/2016/12/14/how-ford-turned-thousands-of-employees-into-inventors/> [<https://perma.cc/D493-6WVP>]; Keith Shaw, *AI Research Among Record 9,100 Patents for IBM in 2018*, ROBOTICS BUS. REV. (Jan. 8, 2019), <https://www.roboticsbusinessreview.com/ai/ai-research-among-record-9100-patents-for-ibm-in-2018/> [<https://perma.cc/6T6P-U7T5>] (“Ingrained in the company’s culture, IBM patents were awarded to employee inventors across 48 countries worldwide last year.”); Louis Columbus, *The Most Innovative Tech Companies Based on Patent Analytics*, FORBES (Dec. 15, 2019, 11:05 AM), <https://www.forbes.com/sites/louiscolumnbus/2019/12/15/the-most-innovative-tech-companies-based-on-patent-analytics/?sh=3a65e8ca62ce> [<https://perma.cc/53EM-UP73>].

<sup>73</sup> *Setting Key Milestones in Startup Fundraising: From Seed to Series B*, SEEDRS, <https://www.seedrs.com/academy/setting-key-milestones-in-startup-fundraising-from-seed-to-series-b/> [<https://perma.cc/8QSL-67X9>]; *Tick Off These Meaningful 15 Milestones For Your Early Startup Stage*, ALCOR (Jan. 14, 2021), <https://alcorfund.com/insight/tick-off-these-meaningful-15-milestones-for-your-early-startup-stage/> [<https://perma.cc/73FX-6L3P>]; Zenas Block & Ian C. MacMillan, *Milestones for Successful Venture Planning*, HARV. BUS. REV. (1985), <https://hbr.org/1985/09/milestones-for-successful-venture-planning> [<https://perma.cc/9D4R-KMJC>].

<sup>74</sup> Brad Stone, *How Much Cash Are On Demand for Startups Burning*, ECON. TIMES (Apr. 2, 2019), <https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/how-much-cash-are-on-demand-startups-burning/articleshow/68681480.cms?from=mdr> [<https://perma.cc/AD6J-P47C>]; Lewis Hower, *Understanding What Your Startups’s Burn Rate Really Means*, SVB, <https://www.svb.com/blogs/lewis-hower/startup-burn-rate-cash-flow> [<https://perma.cc/X2HZ-SMY3>]; Chris Read, *2018 Startup Cash Burn Report: A Benchmarking Spend*, BREX (Dec. 6, 2018), <https://www.brex.com/blog/burn-rates/> [<https://perma.cc/W9E2-TTUG>].

<sup>75</sup> Efrat Kasznik, *Examining the Correlation Between IP and Startup Valuation*, BVR (Feb. 24, 2020), <https://www.bvresources.com/blogs/intellectual-property-news/2020/02/24/examining-the-correlation-between-ip-and-startup-valuations> [<https://perma.cc/QC7X-CDFM>]; Richard Harroch, *10 Intellectual Property Strategies for Technology Startups*, FORBES (June 6, 2017, 9:30 AM), <https://www.forbes.com/sites/allbusiness/2017/06/06/10-intellectual-property->

30 innovation centers across the United States, vibrant startups collaborate and compete against one another, shaping, challenging, and realizing impossible dreams.<sup>76</sup> Startup failures and successes produce ideas and knowledge fueling the next layer of collective knowledge enjoyed by all.<sup>77</sup>

Established companies either acquire startups for their new technologies or enter into technology licensing deals with startups.<sup>78</sup> From Microsoft to Facebook, from Google to Apple, from Amazon to eBay (among others), acquisitions of startups are among key corporate transactions that allow big companies to survive and thrive in the marketplace.<sup>79</sup> Simply put, legacy companies often prove too big and too ingrained in their own rhythm in order to continue the dynamic innovations that constantly demand new ideas

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strategies-for-technology-startups/?sh=37eede8dab1b [https://perma.cc/K4Q5-8PQU]; Efrat Kasznik, *Intellectual Property Value in Startup Investments: A View from Silicon Valley*, IPEG (Mar. 3, 2016), <https://www.ipeg.com/intellectual-property-value-in-startup-investments-a-view-from-silicon-valley/> [https://perma.cc/R2HR-JWL4].

<sup>76</sup> See Xuan-Thao Nguyen, *Banking the Unbanked Innovators*, 45 J. CORP. L. 715, 720 n.33 (2020) (discussing innovation centers in the United States where funding ecosystems are available for startups).

<sup>77</sup> See generally Sifan Liu & Joseph Parilla, *How Startups Help Cities Measure Their Economic Development Frontier*, BROOKINGS (Oct. 24, 2019), <https://www.brookings.edu/research/how-startups-help-cities-measure-their-economic-development-frontier/> [https://perma.cc/CH8Q-6QMV]; *How Startups Contribute During COVID-19—Meet the German Accelerator Companies That Share Knowledge, Valuable Resources and Help Lighten Our Mood*, GERMAN ACCELERATOR (Apr. 20, 2020), <https://www.germanaccelerator.com/blog/how-startups-contribute-during-covid-19-meet-the-german-accelerator-companies-that-share-knowledge-valuable-resources-and-help-lighten-our-mood-pt-2/> [https://perma.cc/RU2Y-FCZZ]; Jouni A. Laitinen & Dai Senoo, *Knowledge Sharing in Young Startups—First Quantitative Steps*, 12 J. SERV. SCI. & MGMT. 495–520 (2019); John Wu & Robert D. Atkinson, *How Technology-Based Start-Ups Support U.S. Economic Growth*, INFO. TECH. & INNOVATION FOUND. (Nov. 28, 2017), <https://itif.org/publications/2017/11/28/how-technology-based-start-ups-support-us-economic-growth> [https://perma.cc/R82N-JHL3].

<sup>78</sup> Scott Carey, *Biggest Technology Acquisitions of 2020*, COMPUTERWORLD (Dec. 15, 2020, 4:08 AM), <https://www.computerworld.com/article/3513439/biggest-technology-acquisitions-of-2020.html> [https://perma.cc/ZA3J-2AFY].

<sup>79</sup> Chris Alcantara et al., *How Big Tech Got So Big: Hundreds of Acquisitions*, WASH. POST (Apr. 21, 2021), <https://www.washingtonpost.com/technology/interactive/2021/amazon-apple-facebook-google-acquisitions/> [https://perma.cc/U2A4-TV8G] (reporting that Amazon, Apple, Facebook and Google “acquired hundreds of companies over decades to propel them to become some of the most powerful tech behemoths in the world”); Kif Leswing, *How Apple Does M&A: Small and Quiet, With No Bankers*, CNBC (May 1, 2021), <https://www.cnbc.com/2021/05/01/how-apple-does-ma-small-and-quiet-with-no-bankers.html> [https://perma.cc/XG49-9AF7] (stating that Apple purchased 100 companies in the past six years or a company every three or four weeks); *Acquisitions by eBay*, TRACXN (Oct. 29, 2020), <https://tracxn.com/d/acquisitions/acquisitionsbyEBay> [https://perma.cc/3AAA-B7MS]; Debasish Sarkar, *Why Tech Businesses Are Eyeing Business Growth Through Startup Acquisition?*, INC 42 (May 31, 2020), <https://inc42.com/resources/tech-companies-unlock-business-growth-through-startup-acquisition/> [https://perma.cc/NG3P-EWWY].

and present threats to a self-imposed sense of comfort.<sup>80</sup> Fear of oblivion keeps enterprises innovative and surviving,<sup>81</sup> often through technologies obtained from others for subsequent incorporation into their own R&D in the hope of closing the gap between the legacy enterprises and their rivals.<sup>82</sup>

In the biotech industry, companies participate in licensing deals with others for their technologies and products with the desire to augment their R&D and to expand product lines.<sup>83</sup> In many instances, established companies rely on startups for the missing, early-stage innovations. For example, large pharma companies obtain the drug candidates and associated technologies from small biotech companies after Phase II of the drug development cycle.<sup>84</sup> That means the small biotech companies focus on preclinical and Phases I and II discovery before big biotech companies devote their resources to the subsequent clinical studies and regulatory approval process.<sup>85</sup> Small biotech

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<sup>80</sup> See Solon Moreira, Thomas Maximilian Klueter & Stefano Tasselli, *When Licensing New Tech Is Better Than Building It In-House*, HARV. BUS. REV. (June 30, 2020), <https://hbr.org/2020/06/when-licensing-new-tech-is-better-than-building-it-in-house> [<https://perma.cc/TXW6-5REN>] (noting that some companies “drew on external knowledge by entering into strategic alliances and collaborating with outside partners” to catch up R&D).

<sup>81</sup> Isobel Asher Hamilton, *As Amazon CEO, Jeff Bezos Was Obsessed with Amazon’s “Inevitable” Death*, BUS. INSIDER (July 5, 2021, 5:35 AM), <https://www.businessinsider.com/jeff-bezos-keeps-talking-about-amazons-inevitable-death-2018-12> [<https://perma.cc/4NFK-Z2LZ>]; Brad Stone, *The Jeff Bezos Paradox*, N.Y. TIMES (July 3, 2021), <https://www.nytimes.com/2021/07/03/opinion/jeff-bezos-space-amazon.html> [<https://perma.cc/696S-NP75>] (describing Jeff Bezos’s fear of Amazon becoming a “‘Day 2’ company” because “Day 2 is stasis, followed by irrelevance, followed by excruciating, painful decline, followed by death. . . . And that is why it is always Day 1”). Amazon acquired a number of companies to supplement its R&D and expand. See *Amazon’s Major Acquisitions Over the Years*, REUTERS (May 26, 2021), <https://www.reuters.com/technology/amazons-major-acquisitions-over-years-2021-05-26/> [<https://perma.cc/8VXM-A4R8>]; Alison Durkee, *Amazon’s Biggest Acquisitions Have Allowed It to Become a Marketplace for Nearly Everything*, FORBES (May 24, 2021, 9:09 PM), <https://www.forbes.com/sites/alison-durkee/2021/05/24/amazon-biggest-acquisitions-have-allowed-it-to-become-a-marketplace-for-nearly-everything-mgm-deal/?sh=61ad77b36354> [<https://perma.cc/9SPU-T6YK>].

<sup>82</sup> See Moreira et al., *supra* note 80 (stating that “[m]ost companies fear competition from a rival’s product innovations and the risk of falling behind their industry’s technological frontier” and identifying three approaches to how companies close the distance between them and competitors in the innovation space).

<sup>83</sup> Phil Taylor, *The Top 15 Biopharma Licensing Deals of 2020*, FIERCE BIOTECH (Apr. 27, 2021, 3:00 AM), <https://www.fiercebiotech.com/special-report/top-15-biopharma-licensing-deals-2020> [<https://perma.cc/WZ6A-BV22>].

<sup>84</sup> Shiva Khalafpour, *Supporting Drug Product Innovation Through Small Biotech Companies*, DRUG DISC. & DEV. (Apr. 12, 2019), <https://www.drugdiscoverytrends.com/supporting-drug-product-innovation-through-small-biotech-companies/> [<https://perma.cc/2CHQ-XT9B>].

<sup>85</sup> See Emily Henderson, *Small Biotech Companies Join with Pharmaceutical Giants to Manufacture Drugs*, NEWS MED. LIFE SCI. (June 30, 2021), <https://www.news-medical.net/news/20210630/Small-biotech-companies-join-with-pharmaceutical-giants-to-manufacture-drugs.aspx> [<https://perma.cc/L7BJ-A7Y8>] (reporting that “tiny biotech Cassava Sciences has teamed up with

companies, lacking size in commercialization and expertise to navigate through complex regulatory processes, may team up with partners in contract development and manufacturing organizations for opportunities to bring products to market.<sup>86</sup> Other small biotech companies with venture capital backing might take a different and bolder step; the small biotech companies develop their treatments and products through commercialization in a particular niche.<sup>87</sup>

In the biopharma ecosystem, contrary to the perception of innovation at large enterprises, studies demonstrate that big pharma companies actually do not engage all in-house drug development innovation.<sup>88</sup> For instance, only 23% of Pfizer products are in-house and 11% of J&J products are developed by their own scientists.<sup>89</sup> The majority of Pfizer products are originated or developed by other companies. Pfizer's highest selling product, Prevnar 13 vaccine for pneumococcal disease, is the direct result of Pfizer's purchase of Wyeth in 2009.<sup>90</sup> Similarly, Pfizer acquired from Warner-Lambert and Onyx Pharmaceuticals the drug palbociclib (Ibrance). Likewise, J&J's top product, infliximab (Remicade) comes from the monoclonal antibody synthesized by Centocor.<sup>91</sup>

Moreover, with respect to the COVID-19 vaccine development, the collaboration between Pfizer and BioNTech illustrates the current biopharma ecosystem. BioNTech is a young biotech company founded in 2008, having a narrow focus on developing mRNA vaccines.<sup>92</sup> As a new and small enter-

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the giant Evonik Industries to make an experimental Alzheimer's treatment for phase 3 clinical trials and, possibly, later commercialization").

<sup>86</sup> See Khalafpour, *supra* note 84; *Pharmaceutical CDMOS*, TAPEMARK (2021), <https://www.tapemark.com/pharmaceutical-cdmos> [<https://perma.cc/ZG2C-TWPG>] (explaining the CDMO ecosystem); see also *Samsung Biologics, Contract Development & Manufacturing in Pharmaceuticals: The Difference Between Good & Great*, FIERCEPHAMA (July 20, 2020, 10:30 AM), <https://www.fiercepharma.com/sponsored/insider-principles-key-criteria-to-consider-when-selecting-right-cdmo> [<https://perma.cc/BAQ7-DAA8>]; *403 Biotech Contract Manufacturing Companies—Worldwide*, BIOPHARM GUY, <https://biopharmguy.com/links/company-by-location-contract-manufacturing.php> [<https://perma.cc/LC9Q-C7EQ>].

<sup>87</sup> See Khalafpour, *supra* note 84. See also Alex Phillippidis, *20 Top VC Firms for Biotechs*, GENETIC ENG'G & BIOTECH. NEWS (Nov. 28, 2014), <https://www.genengnews.com/a-lists/20-top-vc-firms-for-biotechs/> [<https://perma.cc/L5WV-Q8RY>].

<sup>88</sup> See Emily H. Jung, Alfred Engelberg & Aaron S. Kesselheim, *Do Large Pharma Companies Provide Drug Development Innovation? Our Analysis Says No*, STATNEWS (Dec. 10, 2019), <https://www.statnews.com/2019/12/10/large-pharma-companies-provide-little-new-drug-development-innovation/> [<https://perma.cc/5XNS-3UMP>].

<sup>89</sup> See *id.*

<sup>90</sup> *Id.*

<sup>91</sup> *Id.*

<sup>92</sup> Two scientists, a husband-and-wife team, founded BioNTech in 2008. See David Gelles, *The Husband-and-Wife Team Behind the Leading Vaccine to Solve Covid-19*, N.Y. TIMES

prise, BioNTech holds no track record of success in its efforts to develop vaccines.<sup>93</sup> BioNTech, nevertheless, possesses expertise in mRNA vaccine development. Additionally, in August 2018, the company entered into a multi-year R&D agreement with Pfizer to develop mRNA-based flu vaccines.<sup>94</sup> When the COVID-19 virus hit Wuhan, China, and spread to other countries, BioNTech raced into action under “Project Lightspeed” in January 2020.<sup>95</sup> Two months later, BioNTech and Pfizer capitalized on their collaboration and devoted their efforts to mRNA vaccine development for COVID-19, as announced to the world in March 2020.<sup>96</sup> BioNTech and Pfizer complemented each other to accelerate the development of the vaccine for the benefit of all.

In summary, big pharma conducts in-house drug development and testing and acquires drugs in preclinical studies from other enterprises.<sup>97</sup> The same approach is also common in big tech. Moreover, innovation occurs at all stages of the R&D process. An understanding of the process of innovation at small and large enterprises in the tech, pharma, and other sectors is necessary if tax policy is to be used effectively as a tool to incentivize innovation.

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(Nov. 10, 2020), <https://www.nytimes.com/2020/11/10/business/biontech-covid-vaccine.html> [<https://perma.cc/4GKZ-6XD6>]. Two years before the pandemic, the BioNTech founder stated at a conference of infectious disease experts that “his company might be able to use its so-called messenger RNA technology to rapidly develop a vaccine in the event of a global pandemic.” *Id.*

<sup>93</sup> *Id.*

<sup>94</sup> See Press Release, BioNTech, BioNTech Signs Collaboration Agreement with Pfizer to Develop mRNA-based Vaccines for Prevention of Influenza (Aug. 16, 2018), <https://biontechse.gcs-web.com/news-releases/news-release-details/biontech-signs-collaboration-agreement-pfizer-develop-mrna-based> [<https://perma.cc/L8MJ-E7WT>].

<sup>95</sup> *Project Lightspeed*, BIONTECH, <https://biontech.de/covid-19-portal/project-lightspeed> [<https://perma.cc/WTE3-DCLP>].

<sup>96</sup> See Press Release, Pfizer, Pfizer and BioNTech to Co-Develop Potential COVID-19 Vaccine (Mar. 17, 2020, 2:00 AM), <https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-co-develop-potential-covid-19-vaccine> [<https://perma.cc/U5FL-RRE5>]. The Press Release states that both companies agreed to a letter of intent regarding the co-development and distribution of

a potential mRNA-based coronavirus vaccine aimed at preventing COVID-19 infection. . . . The collaboration aims to accelerate development of BioNTech’s potential first-in-class COVID-19 mRNA vaccine program, BNT162, which is expected to enter clinical testing by the end of April 2020. The rapid advancement of this collaboration builds on the research and development collaboration into which Pfizer and BioNTech entered in 2018 to develop mRNA-based vaccines for prevention of influenza.

*Id.*

<sup>97</sup> Jung et al., *supra* note 88 (explaining that preclinical studies are “the basic and translational science that is the foundation for the discovery of innovative drugs”).

## B. *Individual Innovators*

Individual innovators are the brain ushering companies into competition space, sustaining the gruesome pace, and capturing the unimaginable.<sup>98</sup> Simply put, without the talented individuals in tech, pharma, and other sectors, there will be little to no economic growth and innovation in a particular city, nation, or continent.<sup>99</sup>

Talented employees at companies collaborate and innovate. As companies cultivate a culture that truly fosters creative thinking and values innovation, they must attract and retain talented individuals. Illustratively, among the top 50 companies recognized as “best workplaces for innovators,” the freebies of great snacks and a generous leave policy prove not to be the key determinants.<sup>100</sup> Instead, “offering people time to pursue bold projects (both within and outside their main jobs),” “configuring work spaces” for greater collaboration across teams, placing “premiums on inclusivity,” and “giving people room to fail” are among the main drivers that propel innovations in the workplace.<sup>101</sup> The list of best workplaces includes some familiar and not very familiar names, including 3M, Activision Blizzard, Amazon, AMD, Ansys, Chobani, Compass, Kronos, Procter & Gamble, Reverb, Sephora, Sonatype, Workday, Thorn, and Xinova.<sup>102</sup>

Through collaboration and experimentation, innovators become inventors when their employers file for and subsequently obtain patents. Whether the inventors work at the “Top 50 Best Workplaces for Innovators” or other companies in the United States, the inventors generally do not receive a share in the profit generated from the patents. The rationale for the lack of profit-sharing from patents is that the employer already has provided its employees

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<sup>98</sup> Davis Carlin et al., *Building the Tech Talent Pipeline*, MCKINSEY & CO. (Dec. 10, 2019), <https://www.mckinsey.com/business-functions/organization/our-insights/building-the-tech-talent-pipeline#> [<https://perma.cc/9HM2-96ZA>] (“if technology is now the growth engine for business, tech talent and the institutions that produce it are the fuel”).

<sup>99</sup> The scarcity of talented tech workers has now become a global problem as national and continental economies increasingly depend on the availability of tech workers. Pedro Nicolaci da Costa, *Tech Talent Scramble: Global Competition for a Limited Pool of Technology Workers Is Heating Up*, INT’L MONETARY FUND FIN. & DEV. (Mar. 2019), <https://www.imf.org/external/pubs/ft/fandd/2019/03/global-competition-for-technology-workers-costa.htm#.XhluSQb3YI> s.twitter. Regionally, cities in the United States identify ways in which to attract talented workers. See, e.g., *Technology, Talent, and Tolerance: Attracting the Best and Brightest to Memphis*, MEMPHIS TALENT MAGNET PROJECT, <https://www.networksnorthwest.org/userfiles/filemanager/1169/> [<https://perma.cc/NUZ5-9DRD>].

<sup>100</sup> *The 50 Best Workplaces for Innovators*, FAST COMPANY (Aug. 5, 2019), <https://www.fast-company.com/best-workplaces-for-innovators/2019> [<https://perma.cc/FWN4-78SZ>] (discussing the study conducted between Fast Company and Accenture to identify the best workplaces for innovators).

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

with the facilities and work environments, in addition to salary and benefits, conducive to innovation. The U.S. approach with respect to the absence of profit-sharing between employers and inventor-employees is similar to that in other Western countries.<sup>103</sup> Consequently, lawsuits demanding a share of the profits from patents brought by employee-inventors against their employers are extraordinarily rare.<sup>104</sup> Likewise, few companies implement special programs rewarding their employee-inventors.<sup>105</sup>

Contrary to U.S. practice, China, a nation with more international patent filings than the United States in recent years,<sup>106</sup> embraces a different approach to employee-inventors and special compensation. Under Chinese law, when employees invent under the scope of employment or use mainly the materials and facilities of the employer, the employer must provide the employee-inventor with reasonable remuneration in accordance with the economic results achieved in association with the invention.<sup>107</sup> The remuneration should not be less than two percent of the annual operating profit generated through the

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<sup>103</sup> See Phillip Broadwith, *You Don't Own Me*, CHEMISTRY WORLD (Dec. 18, 2019), <https://www.chemistryworld.com/opinion/when-should-employees-share-profits-from-inventions/4010944.article> [<https://perma.cc/5RXZ-BAPZ>]. See also William P. Hovell, *Patent Ownership: An Employer's Rights to His Employee's Invention*, 58 NOTRE DAME L. REV. 863 (1983).

<sup>104</sup> Broadwith, *supra* note 103 (discussing the litigation brought by Ian Shanks against Unilever for his research that led to electrochemical sensors for monitoring glucose for diabetes).

<sup>105</sup> See Susan Malanowski, *Innovation Incentives: How Companies Foster Innovation* (Sept. 2007) (unpublished manuscript) (available at <https://www.wilsongroup.com/wp-content/uploads/2011/03/InnovationIncentives.pdf> [<https://perma.cc/V5MK-Y523>]) (identifying the various forms of compensation companies in the survey provide to employee-inventors).

<sup>106</sup> See Emma Farge, *China Extends Lead Over U.S. in Global Patents Filings*, U.N. SAYS, REUTERS (Mar. 2, 2021), <https://www.reuters.com/article/us-un-patents/china-extends-lead-over-u-s-in-global-patents-filings-u-n-says-idUSKCN2AU0TM> [<https://perma.cc/ME6B-4KKP>].

<sup>107</sup> See Xu Jing & Ye Wanli King, *Notes on a Recent Inventor Remuneration Dispute*, CHINA LAW INSIGHT (Sept. 11, 2020), <https://www.chinalawinsight.com/2020/09/articles/intellectual-property/notes-on-a-recent-inventor-remuneration-dispute/> [<https://perma.cc/B5F9-P8E7>] (discussing Article 16 of China's Patent Law and explaining that the Implementing Rules of the Patent Law further provide the statutory remuneration in the absence of a contract).

According to Article 76 of the Implementation Regulations, a patentee-employer may reach an agreement with the inventor or have policies to determine reward and remuneration for inventions. Article 78 provides that, if the patentee-employer does not have agreements or policies on rewards and remuneration, the default legal scheme for remuneration would be: 1) at least 2% of after-tax profits for invention or utility model and at least 0.2% of after-tax profits for design patent; or 2) if the patent is licensed, at least 10% of after-tax income from the patent license.

*Id.* See also Xia Zheng & Mengmeng Yu, *Reward and Remuneration for Service Inventions*, IAM (Apr. 6, 2016), <https://www.iam-media.com/reward-and-remuneration-service-inventions> [<https://perma.cc/X27X-Q9F6>].

exploitation of the invention or ten percent of the royalties from the licensing of the issued patents.<sup>108</sup>

In U.S. research universities, the university is often the owner of patents based on the efforts of employees engaged in research since the passage of the Bayh-Dole Act in 1980.<sup>109</sup> Universities have adopted policies that require that researchers disclose their inventions, thereby allowing university tech offices to determine whether the university should seek patent protection.<sup>110</sup> Large research universities such as the University of California system, MIT, Stanford, the University of Texas, Johns Hopkins, and Purdue are among the top 100 universities with the most patents in 2020.<sup>111</sup> Inventors at these top universities often receive rewards if their patents are exploited by their universities through licensing deals. For instance, at Stanford University, the inventors receive one-third of the net equity which is the total equity minus 15% of such equity to cover the university's administrative expenses.<sup>112</sup>

In summary, individual innovators are the true creators of patented inventions. Depending on the workplaces, employees are encouraged to innovate through various incentives. For the innovators who invent, however, they rarely receive a share of profits from their patented inventions under U.S. law and practice.

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<sup>108</sup> See Jing & King, *supra* note 107.

<sup>109</sup> See *Landmark Law Helped Universities Lead the Way*, AUTM, <https://autm.net/about-tech-transfer/advocacy/legislation/bayh-dole-act> [<https://perma.cc/WLQ2-YBEU>] (describing the major provisions of the Act and how universities retain title to inventions and engage in technology transfers).

<sup>110</sup> See *Submit Your Disclosure*, MASS. INST. OF TECH., <https://tlo.mit.edu/disclose-protect-your-intellectual-property/submit-your-disclosure> [<https://perma.cc/8Y4A-JVSW>] ("Inventors are encouraged to contact our office and/or submit an MIT Technology Disclosure Form as early as possible in the inventive process, before a public disclosure of the idea or invention. The disclosure form is designed to gather specific information that will enable evaluation of the invention's patentability and commercial potential."). See also *Disclosure Forms*, PURDUE OFF. OF TECH. COM., <https://www.prf.org/otc/disclosure/form-types.html> [<https://perma.cc/SNZ6-7MNY>] ("Technology Disclosure Form—This form is used for disclosing intellectual property to the Office of Technology Commercialization. The disclosure document is to be prepared and submitted by the inventor(s), and is then completed in conjunction with OTC. It provides the basis for an assessment of patentability and market opportunity; a fully completed Technology Disclosure Form triggers the 6-month Innovation Assessment Process within OTC.").

<sup>111</sup> Nat'l Acad. of Inventors, *Top 100 Worldwide Universities Granted U.S. Utility Patents in 2020* (2020), <https://academyofinventors.org/wp-content/uploads/2021/06/NAI-IPO-Top-100-Universities-Granted-U.S.-Utility-Patents-2020.pdf> [<https://perma.cc/2BMR-9H5A>].

<sup>112</sup> See *Equity Acquisition in Technology Licensing and Distance Learning Agreements*, STANFORD UNIV., <https://doresearch.stanford.edu/policies/research-policy-handbook/conflicts-commitment-and-interest/equity-acquisition-technology-licensing-and-distance-learning-agreements> [<https://perma.cc/4HVC-T8ZB>].

### III. Designing *Ex Post* R&D Tax Incentives for Corporate Taxpayers

Corporations (unlike individuals) are taxed at the same rate on all of their income—regardless of the classification of that income. Thus, royalties received from the licensing of a patent are taxed at the same rate as gains realized from the sale of the patent.<sup>113</sup> And both of these are taxed at the same rate as any other category of corporate income received. For example, royalties from the licensing of a patent are taxed the same as rent received from the leasing of a building. And gains realized from the sale of a patent are taxed the same as gains realized from the sale of land.

Historically, the U.S. government has eschewed offering *ex post* tax rewards to corporations for successful R&D efforts, such as a lower tax rate for patent royalties or patent gains. Instead, the government relies on its *ex ante* rules—tax deduction or tax credit—to incentivize corporate R&D investment. These *ex ante* tools, however, have fundamental design flaws that have been highlighted in the literature.<sup>114</sup> For example, the current, immediate tax deduction for R&D spending is slated to expire in 2022; at that point R&D costs will only be deductible ratably over a five-year period.<sup>115</sup> Furthermore, the current tax credit for R&D, while now permanent, is less robust than the R&D tax credit in many other countries.<sup>116</sup> The U.S. tax credit is 20% of

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<sup>113</sup> Royalties are taxable. I.R.C. § 61(a)(7). Gains from dealings in property are also taxable. I.R.C. § 61(a)(3). Both categories are taxed at the same rate. I.R.C. § 11. Note that prior to 2018, the Code imposed a maximum 35% tax rate for net capital gains for years in which a corporation's ordinary income tax rate exceeded 35%. I.R.C. § 1201(a), repealed by the TCJA, Pub. L. No. 115-97, § 13001(b)(2)(A), 131 Stat. at 2096. In effect, the alternative tax did not apply because the maximum corporate income tax rate was 35%. Congress repealed the alternate tax for net capital gains when it lowered the corporate rate to 21%. TCJA, Pub. L. No. 115-97, § 13001(a), 131 Stat. at 2096.

<sup>114</sup> See, e.g., Nguyen & Maine, *supra* note 1, at 1737 (noting some reasons why the research tax credit is not available for many individual and corporate innovators).

<sup>115</sup> This change will place the United States further from the global norm. Some countries offer enhanced tax deductions greater than 100% for qualifying R&D expenditures. See Graetz & Doud, *supra* note 63, at 353–54 (summarizing countries that have offered super deductions for R&D, such as Austria, Hungary, the United Kingdom, Denmark, and the Czech Republic). The United Kingdom, for example, provides an enhanced deduction of 230% for qualifying research and development expenditures by small or medium-sized enterprises and a 13% tax credit for large enterprises. EU TAX CENTRE, KPMG, UNITED KINGDOM COUNTRY PROFILE (Aug. 2020), <https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/10/uk-country-profile-2020.pdf> [<https://perma.cc/XJ6N-XMTZ>].

<sup>116</sup> The U.S. government has acknowledged that reforms should be made to increase the effectiveness of the R&D tax credit. President Obama, for example, suggested simplifying the credit by repealing the outdated formula and enhancing the credit for pass-through business. THE WHITE HOUSE & DEP'T OF THE TREAS., THE PRESIDENT'S FRAMEWORK FOR BUSINESS TAX REFORM: AN UPDATE 21 (Apr. 2016), <https://www.treasury.gov/resource-center/tax-policy/Documents/The-Presidents-Framework-for-Business-Tax-Reform-An-Update-04-04-2016.pdf> [<https://perma.cc/29XE-XNSW>] [hereinafter THE PRESIDENT'S FRAMEWORK].

qualified R&D spending above a company's normal level of R&D investment; in contrast, many other countries offer a tax credit greater than 20% (e.g., 25% in Spain and Ireland; 30% in France). In addition, the U.S. credit is incremental (applicable only if the company increases its R&D over time); many other countries, on the other hand, offer a volume-based credit (applicable simply on the volume or amount of qualified R&D spending).<sup>117</sup>

As a backstop to inadequately designed deduction and credit rules, the U.S. government could consider back-end tax incentives for successful R&D. Back-end, or *ex post*, tax incentives could take one of three forms: (1) complete exemption from taxation of income from intellectual property; (2) imposition of a lower effective tax rate on income from intellectual property; or (3) current deferral (*i.e.*, postponement) of taxation of income from intellectual property. In the current political climate, the first two options may be unrealistic. The third approach for R&D is a novel, but perhaps more realistic, approach.

#### A. *Exempt Intellectual Property Income from Taxation*

Corporations first became subject to an entity tax in 1895.<sup>118</sup> The Revenue Act of 1894 imposed a two percent income tax on individuals and corporate

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<sup>117</sup> See Louise Kelly, *Looking to the Future: Life After the "Double Irish,"* INT'L TAX REV. (Feb. 24, 2015), <https://www.internationaltaxreview.com/Article/3430276/Looking-to-the-future-Life-after-the-Double-Irish.html>; Patrick Eparvier, *Monitoring and Analysis of Policies and Public Financing Instruments Conducive to Higher Levels of R&D Investment—The "Policy Mix" Project—Country Review France*, 19 (Mar. 2007), [http://ec.europa.eu-invest-in-research/pdf/download\\_en/france.pdf](http://ec.europa.eu-invest-in-research/pdf/download_en/france.pdf) [<https://perma.cc/8CAM-Q5S9>]; PwC, *supra* note 115.

<sup>118</sup> Act of August 27, 1894, ch. 349, 28 Stat. 509. For a history of early revenue laws, see Patrick E. Hobbs, *Entity Classification: The One Hundred-Year Debate*, 44 CATH. U. L. REV. 437, 441–59 (1995); Marjorie E. Kornhauser, *Corporate Regulation and the Origins of the Corporate Income Tax*, 66 IND. L.J. 53 (1990); Stephen B. Scallen, *Federal Income Taxation of Professional Associations and Corporations*, 49 MINN. L. REV. 603, 610–13 (1965). Corporations were not subject to the first federal income tax, which was enacted in 1861. Act of August 5, 1861, ch. 45, 12 Stat. 292. The 1861 Act imposed a tax on "every person residing in the United States." *Id.* at § 49. The term "person" apparently meant that individuals were taxed, but not corporations. See Scallen, *supra*, at 610 n.38.

income.<sup>119</sup> The 1894 Act was declared unconstitutional a year after its enactment.<sup>120</sup> In 1909, however, corporate taxation arose again. The 1909 Revenue Act imposed a one percent tax on the net income of corporations.<sup>121</sup> The corporate income tax has been in existence ever since, with rate fluctuations over time.<sup>122</sup> Different theories have been used to justify an entity tax on corporations.<sup>123</sup> Under the “natural entity theory,” the corporation is viewed as an entity separate and distinct from its owners, with many of the qualities of natural persons. As the corporation is like a natural person, it should pay tax like a person.<sup>124</sup> The United States is not alone in taxing corporations. Most industrialized countries—indeed all advanced countries that comprise the

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<sup>119</sup> Ch. 349, § 32, 28 Stat. 509, 556 (imposing the tax on “all other corporations, companies, or associations doing business for profit in the United States, no matter how created or organized, but not including partnerships”).

<sup>120</sup> The Supreme Court held that the 1894 tax was a direct tax on property, not apportioned among the states in proportion to the population as required by the U.S. Constitution. See *Pollock v. Farmers' Loan & Trust Co.*, 158 U.S. 601, *vacating* 157 U.S. 429 (1895).

<sup>121</sup> Corporate Tax Act of 1909, ch. 6, § 38, 36 Stat. 11, 112 (imposing tax on the net income of “every corporation, joint stock company or association, organized for profit and having a capital stock represented by shares”).

<sup>122</sup> Until recently, the United States had one of the highest corporate income tax rates in the world, with a top marginal rate of 35%. Many OECD countries had lowered their corporate tax rates in an effort to attract investment. In fact, over several decades, the average top marginal corporate income tax rate in the OECD dropped from appropriately 48% to approximately 25%. See *Table 11.1. Statutory Corporate Income Tax Rate*, OECD.STAT, last accessed Oct. 19, 2021, [https://stats.oecd.org/Index.aspx?DataSetCode=TABLE\\_II1](https://stats.oecd.org/Index.aspx?DataSetCode=TABLE_II1) [<https://perma.cc/VYK8-5K99>]. As a result, many U.S. multinational companies engaged in aggressive tax strategies to shift their intellectual property and related income offshore through the use of foreign subsidiaries. See JEFFREY A. MAINE & XUAN-THAO NGUYEN, *THE INTELLECTUAL PROPERTY HOLDING COMPANY: TAX USE AND ABUSE FROM VICTORIA'S SECRET TO APPLE* (2017). In response, the United States recently lowered its corporate tax rate to a flat 21%. I.R.C. § 11, as amended by the TCJA.

<sup>123</sup> See Jeffrey A. Maine, *Linking Limited Liability and Entity Taxation: A Critique of the ALI Reporters' Study on the Taxation of Private Business Enterprises*, 62 U. PITT. L. REV. 223, 244 (2000) (“[E]arly versions of the corporate tax adopted a theory of taxation that focused on the statutory benefit of limited liability, either a benefits theory of taxation or an artificial entity view of the corporation with a heavy focus on limited liability privileges granted by the state, rather than the natural entity theory.”).

<sup>124</sup> Professor Klein has offered two views of the entity theory. See William A. Klein, *Income Taxation and Legal Entities*, 20 UCLA L. REV. 13 (1972). Under an extreme view of the entity theory, the corporation is a nonphysical legal devise that has been “converted into a person—or at least into a thing with many of the qualities of a person,” and, hence, should pay a tax like a person. *Id.* at 53. Under a less extreme view of the entity theory, the “fictional quality of the corporate person” are analyzed to determine whether the entity is really separate and apart from its owners. *Id.* at 44. If the corporation is seen as separate for nontax purposes, then an entity tax is justified. See also Jennifer Arlen & Deborah M. Weiss, *A Political Theory of Corporate Taxation*, 105 YALE L.J. 325, 331 (1995) (suggesting the “entity theory was indeed the original basis for imposing a separate corporate tax”).

Organization for Economic Cooperation and Development (OECD)—levy a tax on corporate profits.<sup>125</sup>

The ultimate tax incentive for R&D activity would be total exemption from taxation of income derived from intellectual property—royalties from licensing of successful intellectual property or gains from dispositions of such property. As a general rule, a corporation is taxed on all of its “income,” broadly defined as “undeniable accessions to wealth, clearly realized, and over which the taxpayer has complete dominion.”<sup>126</sup> Although realized income is a broad concept, there are limitations on its meaning. Indeed, Congress has decided, for various policy reasons, to exclude certain types of receipts or benefits from the income tax base.<sup>127</sup> Each statutory exclusion addresses some particular congressional concern or achieves some particular goal.

Many of these statutory exclusions are available to individuals and not corporations. For example, damages received in certain tort actions are excluded from taxation, perhaps reflecting congressional compassion for those who suffer personal physical injury or sickness.<sup>128</sup> Gain from the sale of an individual’s principal residence is excluded, promoting the goal of eliminating tax considerations from the decision to move from one home to another.<sup>129</sup> And certain fringe benefits received by an employee are excluded, in part reflecting congressional concern about administrative convenience.<sup>130</sup>

While many statutory exclusions benefit individual taxpayers, some do benefit corporate taxpayers. Examples include interest on state and local bonds,<sup>131</sup> income from discharge of indebtedness,<sup>132</sup> improvements by lessees on corporate property,<sup>133</sup> and contributions to the capital of corporations,<sup>134</sup> to name a few.

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<sup>125</sup> See Kyle Pomerleau, *Sources of Government Revenue in the OECD, 2014*, TAX FOUND. (Nov. 12, 2014), <http://taxfoundation.org/article/sources-government-revenue-oecd-2014> [https://perma.cc/4NV6-BGG6].

<sup>126</sup> The starting point in computing a taxpayer’s tax liability is to determine the taxpayer’s *gross income*. Section 61 of the Code defines gross income broadly as “all *income* from whatever source derived.” I.R.C. § 61(a) (emphasis added). In *Commissioner v. Glenshaw Glass*, 348 U.S. 426, 431 (1955), the Supreme Court defined *income* as “undeniable accessions to wealth, clearly realized, and over which the taxpayer [has] complete dominion.”

<sup>127</sup> See, e.g., I.R.C. §§ 101–140.

<sup>128</sup> I.R.C. § 104.

<sup>129</sup> I.R.C. § 121.

<sup>130</sup> I.R.C. § 132.

<sup>131</sup> I.R.C. § 103.

<sup>132</sup> I.R.C. § 108.

<sup>133</sup> I.R.C. § 109.

<sup>134</sup> I.R.C. § 118.

### 1. *Exemption Examples*

Statutory income exemptions are often designed to encourage certain economic behavior. While an ideal tax system would be neutral in order to avoid unnecessarily shaping economic behavior, this neutrality principle has lost ground over the past half century to what might be termed “social engineering.” Indeed, many tax rules have been enacted to encourage various behaviors; they deliberately attempt to drive economic decision making.<sup>135</sup> A prime example is section 1202 of the Code. It provides taxpayers other than corporations a 100% exclusion for gains recognized with respect to the stock of qualified small business corporations.<sup>136</sup> This exemption was enacted as an incentive for taxpayers to start and invest in certain small businesses.<sup>137</sup> Of course, various requirements must be met to benefit from the 100% exclusion. The stock must be in a company that satisfies an active business requirement,<sup>138</sup> and the stock must be held for more than five years.<sup>139</sup>

A more recent example of social engineering is a new rule relating to investments in qualified opportunity zones, created by the TCJA.<sup>140</sup> The new rule provides tax benefits to taxpayers who realize capital gains and invest them in certain so-called qualified opportunity funds (QOFs) that invest in businesses and real estate located in economically distressed communities.<sup>141</sup> More specifically, if a taxpayer has a capital gain, the taxpayer can defer paying tax on that capital gain by making an investment in a qualified opportunity zone—that is, by making an investment in a QOF within 180 days. The original deferred gain must be recognized in 2026 (or in the year of sale if the QOF investment is sold earlier), providing a healthy amount of deferral. In addition to providing for *deferral* of the original gain, the rule provides for

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<sup>135</sup> MILLER & MAINE, *supra* note 30, at 6.

<sup>136</sup> I.R.C. § 1202.

<sup>137</sup> Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, § 13113(a), 107 Stat. 312, 422. For an overview of the provision, the history behind the development of amendments, and the apparent intent for enactment, see Beckett G. Cantley, *The New Section 1202 Tax-Free Business Sale: Congress Rewards Small Businesses that Survived the Great Recession*, 17 *FORDHAM J. CORP. & FIN. L.* 1127 (2012).

<sup>138</sup> I.R.C. § 1202(c)(2)(A). Specifically, the corporation must use at least 80% of its assets, measured by value, in the active conduct of one or more qualified trades or businesses, which is defined by negation (i.e., any business other than those listed in the statute). I.R.C. § 1202(e)(3).

<sup>139</sup> I.R.C. § 1202(a)(1).

<sup>140</sup> I.R.C. §§ 1400Z-1, 1400Z-2.

<sup>141</sup> See Notice 2019-42, 2019-29 I.R.B. 352 (providing a list of “qualified opportunity zones” by state). Congress has occasionally offered temporary tax incentives designed to encourage investment in distressed communities (e.g., so-called empowerment zones, the District of Columbia Enterprise Zone, the Gulf Opportunity Zone). See STAFF OF THE JOINT COMM. ON TAX’N, INCENTIVES FOR DISTRESSED COMMUNITIES: EMPOWERMENT ZONES AND RENEWAL COMMUNITIES, JCX-38-09 (2009).

the *exclusion* of gain in some cases.<sup>142</sup> Most notably, the appreciation in the QOF investment in excess of the original deferred gain is completely exempt from tax if the taxpayer holds its QOF investment for at least ten years.<sup>143</sup>

The United States could consider enacting something along these lines (the rules for qualified small business investments and QOF investments) for taxpayers with certain R&D investments. A 100% income exclusion for intellectual property income could be designed narrowly to achieve targeted goals and minimize revenue loss for the government. Taxpayers eligible for the exclusion could be limited to companies that engage in original research (and not available to companies that outsource R&D or purchase R&D); the benefit could be geared toward small or large companies. R&D activity eligible for the exclusion could be specified. A list of R&D projects, such as vaccine development, could be targeted for the benefit; alternatively, the exemption could be designed to apply only to registered R&D activities. And the type of intellectual property income exempt from taxation could be specified (e.g., royalties from licensing of intellectual property, gains from the sale of intellectual property, gains from the sales of products whose value lies predominantly in the underlying intellectual property, etc.).

## 2. *The Prohibitive Costs of Exemption*

The statutory income exclusion would no doubt be costly for the government, as are most of the statutory exclusions in the Code. Exclusions create what are known as “tax expenditures,” which occur when a special rule causes the government to collect less revenue than it would collect if all net accessions to wealth were taxed.<sup>144</sup> Already federal income tax revenues are reduced by hundreds of billions of dollars annually because of existing tax expenditures. In fact, the *ex ante* tax incentives (deduction and credit) for R&D represent some of the largest business tax expenditures for the U.S. government. Expensing of R&D expenditures was expected to cost the government \$119

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<sup>142</sup> If the taxpayer holds its QOF investment for at least five years, the taxpayer may increase the basis in the QOF investment by ten percent of the original deferred gain (this effectively excludes 10% of the original deferred gain). I.R.C. § 1400Z-2(b)(2)(B)(iii). If the taxpayer holds its QOF investment for at least seven years, the taxpayer may increase basis in the QOF investment by 15% (instead of 10%) of the original deferred gain (this effectively excludes 15% of the original deferred gain). I.R.C. § 1400Z-2(b)(2)(B)(iv). Any remaining deferred capital gain is taxed on the earlier of (1) the date the investment fund is sold or (2) December 31, 2026.

<sup>143</sup> If the taxpayer holds its QOF investment for at least ten years, the taxpayer may increase the basis in its QOF investment to its fair market value on the date the investment is sold. This effectively excludes the gain attributable to the appreciation in the investment after the original deferred gain is recognized in 2026 (or earlier in case of an earlier sale). I.R.C. § 1400Z-2(c).

<sup>144</sup> The federal government maintains what is known as the tax expenditure budget, a compilation of all of the tax expenditures. See *Tax Expenditures*, U.S. DEP'T OF THE TREASURY, <https://www.treasury.gov/resource-center/tax-policy/Pages/Tax-Expenditures.aspx> [<https://perma.cc/M84T-EVSG>].

billion over the ten-year, 2018–2027 period.<sup>145</sup> The tax credit for R&D was expected to cost the government \$163 billion in tax revenues over the same ten-year period.<sup>146</sup> The additional revenue loss from a new intellectual property income exclusion may not be viewed as outweighing its benefit, especially since the government already has two costly tax expenditures to encourage new R&D (*i.e.*, the tax deduction and tax credit referenced earlier). The costs of total exemption may explain why most countries have not adopted such approach.

### B. Lower the Effective Tax Rate on Intellectual Property Income

As an alternative to exempting intellectual property income from taxation, the U.S. government could consider adopting a reduced tax rate on R&D investment returns. The concept is not a new one. Indeed, many countries in recent years have adopted such an approach.<sup>147</sup> In these countries, so-called “patent boxes” or “innovation boxes” basically provide a reduced effective tax rate on income associated with eligible intellectual property. Some of these regimes exempt a certain percentage of income (royalty income, and, in some cases gains from disposition) from qualifying intellectual property, which has the effect of reducing the effective corporate tax rate on that intellectual property.<sup>148</sup> In contrast, some regimes allow certain income from qualifying intellectual property to be taxed at reduced rates.<sup>149</sup>

<sup>145</sup> See STAFF OF THE JOINT COMM. ON TAX'N, ESTIMATED BUDGET EFFECTS OF THE CONFERENCE AGREEMENT FOR H.R.1, THE “TAX CUTS AND JOBS ACT,” FISCAL YEARS 2018–2027, JCX-67-17 (Dec. 18, 2017). See also U.S. Dep't of the Treasury, *Tax Expenditures* (Oct. 16, 2017), <https://www.treasury.gov/resource-center/tax-policy/Documents/Tax-Expenditures-FY2019.pdf> [<https://perma.cc/2DDY-YBLE>].

<sup>146</sup> See *Tax Expenditures 2019*, *supra* note 145, at 21, 34 (Tables 1 & 3).

<sup>147</sup> The United Kingdom's regime became effective in 2013. See FINANCE ACT 2012, ch. 14 sched. 2 (U.K. PUB. GEN. ACTS), <http://www.legislation.gov.uk/ukpga/2012/14/contents/enacted> [<https://perma.cc/47SS-GPTG>]. Italy introduced its regime in 2015. See Carlo Maria Paoletta, Andrea Tempestini & Federico Bortolameazzi, *The Upcoming Implementation of the Italian Patent Box Regime*, MCDERMOTT WILL & EMORY (July 31, 2015), <http://www.mwe.com/The-Upcoming-Implementation-of-the-Italian-Patent-Box-Regime-07-31-2015/> [<https://perma.cc/3JP7-5HHG>]. Ireland first adopted the concept in 1973. See Robert D. Atkinson & Scott Andes, *Patent Boxes: Innovation in Tax Policy and Tax Policy for Innovation*, INFO. TECH. & INNOVATION FOUND. at 3, 5 (Oct. 2011), <http://www.itif.org/files/2011-patent-box-final.pdf> [<https://perma.cc/M8XH-MLRS>]. The regime was repealed in 2010, only for a new one to be enacted in 2016. See Wim Eynatten, *European R&D and IP Tax Regimes: A Comparative Study*, 36 INTER-TAX 502, 512 (2008).

<sup>148</sup> Exemption rates vary (*e.g.*, 80% in Belgium and Luxemburg, but 50% in Hungary and Spain).

<sup>149</sup> France, for example, does not offer an exemption rate, but does offer an effective rate of ten percent on qualifying intellectual property. KPMG, France Country Profile 2 (June 2021), <https://assets.kpmg/content/dam/kpmg/xx/pdf/2021/10/france-country-profile-2021.pdf> [<https://perma.cc/9DSG-NKG2>]. Likewise, the United Kingdom allows for certain income from

The United States has yet to follow the global trend and adopt a low tax rate specifically for intellectual property income, although there have been congressional proposals for such a regime.<sup>150</sup> There are several plausible reasons why.<sup>151</sup> First, the government seems stuck on accepting *ex ante* tax incentives (R&D deduction and credit provisions) as doing a better job of encouraging *new* R&D; *ex post* tax incentives (patent box regimes) can be viewed as less effective because they provide benefits for intellectual property already in existence.<sup>152</sup> Second, patent box regimes require new rules and

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qualifying patents to be taxed at a reduced rate of ten percent. KMPG, United Kingdom Country Profile 7 (Aug. 2020), <https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/10/uk-country-profile-2020.pdf> [<https://perma.cc/RHV4-XAS2>].

<sup>150</sup> The closest policy the United States has to a patent box is a special deduction for certain foreign-derived intangible income (FDII). I.R.C. § 250, added by the TCJA. This provision grants the benefit of a reduced tax rate to FDII earned directly by a U.S. corporation. The provision provides a 37.5% deduction for FDII, which amounts to a 13.125% effective tax rate on FDII. Mindy Herzfeld, *For Biden's Treasury Team, Big Ideas Are About to Meet Reality*, 170 TAX NOTES FED. (TA) 1054 (Feb. 15, 2021). For critique of the regime, see Rebecca M. Kysar, *Critiquing (and Repairing) the New International Tax Regime*, 128 YALE L.J. 339 (2018). The Biden Administration has proposed eliminating the FDII regime. See Press Release, The White House, *supra* note 20.

Prior to the enactment of section 250, there were calls for a patent box in the United States. For example, former House Committee on Ways and Means Chairman, David Camp, proposed a 15% rate on certain intellectual property income. See HOUSE COMM. ON WAYS & MEANS, 112TH CONG., TECHNICAL EXPLANATION OF THE WAYS AND MEANS DISCUSSION DRAFT PROVISIONS TO ESTABLISH A PARTICIPATION EXEMPTION SYSTEM FOR THE TAXATION OF FOREIGN INCOME 34 (2011), [http://waysandmeans.house.gov/UploadedFiles/FINAL\\_TE\\_01-Ways\\_and\\_Means\\_Participation\\_Exemption\\_Draft.pdf](http://waysandmeans.house.gov/UploadedFiles/FINAL_TE_01-Ways_and_Means_Participation_Exemption_Draft.pdf).

<sup>151</sup> THE PRESIDENT'S FRAMEWORK, *supra* note 116, at 22 ("Measured by the criterion of economic efficiency, the innovation box comes up short as a desirable tax policy tool."). See Remarks by Jason Furman, *Encouraging Innovation and the Role of Tax Policy*, JOINT INT'L TAX POL'Y F. & GEO. UNIV. LAW CTR., Mar. 11, 2016, [https://www.whitehouse.gov/sites/default/files/docs/20160311\\_innovation\\_and\\_tax\\_policy\\_itpf.pdf](https://www.whitehouse.gov/sites/default/files/docs/20160311_innovation_and_tax_policy_itpf.pdf) [<https://perma.cc/Z8SL-HABJ>]. See also Jason J. Fichtner & Adam N. Michel, *Don't Put American Innovation in a Patent Box: Tax Policy, Intellectual Property, and the Future of R&D*, MERCATUS CTR., GEO. MASON UNIV. (Dec. 2015), <https://www.mercatus.org/system/files/Fichtner-Patent-Boxes-MOP.pdf> [<https://perma.cc/3LDC-EDE2>].

<sup>152</sup> THE PRESIDENT'S FRAMEWORK, *supra* note 116, at 22 ("Compared to the R&E credit, an innovation box is less effective in encouraging innovation."); Graetz & Doud, *supra* note 63, at 374–75 (summarizing data on benefits of R&D tax incentives). As further support for the notion that the government prefers *ex ante* R&D incentives, a proposed change in the Biden Tax Plan is repeal of the deduction for foreign-derived intangible income (FDII). DEP'T OF THE TREASURY, GENERAL EXPLANATIONS OF THE ADMINISTRATION'S FISCAL YEAR 2022 REVENUE PROPOSALS 11 (May 2021), <https://home.treasury.gov/system/files/131/General-Explanations-FY-2022.pdf> [<https://perma.cc/8BGG-L8NA>] [hereinafter the Greenbook]. The deduction, added by the TCJA, is 37.5% of a domestic corporation's FDII, which is a portion of its intangible income determined on a formulaic basis that is derived from exports. According to the Greenbook, the

compliance checks which would only further complicate our tax system.<sup>153</sup> Third, patent boxes can result in a “race to the bottom” wherein countries compete to have the lowest rate on intellectual property income.<sup>154</sup> Finally, patent boxes are costly.<sup>155</sup> If the United States adopted a patent box, the regime, considering the large size of the U.S. market, could result in a significant loss of revenue.<sup>156</sup>

In lieu of targeting intellectual property specifically for a special low tax rate, the government could consider adopting, more generally, a reduced tax rate applicable to corporate capital gains. From 1913 (the year of the enactment of the modern income tax) to 1921, the tax laws did not distinguish between gains from the disposition of capital assets and other types of income.<sup>157</sup> Since 1921, however, gains from sales or exchanges of capital assets have been subject to preferential tax rates for *individual taxpayers only* and not corporate taxpayers.<sup>158</sup> Corporate taxpayers generally have not been allowed preferential tax treatment on capital gains.<sup>159</sup>

Preferential treatment for corporate capital gains would lower the rate of tax on gains recognized on sales of corporate patents but not on royalty income received with respect to corporate patents. That is because, under general characterization principles, the capital gain preference is given only to “sales or exchanges” of “capital assets.”<sup>160</sup> Unless considered inventory, corporate patents would qualify as capital assets and, hence, give rise to capital

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FDII deduction is not an effective way to encourage R&D in the United States; it provides large tax breaks to companies with excess profits rather than incentivizing new domestic R&D. *Id.*

<sup>153</sup> THE PRESIDENT’S FRAMEWORK, *supra* note 116, at 22. The design of any patent box is complicated. For example, (1) the effective tax rate must be agreed upon, (2) the types of intellectual property eligible for special tax rate treatment must be defined, (3) the scope of qualifying income (*i.e.*, the base of income that qualifies for preferential tax treatment) must be determined, and (4) the degree of external contributions permitted must be determined (*i.e.*, should only self-developed intellectual property qualify for special rate treatment or should income from outsourced or purchased intellectual property be included?).

<sup>154</sup> *Id.*

<sup>155</sup> *Id.* The United Kingdom, for example, saw a reduction in corporate revenues with its patent box even though additional innovation was reported. See Rachel Griffith, Helen Miller & Martin O’Connell, *Ownership of Intellectual Property and Corporate Taxation*, 112 J. PUB. ECON. 12 (2014).

<sup>156</sup> A way to make up the tax revenue loss would have to be considered. See Luca Gattoni-Celli, *Ryan Eyeing Research Cost Recovery to Pay for Innovation Box*, 148 TAX NOTES (TA) 824 (Aug. 24, 2015) (proposing 5-year amortization of R&D costs).

<sup>157</sup> See Howard J. Rothman, Pamela M. Capps & Barry Herzog, *Capital Assets*, 561-3rd TAX MGMT. PORT. (BNA) II (2021) (“Before the enactment of the Revenue Act of 1921, there was no statutory distinction between profits realized upon the sale of property and other items of income.”).

<sup>158</sup> *Id.* (citing The Revenue Act of 1921, ch. 136, § 206(a)(6), 42 Stat. 277).

<sup>159</sup> *Id.*

<sup>160</sup> I.R.C. § 1222.

asset treatment.<sup>161</sup> This lower rate would incentivize risky R&D investment. Indeed, one argument in favor of preferential treatment for capital gains is that the preference reduces a disincentive to risk taking.<sup>162</sup> A company's patent portfolio, which would be subject to capital asset treatment, reflects risk capital. Taxation of patent gains at the regular corporate income tax rate undermines, rather than incentivizes, risk taking.<sup>163</sup>

A tax rate preference for corporate capital gains generally would amount to an indirect *ex post* incentive for successful R&D. However, a reduced tax rate on capital gains generally would face the same hurdles as a more targeted rate reduction on intellectual property specifically. The incentive may be viewed as unnecessary, or less effective than *ex ante* rules, in encouraging new R&D activity. The general rate preference for a corporation's capital gains over other types of income would only increase the stakes on which intellectual property income qualifies (*e.g.*, what types of intellectual property should qualify and what types of dispositions should qualify), adding additional

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<sup>161</sup> I.R.C. § 1221. Note that patents used in a company's trade or business are not capital assets. I.R.C. § 1221(a)(2). However, such patents are considered quasi-capital assets, or section 1231 property, and may be accorded capital asset status nonetheless. I.R.C. § 1231. Patents held by a taxpayer whose personal efforts created the property are also not capital assets or quasi-assets. I.R.C. §§ 1221(a)(3), 1231(b)(1). However, this capital asset exception arguably applies to only individual creators and not corporate creators.

<sup>162</sup> Anthony P. Polito, *Small Business Corporation Stock: Special Tax Incentives*, 760 TAX. MGMT. PORT. (BNA) I.B n.10 (2021) (citing John W. Lee, *Critique of Current Congressional Capital Gains Contentions*, 15 VA. TAX REV. 1 (1995); Noel B. Cunningham & Deborah H. Schenk, *Colloquium on Capital Gains: The Case for a Capital Gains Preference*, 48 TAX L. REV. 319 (1993); Walter J. Blum, *A Handy Summary of the Capital Gains Arguments*, 35 TAXES 247 (1957)). There are other arguments supporting preferential treatment for capital gains. It is argued that it would be inequitable to tax capital gains at high rates in the year of disposition when those gains may have accrued over several years. Further, it is contended that a high tax on capital gains may effectively lock some taxpayers into their existing investment and impair the mobility of capital, whereas a tax preference encourages the free flow of capital into new enterprises and productive investments, increases economic activity and growth, and ultimately creates more tax revenue for the government. See MILLER & MAINE, *supra* note 30, at 253 (discussing arguments for and against according a tax rate preference to capital gains).

<sup>163</sup> Polito, *supra* note 162 (making the risk-taking argument):

Taxation at ordinary rates undermines risk taking, because the ordinary tax treatment takes a larger share of the upside than the downside. In other words, profits are fully taxable, but losses often are not fully useable either because of various loss disallowance rules or because the taxpayer does not have sufficient other income against which to deduct the losses. Examining an investment prospectively, therefore, the tax system causes the taxpayer to bear a greater percentage of downside risk than the taxpayer enjoys of upside potential. On a risk-weighted basis, therefore, it reduces the expected rate of return of risky investments. The same disparity of treatment does not apply to riskless investments. Although the income tax reduces the return to riskless investments as well, the argument runs, it has a greater effect on risky investments.

complexity to the Code and transaction costs for corporate taxpayers. Unless targeted at risky R&D projects, the approach would be extremely costly as a number of non-intellectual property assets and transactions would also qualify for the special treatment.<sup>164</sup>

As a final note, the appropriate tax rate to impose on corporate income has been the subject of fierce debate. Until recently, the United States maintained the same high corporate tax rate for 30 years. During that period, many OECD countries lowered their corporate tax rates in an effort to attract investment. In fact, the average top marginal corporate income tax rate in the OECD dropped from approximately 48% to approximately 25%.<sup>165</sup> Recently, in response, the United States lowered its corporate tax rate from 35% to 21%. Historically, however, the United States has been an outlier when it comes to rate reduction policies. Lowering the rate on intellectual property income, or extending a capital gain rate preference to corporations, seems highly unlikely in the present political climate. Indeed, the Biden Administration has recently proposed to move in the opposite direction—raising the corporate income tax rate as well as the capital gains tax rate applicable to individuals.<sup>166</sup>

### C. *Defer (Postpone) Taxation of Intellectual Property Income*

In lieu of exempting intellectual property income from taxation or reducing the effective tax rate on such income, the U.S. government could consider a third option—taxation deferral. The income tax is imposed on an annual basis, the tax year. Taxpayers will nearly always be economically advantaged by the deferral of taxable income to a later year.<sup>167</sup> The advantage is a reduction of the taxpayer's current tax liability, which leaves the taxpayer with the use of its money for a while longer.

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<sup>164</sup> Under general characterization principles, sales and exchanges of so-called capital assets (defined in section 1221) or quasi-capital assets (defined in section 1231) produce capital gains. Generally, non-inventory property used in business (*e.g.*, land, buildings, and other assets) qualify for capital asset treatment. As noted earlier, however, for corporate taxpayers, capital gains are taxed at the same rate as other income.

<sup>165</sup> See Table II.1, *Statutory corporate income tax rate*, *supra* note 122.

<sup>166</sup> President Biden's proposal would lead to the United States having the highest tax rate on capital gains. See Clifton Painter, *Biden's Top Marginal Capital Gains Tax Rate Would Be Highest in OECD*, TAX FOUND. (July 6, 2021), <https://taxfoundation.org/biden-capital-gains-tax-rate-oecd/> [<https://perma.cc/848T-M7K4>].

<sup>167</sup> The government, in contrast, has an interest in the acceleration of income reporting since that will increase the government's current tax revenues. An evenhanded set of rules in the Code help navigate between these competing interests of the taxpayer and the government. The primary determinant of the timing of income is the taxpayer's method of accounting. There are two main methods: the cash method and the accrual method. See I.R.C. § 446(c); see also MILLER & MAINE, *supra* note 30, at 209.

Deferral of income reporting is at the heart of tax planning. Indeed, taxpayers often attempt to structure transactions to delay income taxation to a later year.<sup>168</sup> An example is the so-called “installment sale.” If a taxpayer sells a patent for \$1,000,000 cash in Year 1, the taxpayer will have to report and pay tax on \$1,000,000 of gain in Year 1.<sup>169</sup> However, if a taxpayer sells a patent for \$1,000,000 in an installment sale whereby the taxpayer receives \$100,000 each year for the next ten years, the taxpayer will report and pay tax on only \$100,000 of gain in Year 1, \$100,000 in Year 2, and so on.<sup>170</sup> The installment method of reporting, which is sanctioned by the Code, is favorable to taxpayers because it defers tax liability until actual payment (as distinguished from the installment note) is received.<sup>171</sup> It is justified primarily on the basis of taxpayer liquidity.

### 1. *Deferral Examples*

There are numerous provisions in the Code that sanction deferral of income reporting. Settling on a unified justification for these pro-taxpayer rules is difficult.<sup>172</sup> Some of these deferral rules, also known in tax jargon as “non-recognition” provisions, are premised on the fact that a taxpayer’s economic position has not substantially changed as a result of the transaction.<sup>173</sup> Consider the formation of a corporation. From a tax perspective, formation of a corporation is essentially a sale or exchange between a corporation and its founding shareholders. The shareholders transfer property (*e.g.*, a highly appreciated patent) to the corporation in return for stock in the corporation;

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<sup>168</sup> This is not always easy because of the statutorily mandated methods of accounting. Under the cash method of reporting, income is reported when it is either actually or constructively received. Reg. § 1.451-1(a). An item of income is constructively received when it is credited to the taxpayer’s account or set aside for him and there are no substantial restrictions on his control. Reg. § 1.451-2(a). For example, suppose a patent owner declines to accept a royalty check on December 31, Year 1. Instead, the patent owner asks that the royalty be given to her on January 2 of Year 2. Her purpose in making this request is to defer the tax on that royalty until Year 2. The doctrine of constructive receipt will require her to report the income in Year 1.

<sup>169</sup> This assumes the taxpayer has a zero basis in the patent, which would be the case if the taxpayer previously expensed all R&D costs under section 174; *see also* I.R.C. § 1001(a) (providing that the gain realized on a sale is the excess of the amount realized over the adjusted basis).

<sup>170</sup> I.R.C. § 453. An installment sale is a sale where at least one payment is received after the end of the year in which the disposition occurs. I.R.C. § 453(b)(1). The key to applying the installment method is found in section 453(c). *But see* I.R.C. § 453A(c) (requiring the payment of interest on the deferred tax liability under certain circumstances).

<sup>171</sup> This is different from the outcome that would normally arise under either the cash method or the accrual method of accounting. The installment method is an exception to both of these methods. It automatically applies unless the taxpayer elects out. I.R.C. § 453(d).

<sup>172</sup> *See* Fred B. Brown, *Designing Nonrecognition Rules Under the Internal Revenue Code*, 24 FLA. TAX REV. (forthcoming 2021).

<sup>173</sup> *See* Reg. § 1.1002-1(c) (stating that “[t]he underlying assumption of these exceptions is that the new property is substantially a continuation of the old investment still unliquidated . . .”).

the corporation issues its valuable stock for the property received from the shareholders. In the absence of overriding rules, each party would have to report gain or loss on the exchange.<sup>174</sup> However, Congress has chosen to treat corporate formations as nonrecognition events under certain circumstances.<sup>175</sup> A justification for the approach is that current gain recognition may be inappropriate because the shareholder may have simply changed the form but not the substance of her investment (the shareholder once owned the patent directly but now owns it indirectly through a controlling interest in the corporation).

The tax rules with respect to corporate formations bear a strong similarity to the so-called “like-kind” exchange rules. The Code grants nonrecognition of gain or loss on the exchange of business or investment real property for like-kind business or investment real property.<sup>176</sup> The basic rationale for the rule, as for most nonrecognition provisions, is that the taxpayer has not substantially changed her overall economic position. The investment vehicle may have changed but the substance of the investment remains. Put another way, one might say that the taxpayer has not “cashed in her chips.”

Nonrecognition provisions are generally considered taxpayer friendly. However, there is a catch. Nonrecognition usually means deferral, not exemption, from gain recognition. In the case of a corporate formation, any gain lurking in property transferred to a corporation will be taxed when the taxpayer sells the stock received in exchange. In the case of a like-kind exchange, any gain lurking in property transferred in the exchange will be taxed when the taxpayer sells the property received in the exchange. In short, nonrecognition provisions merely postpone the reporting of gain to a later year

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<sup>174</sup> I.R.C. § 1001(c) (providing all gains and losses are recognized (*i.e.*, reportable), unless a nonrecognition rule applies).

<sup>175</sup> I.R.C. §§ 351 (preventing current recognition of gains and losses by transferors when property is contributed solely for stock of a corporation if afterwards the transferors are in control of the corporation); 1032 (granting the corporation nonrecognition treatment). The key operative provision in most partnership formations is section 721. I.R.C. § 721 (providing that no gain or loss shall be recognized by a partner upon a contribution of property to the partnership in exchange for a partnership interest).

<sup>176</sup> I.R.C. § 1031(a)(1). The general rule for determining whether property is “like kind” is that the properties exchanged must be similar in “nature or character.” Reg. § 1.1031(a)-1(b). In this context, any sort of fee interest in real estate is similar in nature or character to any other form of fee interest in real estate. Reg. §§ 1.1031(a)-1(b) & (c); 1.1031(b)-1(b), Ex. 1.

It should be noted that, until recently, like-kind intellectual property qualified for nonrecognition; now the rule is limited to real property. Whether intellectual property was of a like-kind to other intellectual property generally depended on the nature or character of the rights involved (*e.g.*, a patent or copyright) and also on the nature or character of the underlying asset to which the intellectual property related. Reg. § 1.1031(a)-2(c). For guidance, see Reg. § 1.1031(a)-2(c)(3), Ex. 1 & 2; see also T.A.M. 2006-02-034 (Sept. 29, 2005) (providing guidance for determining whether patents and other types of intellectual property are of like kind).

when the property received in the transaction is sold or disposed of in a taxable transaction.<sup>177</sup>

In some cases, nonrecognition rules are justified as incentivizing desirable behavior. In the case of corporate formations, discussed above, nonrecognition fosters capital formation, that is, the pooling of money and other productive assets. In a capitalist society, capital formation is a good thing since it generates economic activity leading to profits for investors and jobs for employees.

A recent example of a nonrecognition rule designed to incentivize certain activities is the provision governing investments in qualified opportunity zones, discussed earlier.<sup>178</sup> Basically, investors can defer tax on capital gain by making an investment in a qualified opportunity zone—that is, by making an equity investment in a QOF.<sup>179</sup> The original gain deferred is not recognized until 2026 (or in the year of sale if the QOF investment is sold earlier).<sup>180</sup> The tax benefit—several years of tax deferral—was designed to encourage taxpayers to invest in businesses and real estate located in economically distressed communities.

In addition to providing incentives aimed at encouraging investment in distressed communities, the government has a history of providing incentives aimed at encouraging investment in small businesses.<sup>181</sup> For example, section 1045 of the Code allows the tax-deferred rollover of gain from the sale of stock of one qualified small business into stock of another.<sup>182</sup>

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<sup>177</sup> Gain is preserved by giving the taxpayer the same basis in the property received as he or she had in the property given up in the transaction with certain adjustments. See, e.g., I.R.C. §§ 358(a)(1) (corporate formations), 1031(d) (like-kind exchanges).

<sup>178</sup> I.R.C. § 1400Z-2. See *supra* notes 140–143 and accompanying text.

<sup>179</sup> Other requirements must be met. For example, the taxpayer must make the investment in a QOF within 180 days of the sale and must make an election on Form 8949. I.R.C. § 1400Z-2(a)(1)(A).

<sup>180</sup> I.R.C. § 1400Z-2(b)(1); Reg. § 1.1400Z2(b)-1(b). Of course, basis will be increased by the gain recognized. I.R.C. § 1400Z-2(b)(2)(B)(ii).

<sup>181</sup> See I.R.C. §§ 1045 (allowing gain from the sale of stock in a qualified small business corporation to be rolled over into the stock of another qualified small business corporation); 1202 (allowing exclusion of gain recognized with respect to stock of a qualified small business corporation); 1244 (allowing ordinary loss treatment with respect to stock of small business corporations). For analysis, see Polito, *supra* note 162, at III.

<sup>182</sup> I.R.C. § 1045. Section 13313 of the TCJA, Pub. L. No. 115-97, 131 Stat. at 2133, repealed section 1044, which permitted tax deferral of gain realized on the sale of publicly traded securities if the taxpayer used the sales proceeds to purchase common stock in a specialized small business investment company. See I.R.C. § 1044, prior to being stricken by the TCJA.

## 2. *The Case for Extending Deferral to R&D Income*

These examples of tax incentives aimed at encouraging investment in distressed communities and in small businesses are more broadly aimed at encouraging economic growth. Most people would agree that R&D investment is equally important to economic growth in this country. R&D activity, with its own positive spillover effects, can lead to technological advances, which can lead to economic growth. Indeed, few would dispute that R&D spending to find a COVID-19 vaccine did more for the economy than many other forms of investment spending.<sup>183</sup> Contextualizing the R&D spending for the COVID-19 vaccine and its impact requires an acknowledgment that without the successful vaccine, people cannot return to work safely in many sectors of the economy.<sup>184</sup> The healthcare cost associated with infection and hospitalization, if there was no COVID-19 vaccine, would continue to escalate.<sup>185</sup> With the success of the COVID-19 vaccine, evidence now demonstrates that vaccinated people receive immediate and measurable health benefits and are

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<sup>183</sup> See generally Joseph E. Gagnon et al., *Economic Costs and Benefits of Accelerated Covid-19 Vaccinations*, PETERSON INST. FOR INT'L ECON. (May 2021), <https://www.piie.com/publications/policy-briefs/economic-costs-and-benefits-accelerated-covid-19-vaccinations> [<https://perma.cc/V6Y4-RAEM>] (“Emergency measures to research, test, produce, and distribute vaccines have been expensive, but increases in GDP resulting from the vaccines are expected to exceed those costs by wide margins.”).

<sup>184</sup> See Christian E. Weller, *The Economic Benefits of Vaccinations*, CTR. FOR AM. PRO. (July 15, 2021), <https://www.americanprogress.org/issues/economy/news/2021/07/15/501698/economic-benefits-vaccinations/> [<https://perma.cc/SMY9-CMFC>] (summarizing the many ways in which vaccinations help the economy recover from the COVID-19 pandemic); *How Economic Recovery Hinges on the Vaccine Rollout*, KNOWLEDGE@WHARTON (Mar. 9, 2021), <https://knowledge.wharton.upenn.edu/article/how-economic-recovery-hinges-on-the-vaccine-rollout/> [<https://perma.cc/8XMC-GC8X>] (“The pace of the economic recovery in the U.S. in 2021 hinges on the pace of COVID-19 vaccinations, according to a brief by the Penn Wharton Budget Model. It projects that doubling the number of vaccine doses administered daily to 3 million would create more than 2 million jobs and boost real GDP by about 1% over the summer of 2021, with smaller effects later in the year.”); Michael Blanding, *The High Cost of the Slow Covid Vaccine Rollout*, HARV. BUS. SCH. WORKING KNOWLEDGE (Apr. 14, 2021), <https://hbswk.hbs.edu/item/the-high-cost-of-the-slow-covid-vaccine-rollout> [<https://perma.cc/H74Z-TDNB>] (“Aggressive investment in COVID-19 vaccine production earlier on could have saved lives and prevented \$700 billion in global economic losses”).

<sup>185</sup> Mallory Hackett, *Average Cost of Hospital Care for Covid-19 Ranges from \$51,000 to \$78,000, Based on Age*, HEALTHCARE FIN. (Nov. 5, 2020), <https://www.healthcarefinancenews.com/news/average-cost-hospital-care-covid-19-ranges-51000-78000-based-age> [<https://perma.cc/B95A-5QD6>] (predicting that the “cost of hospitalizations, on top of any other required treatments for COVID-19, could total \$546.6 billion for payers”).

more likely to plan for their futures.<sup>186</sup> Overall, the R&D spending for developing the COVID-19 vaccines rescued both life and the economy.<sup>187</sup>

Moreover, as discussed in an earlier section on the collaboration between BioNTech and Pfizer for purpose of illustration, R&D investments by BioNTech occur in the early stage of developing mRNA-based vaccines.<sup>188</sup> As recalled, the subsequent and substantial R&D investments came from Pfizer and were key factors to accelerate the pace of R&D at BioNTech on mRNA for a flu vaccine in 2018.<sup>189</sup> The R&D investments made by Pfizer for the mRNA vaccine for COVID-19, as well as the subsequent clinical phases and regulatory submissions, were both enormous and risky.<sup>190</sup> Overall, the R&D spending and risks associated with developing a new mRNA vaccine in response to a rapidly ravaging pandemic beg the question on the adequacy of incentivizing innovations.

### 3. *Design Options for a New Deferral Regime*

For these reasons, this Article proposes a new incentive regime—specifically, deferral of taxation of profits from successful R&D if such profits are reinvested in further R&D. Profits eligible for deferral could include either royalties from the licensing of self-developed patents or gains from the sale of self-developed patents, or both. The types of patents eligible for tax deferral could be limited to vaccine development and related disease diagnosis and treatments. In light of the rapid mutations of the coronavirus, the new normal now includes living with new variants of coronavirus. The new normal will require the development of vaccines against these new variants and treatments of associated diseases for the foreseeable future. This recognition provides the rationale for limiting the types of patents eligible for tax deferral.

The incentive regime should reward and encourage similar collaborations as seen in the partnership between BioNTech and Pfizer. The incentives should benefit *both* small biotech companies where innovations occur and large pharma companies who direct resources to small biotech companies for

<sup>186</sup> See Weller, *supra* note 184 (demonstrating that rising vaccinate rates coincide with better health care, job prospects, and future education plans). See also Janet Alvarez, *Why Getting the Covid-19 Vaccine Will Be Good for America's Financial Health*, CNBC (Jan. 10, 2021, 8:00 AM), <https://www.cnbc.com/2021/01/10/why-the-covid-19-vaccine-will-be-good-for-financial-health.html> [<https://perma.cc/N54Q-UZXU>].

<sup>187</sup> See Deidre McPhillips, *Covid-19 Vaccines Saved Nearly 280,000 Lives in the US, New Research Estimates*, CNN (July 8, 2021), <https://www.cnn.com/2021/07/08/health/covid-vaccinations-prevent-deaths-hospitalizations/index.html> [<https://perma.cc/F9SM-PS45>]; Victoria Masterson, *Equal Access to Covid-19 Vaccines Could be Worth Billions*, WORLD ECON. (Dec. 15, 2020) <https://www.weforum.org/agenda/2020/12/who-covid-vaccines-equitable-access/> [<https://perma.cc/WWJ4-7L3R>] (reporting that “10 major economies could be \$466 billion better off by 2025” by “averting economic disaster and helping to end the pandemic”).

<sup>188</sup> See *supra* notes 92–96 and accompanying text.

<sup>189</sup> Press Release, Pfizer, *supra* note 96.

<sup>190</sup> *Id.*

specialized R&D. Without the resources from large companies directed to small biotech companies under contractual agreements, innovation stagnation will result, and drug candidates will fail to reach late stages of clinical development.

Likewise, if large companies obtain technologies and know-how whether through purchases or licenses, the acquirers should still receive some benefits under the incentive regime, as long as the acquirers continue and further their R&D efforts. The burden is on the acquirers to demonstrate that they are actually spending on additional R&D to bring the products to market. As we have seen, there are high risks in racing to conduct the late phases of clinical trials and obtain regulatory approval for COVID-19 vaccines. The incentive regime must recognize and encourage such risks.

Eligible intellectual property income or gains would be tax-deferred only if rolled over or reinvested within so many days (say 180 days) in qualified R&D investment activities or funds. Of course, qualified R&D reinvestment activities or funds would have to be specified, but such reinvestment could include not only direct investment in the taxpayer's own R&D but also investments in qualified R&D funds set up by universities and foundations that engage in important basic research. The option to roll over the income and gains from intellectual property into basic research efforts is vital as U.S. government support for basic research has dwindled in recent years; yet, as we just learned with the COVID-19 vaccines, basic research is an essential part of the overall R&D landscape.

#### 4. *Costs and Benefits of a Deferral Regime for R&D Income*

A tax deferral regime for R&D income may be less costly for the government than the other two options discussed above (the complete tax exemption of income from intellectual property or a lower effective tax rate on such income). The period of deferral should be specified and could be limited as is the case with the deferral regime governing qualified opportunity zones; recall from above that taxation of capital gains invested in a QOF is deferred for a set number of years (until 2026).<sup>191</sup> Deferral would not necessarily have to be limited, however. In other words, taxation of qualified intellectual property income could be deferred until the taxpayer sells its investment in the R&D activity or fund, in other words, cashes in its chips.

In contrast to the other options, a tax deferral regime would also ensure continued investment in R&D activity. A rule completely excluding R&D income from taxation, or a rule lowering the effective tax rate on R&D income, provides no guarantee that a beneficiary taxpayer will continue to engage in valuable R&D activity or reinvest R&D gains in other R&D efforts. One can speculate that an income exemption or a lower effective tax rate on R&D gains would encourage firms to respond by investing more in R&D.

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<sup>191</sup> See *supra* notes 140–143 and 178–180 accompanying text.

But only a deferral tax regime would mandate that result in order for the regime's benefits to accrue to a taxpayer.

#### IV. Designing *Ex Post* R&D Tax Incentives for Individual Taxpayers

As noted earlier, corporate taxpayers do not receive preferential tax treatment for their capital gains; individual taxpayers, in contrast, generally do.<sup>192</sup> But individuals must satisfy the requirements of either (1) the general characterization provisions in the Code or (2) some special characterization provision in the Code, which trumps the general characterization provisions.

By the mid-twentieth century, amateur inventors (but not professional inventors) had both tools at their disposal. Sales of their patents qualified as "sales or exchanges" of "capital assets" and, thus, qualified for preferential capital asset treatment under general characterization principles.<sup>193</sup> Moreover, a special characterization provision enacted in 1954, section 1235, guaranteed capital asset treatment to individual inventors (both amateur and professional inventors) who did not meet the requirements under the general characterization provisions, provided such individuals satisfied certain statutory and administrative requirements.

In 2018, in a remarkable shift in tax policy, Congress made individual inventors ineligible for capital asset treatment under long-standing general characterization rules in the Code. Specifically, the TCJA amended the "capital asset" definition to exclude self-created patents and similar property.<sup>194</sup> Under the act, a patent, invention, model or design (patented or not), or secret formula or process is not a capital asset in the hands of the taxpayer whose personal efforts created the property.<sup>195</sup> Thus, gains from the sale of self-created patents and similar property are no longer eligible for preferential capital asset treatment under general characterization principles.<sup>196</sup>

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<sup>192</sup> See *supra* notes 158–159 and accompanying text. For individuals, the top rate of tax on capital gains (with certain exceptions) is 20% whereas the top rate on ordinary income is 37%—a significant rate differential for high earners. Compare I.R.C. §§ 1(h) (capital gain rates) with 1(j) (ordinary rates).

<sup>193</sup> I.R.C. §§ 1222 (requiring a "sale or exchange" of a "capital asset" held for more than one year); 1221 (defining a "capital asset"). The Code defines the term "capital asset" in negative terms (*i.e.*, all property held by a taxpayer except the property specifically listed). A longstanding exception from the capital asset definition is inventory or inventory-like property. I.R.C. § 1221(a)(1). Thus, patents developed by professional inventors have not qualified as capital assets. See *Lockhart v. Commissioner*, 258 F.2d 343, 346, 349–50 (3d Cir. 1958) (holding that an inventor who was granted 37 patents over a 19-year period was in the business of selling and licensing his inventions; such patents were not capital assets and payments received by him from the sale of just three patents were taxable as ordinary income).

<sup>194</sup> TCJA, Pub. L. No. 115-97, § 13314(a), 131 Stat. at 2133.

<sup>195</sup> I.R.C. § 1221(a)(3), as amended by the TCJA.

<sup>196</sup> The stated policy reason for the change was that because "profits and losses arising from everyday business operations [should] be characterized as ordinary income and loss, the general

Interestingly, when Congress removed self-created patents and inventions from capital asset characterization, it failed to repeal section 1235. As noted above, section 1235 is a special characterization provision that acts like a safe harbor for certain patent dispositions by individuals. When it applies, it provides statutory assurance to certain inventors that the sale of their inventions will qualify for reduced capital gains rates, as opposed to ordinary income tax rates, even if the sale would otherwise fail to qualify under general characterization principles (e.g., the transferor is a professional inventor or the invention has been held for less than one year).<sup>197</sup>

If section 1235 had been repealed in 2018, then individual inventors would have absolutely no chance of receiving capital asset treatment on their gains. But Congress kept it.<sup>198</sup> And, thus, as the only *ex post* tax incentive for R&D, the special characterization rule has taken on a more significant role in R&D tax policy.

By allowing individuals to qualify for capital asset treatment on the sale of their inventions, Congress intended to encourage R&D that potentially leads to patentable inventions.<sup>199</sup> Indeed, a stated policy goal underlying section 1235's enactment was "to provide an incentive to inventors to contribute to the welfare of the Nation."<sup>200</sup> Unfortunately, section 1235's design limits its effectiveness. For instance, the rule applies only to transfers of "all substantial rights" to a patent, which, for example, does not include grants that are limited geographically or grants that are limited to fields of use within particular

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definition of capital asset [should] be narrowly applied . . ." H.R. REP. NO. 115-466, at 414 (2017) (Conf. Rep.). The silent, more likely justification for the change, however, was that it helped pay for some of the expensive tax cuts in the TCJA. For criticism of this and other TCJA changes affecting R&D, see Nguyen & Maine, *supra* note 1, at 1732-49. Interestingly, while self-created patents are not eligible for capital asset treatment under general principles, self-created musical copyrights are. See I.R.C. § 1221(b)(3).

<sup>197</sup> I.R.C. § 1235(a) (providing that if all requirements are met, a patent transfer will be treated as a sale or exchange of a capital asset held for more than one year).

<sup>198</sup> The House bill proposed repealing section 1235. Tax Cuts and Jobs Act, H.R. 1, 115th Cong. § 3312 (2017); see H.R. REP. 115-409, at 272 (2017). The Senate version, however, kept it, and the Conference Committee agreed with the Senate. H.R. REP. NO. 115-466, at 414-15.

<sup>199</sup> Section 1235 applies only to patents and not to other forms of intellectual property, such as copyrights and trademarks. See S. REP. NO. 83-1622, at 441 (1954), as reprinted in 1954 U.S.C.C.A.N. 4621, 5084. Although the Code does not define a patent for purposes of section 1235, the regulations provide that the term "patent" means a patent granted under the provisions of Title 35 of the U.S. Code, as well as any foreign patent granting rights generally similar to those under a U.S. patent. Reg. § 1.1235-2(a). Of importance, the regulations provide that it is not necessary that the patent or patent application for the invention be in existence if the requirements of section 1235 are otherwise met. Reg. § 1.1235-2(a). Thus, section 1235 can apply to patentable technology for which a formal application has not yet been made. This is significant since transfers often grant ownership of perfected but unpatented inventions before the patent or patent application is in existence.

<sup>200</sup> S. REP. NO. 83-1622, at 439, as reprinted in 1954 U.S.C.C.A.N. at 5082.

trades or industries.<sup>201</sup> Further, the rule's favorable capital asset treatment applies only if the transferor is a "holder" of the patent, defined narrowly as any individual whose personal efforts created the property and who would qualify as the "original and first" inventor under the patent laws.<sup>202</sup> In many cases, these and other hurdles to capital asset treatment can be insurmountable.<sup>203</sup>

In light of section 1235's design flaws, yet increased significance as an R&D tax policy tool after the TCJA, Congress should consider design enhancements. Recommended below are several suggestions to expand the scope of section 1235 to cover more taxpayers and more patent transactions in the hopes of achieving the provision's original goals of incentivizing R&D activity and harmonizing *ex ante* and *ex post* R&D tax incentives.

## A. *Expand the Taxpayers Eligible for Capital Asset Treatment*

### 1. *Expand Section 1235 to Cover Non-Individual Creators*

Section 1235's favorable capital asset treatment applies only if the taxpayer-transferor is a statutorily defined "holder" of the patent. The holder of a patent is defined narrowly as (1) any individual whose personal efforts created the patent property and who would qualify as the "original and first" inventor, or joint inventor, under the patent laws<sup>204</sup> or (2) any other individual who acquired his or her interest in the patent property from the original inventor in exchange for money or money's worth prior to the actual reduction to practice of the invention covered by the patent (*e.g.*, a "financial backer").<sup>205</sup> There are several problems with this narrow construct of who can benefit from the special rule.

<sup>201</sup> Reg. § 1.1235-2(b)(1).

<sup>202</sup> I.R.C. § 1235(b)(1); Reg. § 1.1235-2(d)(1)(i) (referring to Title 35 of the Code).

<sup>203</sup> The capital gain benefits of section 1235 are not available when an individual transfers a patent to a "related person." I.R.C. § 1235(d); *see* S. REP. No. 83-1622, at 441, *as reprinted in* 1954 U.S.C.C.A.N. at 5084 (noting the limitation was added to "prevent possible abuses arising from the sale of patents within essentially the same economic group"). A transferor and a corporation in which the transferor holds a 25% or greater ownership interest are treated as related. I.R.C. §§ 267(b), 707(b), 1235(d). As illustrated by a recent case, courts might find proscribed control even in the absence of a 25% stock ownership interest in the transferee. *See* *Cooper v. Commissioner*, 143 T.C. 194 (2014), *aff'd*, 877 F.3d 1086, 1092 (9th Cir. 2017) ("[I]f a patent holder exercises control over the recipient corporation such that, in effect, there has not been a transfer of all substantial rights in the subject patent(s), then the requirements of § 1235(a) are not met, even if the documents describing the transfer formally assign all substantial rights.").

<sup>204</sup> I.R.C. § 1235(b)(1); Reg. § 1.1235-2(d)(1)(i) (referring to Title 35 of the Code).

<sup>205</sup> I.R.C. § 1235(b)(2); Reg. § 1.1235-2(d)(1)(ii). Payments for patent application fees and living expenses qualify as consideration for this purpose. *See, e.g., Meiners v. Commissioner*, 42 T.C. 653 (1964), *acq.*, 1967-2 C.B. 1. The term "actual reduction to practice," as used in section 1235(b)(2), has the same meaning as it does under the patent laws. Reg. § 1.1235-2(e) (referring to 35 U.S.C. § 102(g)). Generally, an invention is reduced to actual practice when it has been tested and operated successfully under normal operating conditions. This may occur either before

As an initial observation, only individuals can qualify for section 1235's safe harbor treatment. Startup companies and small research entities whose employees conduct their research do not qualify.<sup>206</sup> This is ironic since such companies are critical to economic growth in the United States; indeed they constitute 51% of firms engaged in innovation.<sup>207</sup> Technology-based startups are particularly important, as they account for more than 70% of business R&D investment and nearly 60% of R&D jobs in the United States.<sup>208</sup> Recently Congress expanded the R&D tax credit for startups and small businesses.<sup>209</sup> Expanding section 1235's scope to cover such entities would better align front-end and back-end R&D tax incentives. Of course, guaranteeing capital asset treatment for corporate startups under section 1235 would be irrelevant for tax rate purposes, as all corporate income (both ordinary income and capital gain income) is currently taxed at the same rate.<sup>210</sup> Nevertheless, capital asset treatment is often sought by companies since their capital losses are deductible in any given year only to the extent of their capital gains.<sup>211</sup> In other words, to the extent company income is characterized as capital gain, any capital losses the company might possess will offset that income.

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or after application for a patent but cannot occur later than the earliest time that commercial exploitation of the invention occurs. *Id.* For a decision finding holder status, see *Meiners*, 42 T.C. at 658. For a decision not finding holder status, see *Juda v. Commissioner*, 877 F.2d 1075, 1078–79 (1st Cir. 1989) (finding a limited partnership did not qualify as “holder” because it did not acquire an interest in the patents in exchange for consideration paid to the inventor prior to actual reduction to practice of the patented invention).

<sup>206</sup> Partnerships and other pass-through entities, such as limited liability companies (LLCs) are an exception. Each member of a partnership who is an individual may qualify as a holder as to his or her pro-rata share of a patent owned by the partnership. Reg. § 1.1235-2(d)(2). For private letter rulings holding that an inventor who filed patents with two co-inventors and formed an LLC with them retained his status as a “holder” for purposes of section 1235, and thereby concluding that gain recognized by the LLC on disposition of the patent rights qualified for capital asset treatment to the members, see P.L.R. 2005-06-008–009, 2005-06-019 (Oct. 20, 2004).

<sup>207</sup> See J. John Wu & Robert D. Atkinson, *How Technology-Based Start-Ups Support U.S. Economic Growth*, INFO. TECH. & INNOVATION FOUND., at 5–12 (Nov. 2017), [http://www2.itif.org/2017-technology-based-start-ups.pdf?\\_ga=2.208635282.1482348089.1511891291-735226115.1509988589](http://www2.itif.org/2017-technology-based-start-ups.pdf?_ga=2.208635282.1482348089.1511891291-735226115.1509988589) [<https://perma.cc/5MJZ-S2WZ>].

<sup>208</sup> *Id.* at 6 (focusing on “10 technology-based industries in manufacturing and services: pharmaceutical manufacturers, medical device manufacturers, computer and electronic manufacturers, semiconductor machinery manufacturers, semiconductor component manufacturers, aerospace manufacturers, data processing services, computer systems and design services, software publishing services, and R&D-performing services”).

<sup>209</sup> Starting in 2016, some startups and small businesses can use the tax credit to offset payroll taxes. I.R.C. § 41(h).

<sup>210</sup> I.R.C. § 11 (imposing a flat 21% tax rate on corporate taxable income).

<sup>211</sup> I.R.C. § 1211(a).

## 2. *Expand Section 1235 to Cover Employers Who Have “Equitable” Ownership of Patents*

A significant anomaly with section 1235 as currently designed is that an inventor's employer, even if an individual, does not qualify for the provision's special capital asset treatment. As noted earlier, an individual qualifies if his personal efforts created the patent property and he would qualify as the “original and first” inventor under the patent laws. Under this approach, an inventor's employer would not qualify “even though he may be the equitable owner of the patent by virtue of an employment relationship with the inventor.”<sup>212</sup> Also as noted, a financial backer can qualify.<sup>213</sup> However, the statute makes clear that a financial backer cannot be the employer of the inventor nor be related to him or her.<sup>214</sup>

Excluding employers from section 1235's benefit seems incongruous with present *ex ante* R&D tax incentives for such employers. Indeed, both the R&D tax deduction and tax credit become available to employers whose employees invent. Qualified research expenses eligible for the tax credit, for instance, include in-house research expenses, which include wages paid to an employee for qualified services performed by such an employee.<sup>215</sup> Expanding section 1235 to apply to an inventor's employer would provide harmony between *ex ante* and *ex post* R&D tax incentives.

More importantly, excluding employers from section 1235's safe harbor treatment ignores the fundamental patent law relating to inventorship and

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<sup>212</sup> S. REP. No. 83-1622, at 439–40, as reprinted in 1954 U.S.C.A.N. at 5082–83.

<sup>213</sup> Harsha Reddy, *Intellectual Property: Exploitation and Disposition*, 558-3rd TAX MGT. PORT. (BNA) I.I.A.1.b.(1)(c) (2021) (“By extending § 1235 treatment to financial backers, Congress recognized that the road to a successful invention is often paved with inadequate financing and the sacrifice by the inventor of gainful endeavors. Congress, however, also wanted to limit the application of § 1235 to those who contribute before the invention is brought to commercial readiness.”).

<sup>214</sup> I.R.C. § 1235(b); Reg. § 1.1235-2(d)(1)(ii). The requirement that a financial backer be neither the employer of the original inventor nor related to the inventor “must be satisfied at the time when the substantive rights as to the interest to be acquired are determined, and at the time when the consideration in money or money's worth to be paid is definitely fixed.” *Id.* For example,

[i]f prior to the actual reduction to practice of an invention an individual who is neither the employer of the inventor nor related to him agrees to pay the inventor a sum of money definitely fixed as to amount in return for an undivided one-half interest in rights to a patent and at a later date, when such individual has become the employer of the inventor, he pays the definitely fixed sum of money pursuant to the earlier agreement, such individual will not be denied the status of a holder because of such employment relationship.

*Id.*

<sup>215</sup> I.R.C. § 41(b)(2)(A). The term “qualified services” is defined as services consisting of (1) engaging in qualified research or (2) engaging in direct supervision or direct support of research activities that constitute qualified research. I.R.C. § 41(b)(2)(B).

the relationship between inventor-employees and their employers. As explained by the Supreme Court in *Stanford v. Roche Molecular Systems, Inc.*, inventors under patent law are individuals; therefore, the USPTO can only grant patents to individuals, not entities.<sup>216</sup> Individual inventors today are typically employed at small and large companies, and they are hired to invent. Under employment agreements or handbooks, individual inventors assign their patents and all other types of intellectual property to their employers because the employers have already compensated the employees for their efforts.<sup>217</sup> Through collaboration in the workplace and the use of the employer's facilities, the employees disclose their inventions to the employer. Thereafter, the employers spend financial resources to prosecute and procure the patent applications upon the employee's disclosure and cooperation. The patents are subsequently issued by the USPTO with the employees listed as inventors and the employers as assignees. Unquestionably, the employers arise as the equitable owners of the patents and should be qualified for section 1235 treatment.

Illustratively, IBM has led among all companies in the number of patents issued by the USPTO for several decades.<sup>218</sup> IBM's researchers are the inventors, and IBM is the assignee on all the patents.<sup>219</sup> IBM, as the employer, owns the patents under patent law, not the inventors.<sup>220</sup> Moreover, according to normative transactions, third parties negotiate for purchases or licenses to use the patents with IBM, not IBM's inventors, because IBM stands as the rightful owner of the patents.<sup>221</sup> Whenever an infringement action occurs,

<sup>216</sup> 563 U.S. at 785–86.

<sup>217</sup> See *Teets v. Chromalloy Gas Turbine Corp.*, 83 F.3d 403, 408 (Fed. Cir. 1996) (holding that, in a case in which an at-will employee did not have an employment contract, the employee still had the obligation to assign the patents to the employer because the employer hired the employee to invent and compensated him for his efforts and paid for the prosecution of the patent application).

<sup>218</sup> See Manny Schecter, *IBM Has Led In U.S. Patents for 25 Years: Five Lessons It Learned*, TECH. (Mar. 20, 2018), <https://teconomy.com/2018/03/ibm-led-u-s-patents-25-years-five-lessons-learned/> [<https://perma.cc/6JR6-J3DZ>] (“[T]he United States Patent and Trademark Office announced that IBM was awarded more U.S. patents than any other company for the 25th consecutive year. This is a remarkable record that is unlikely ever to be surpassed, and IBM has a lot to teach other companies.”).

<sup>219</sup> The USPTO announced IBM, not IBM's employees, as the owners of newly issued patents. See *id.*

<sup>220</sup> See *id.* Also, IBM inventors know that they are not the owners of the patents and that their employer IBM is the rightful owner. See Dario Gil, *IBM's Innovation: Topping the US Patent List For 28 Years Running*, IBM (Jan. 12, 2021), <https://www.ibm.com/blogs/research/2021/01/ibm-patent-leadership-2020/> [<https://perma.cc/9GPU-8CQ8>].

<sup>221</sup> See Jack Ellis, *The Inside Take on IBM's Hybrid Patent Sales Strategy and How It Helps to Create Value for Big Blue*, IAM (Mar. 17, 2017), <https://www.iam-media.com/copyright/inside-take-ibms-hybrid-patent-sales-strategy-and-how-it-helps-create-value-big-blue> [<https://perma.cc/Y3XD-36HB>] (reporting that six out of the ten largest US IPOs by valuation involved companies

IBM and not the inventors decide whether to bring an infringement action and whether to settle any lawsuit.<sup>222</sup> Similarly, in a university setting, the researchers receive a salary and use university facilities to conduct extensive experiments that may lead to patents.<sup>223</sup> University technology offices often prosecute the patent applications, which list the researchers as inventors and the universities as assignees.<sup>224</sup> The universities then negotiate license deals and share some of the profits generated from the licensed patents with the inventors. Clearly, universities should not be excluded from section 1235 treatment; but because most universities are tax-exempt entities, any issue related to capital asset treatment is irrelevant.<sup>225</sup> Nevertheless, the norms of understanding with respect to the original owners of patents in the employment context are well established: the employers are the original and equitable owners. Accordingly, the employers should be included within the scope of section 1235 treatment.

### 3. *Expand Section 1235 to Cover Employees Hired to Invent*

Equally problematic to the fact that *employers* currently do not qualify for section 1235 treatment is the fact that many of their *employees* who invent

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that had purchased patents from IBM and that IBM's patent law team is responsible for the "company's patent, copyright and know-how monetization activity," including patent sales and licenses to "seal broader commercial deals or offer value-adds to its enterprise services customers—many of which are high-growth tech startups aiming for an IPO").

<sup>222</sup> See *IBM Announces Settlement With Airbnb for Patent Lawsuit*, YAHOO! FIN. (Dec. 28, 2020), <https://www.yahoo.com/now/ibm-announces-settlement-airbnb-patent-150503853.html> [<https://perma.cc/M9QN-D7SR>] ("Earlier in March, IBM sued Airbnb for the infringement of its four e-commerce-related patents in the United States District Court of Delaware. Also, IBM proposed to restrict Airbnb from using its technology along with compensation for the damages due to the violation. Per the company, it had been trying to negotiate with Airbnb to reach a patent license agreement since May 2014, but without success, which prompted it to file a lawsuit against the latter.").

<sup>223</sup> See Samantha Stainburn, *Who Owns Your Great Idea?*, N.Y. TIMES (Dec. 24, 2008), <https://www.nytimes.com/2009/01/04/education/edlife/whoseidea-t.html> [<https://perma.cc/469G-DT7Z>] ("Colleges and universities own the ideas and technologies invented by the people who work for them, including professors and graduate students who are paid to do research. Most universities also own inventions created by students using a significant amount of their resources, even if the inventors are undergraduates.").

<sup>224</sup> See *id.*

<sup>225</sup> See *Tax Exemption for Universities and Colleges, Internal Revenue Code Section 501(c)(3) and Section 115*, ASS'N OF AM. U. (Mar. 2014), <https://www.aau.edu/sites/default/files/AAU%20Files/Key%20Issues/Taxation%20%26%20Finance/Tax-Exempt-Status-of-Universities-FINAL.pdf> [<https://perma.cc/7GQ9-3TJ3>] ("Income from activities that are substantially related to the purpose of an institution's tax exemption, charitable contributions received, and investment income are not subject to federal income tax. The Federal tax code classifies tax-exempt colleges and universities and their foundations as public charities. Consequently, they are not subject to tax on investment income, payout requirements, or other rules that apply to private foundations.").

also fail to qualify. As a general rule, section 1235 does not apply to a transfer by an employee to an employer of the rights to any invention by such employee if the transfer was in exchange for compensation pursuant to an employment contract.<sup>226</sup> The reason for this exception is that an employee who is hired by an employer to invent cannot make a transfer of inventions in which he or she has no rights. An employee paid by an employer to invent receives compensation for services rendered (taxable as ordinary income), and not consideration for the assignment of inventions constituting capital assets (taxable as capital gains under section 1235).

This presents an interesting double-whammy in hired-to-invent situations. An employee hired to invent cannot benefit from the section 1235 tax incentive, and as discussed above, the inventor's employer cannot benefit from section 1235 either. The contractual arrangement is quite common in the current innovation landscape, but the tax system's only *ex post* R&D tax incentive fails to apply to either player.

The rule for employees also creates added complexities to the tax regime and raises potential factual disputes between taxpayers and the government. Whether payment received by an inventor-employee from his or her employer is treated as compensation for service rendered by the employee or as proceeds derived from the transfer of patent rights is, of course, a question of fact.<sup>227</sup> Consideration is given to not only all of the facts and circumstances of the employment relationship but also whether the amount of such payments depends upon the production, sale, or use by, or the value to, the employer of the patent rights transferred by the employee.<sup>228</sup> If an employee shares in the proceeds from the sale or licensing of the patent and receives a percentage of royalties in addition to wages, courts are likely to treat the payments as consideration for the transfer of patent rights, thereby entitling the employee to capital asset treatment under section 1235.<sup>229</sup> If, however, an

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<sup>226</sup> Reg. § 1.1235-1(c)(2) (providing that “[p]ayments received by an employee as compensation for services rendered as an employee under an employment contract requiring the employee to transfer to the employer the rights to any invention by such employee are not attributable to a transfer to which section 1235 applies”).

<sup>227</sup> *Id.*

<sup>228</sup> *Id.*

<sup>229</sup> See *McClain v. Commissioner*, 40 T.C. 841, 849–50 (1963), *acq.*, 1964-2 C.B. 3 (holding that payments received were entitled to capital asset treatment even though the parties had signed an agreement requiring the employee to assign inventions developed during the course of employment partly in return for wages); *Chilton v. Commissioner*, 40 T.C. 552, 554, 563 (1963), *acq.*, 1964-2 C.B. 3 (holding that payments received were entitled to capital asset treatment even though the employment agreement provided that the employee shall “devote his whole time and apply his experience and his inventive ability to the problems, improvements, and developments relating to the company’s products”); *Speicher v. Commissioner*, 28 T.C. 938, 944–45 (1957) (holding that percentage payments received by an employee for the transfer of an invention that the employee had worked on for many years (perfected but not patented) were part of the purchase price rather

employee is to receive a fixed salary or a percentage of the employer's earnings regardless of whether the patented invention is licensed or sold, courts are likely to treat the amounts received as compensation for services taxable as ordinary income.<sup>230</sup>

In determining whether an inventor-employee was "hired to invent," courts look closely at whether payments to the employee are a function of his or her services.<sup>231</sup> If the contract contains no provision for services to be rendered or provides that the employee is required to render only advisory services incidental to the transfer (perhaps because the patented invention is technical or intricate), courts are likely to determine that payments received are attributable to the sale of patent rights rather than compensation for services.<sup>232</sup> On the other hand, if the employment agreement requires the employee to assign patented inventions to the employer and does not obligate the employer to pay for the patented inventions, later payments may be viewed as an award or compensation for the employee's continuing contributions to the employer as part of his or her employment.<sup>233</sup> If the employment

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than compensation), *acq.*, 1958-2 C.B. 3. See also *Spence v. United States*, 156 F. Supp. 556 (Ct. Cl. 1957).

<sup>230</sup> *Downs v. Commissioner*, 49 T.C. 533, 537-38 (1968), *acq.*, 1968-2 C.B. 2 (holding that section 1235 did not apply when the employee received payments at a fixed monthly rate to reduce to practical application a concept that was originated by the employer); *Komarek v. Commissioner*, 26 T.C.M. (CCH) 523, 526-27, T.C.M. (P-H) ¶ 67,112, at 571 (1967) (holding that the percentage payments received by the employee were additional compensation for services and should be treated as ordinary income); *Dean v. Commissioner*, 25 T.C.M. (CCH) 1321, 1325-26, T.C.M. (P-H) ¶ 66,258, at 1483-84 (1966) (concluding that the employee transferred his rights in the patents in return for a generous employment contract and holding that the payments under the contract were compensation for his services).

<sup>231</sup> See *Blum v. Commissioner*, 183 F.2d 281, 287-88 (3d Cir. 1950) (holding that the employee had been hired to invent), *aff'g* 11 T.C. 101 (1948). See also *McClain*, 40 T.C. at 848-50 (holding that the amount received by the employee was capital gain although an agreement signed as a condition of employment required the employee to transfer all possible future inventions; subsequent to the assignment, the employer began a program of paying employee-inventors certain percentages of any income received as the result of the sale or licensing of employee inventions to third parties); *Hill v. Commissioner*, 22 T.C.M. (CCH) 1056, 1061-62, T.C.M. (P-H) ¶ 63,211, at 1205-06 (1963) (holding that royalty payments to the employee were capital gain in a case in which the payments were made under a plan that existed prior to the employment date and the employee was not hired to invent).

<sup>232</sup> See *Gable v. Commissioner*, 33 T.C.M. (CCH) 1427, 1433-34, T.C.M. (P-H) ¶ 74,312, at 1359-61 (1974) (finding that the services provided by the inventor were for purposes of solving technical problems, not developing new invention, and the payments received by the inventor were for the patent transfer). See also *Heil Co. v. Commissioner*, 38 T.C. 989 (1962), *acq.*, 1963-2 C.B. 3; *Hessert v. Commissioner*, 1 T.C.M. (CCH) 932, T.C.M. (P-H) ¶ 43,187 (1943).

<sup>233</sup> *Lehman v. Commissioner*, 835 F.2d 431, 436-37 (2d Cir. 1988) (holding that \$30,000 awarded to the employee-chemist was not for the transfer of a patented invention, but instead was

agreement provides that no further consideration is due to the employee for inventions developed during employment, then payment received is not based on the value of the invention to the employer.<sup>234</sup> Nevertheless, in some cases, courts find that payments received are both partially attributable to the sale of patent rights (capital gain) and partially represent compensation for services rendered (ordinary income).<sup>235</sup>

There are many “ifs” in the analysis just described, which creates uncertainty for employees engaged in valuable R&D. As illustrated, numerous courts have had to address section 1235’s application to employees, even in recent years.<sup>236</sup> Additionally, the government must provide administrative guidance.<sup>237</sup> Consequently, the rule can produce unexpected tax consequences. For example, section 1235 may apply to university employees who transfer patent rights to their employer-universities in exchange for a percentage of the employer’s future licensing revenue (that is, a royalty sharing agreement or RSA).<sup>238</sup> But when payments from an RSA are made to the employee’s “research account,” unexpected tax results may occur.<sup>239</sup> Current advice to tax planners is that university agreements with faculty members

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compensation for the employee’s continuing contributions to the company as part of the employment; although the employment agreement required the employee to transfer the patent rights, it did not obligate the employer to pay the employee for the transfer).

<sup>234</sup> See *Beausoleil v. Commissioner*, 66 T.C. 244, 249–50 (1976).

<sup>235</sup> *Glen O’Brien Movable Partition Co. v. Commissioner*, 70 T.C. 492, 505 (1978), *acq.*, 1979-2 C.B. 1 (holding that \$10,000 of a \$25,000 payment that the employee received was attributable to the employee’s sale of patent rights, whereas the remainder represented compensation for the transfer of advisory services and technical know-how); *Spence*, 156 F. Supp. at 558–59 (holding that five percent of sales in excess of \$300,000 was capital gain and three percent of sales was compensation for services, where the agreement provided that the president of a corporation who transferred his patent rights was to receive eight percent of sales in excess of \$300,000 annually, but only five percent when he ceased to be president).

<sup>236</sup> For a 2019 case example, see *Meggs v. Commissioner*, 117 T.C.M (CCH) 1023, 2019 T.C.M. (RIA) ¶ 2019-5. The court had to decide whether any of the payments under a contract addendum were in exchange for intellectual property or were for some other purpose. The Service did not dispute that intellectual property was transferred or that the transfer of the intellectual property met the requirements of section 1235. The Service, however, did dispute whether the payments made under the contract addendum were made in consideration for that transfer, which was necessary to receive capital asset treatment under section 1235. Although there was no explicit reference to the transfer of the intellectual property in the addendum, the court found credible evidence that the payments were consideration for the rights to the intellectual property.

<sup>237</sup> See, e.g., T.A.M. 2002-49-002 (Aug. 8, 2002) (concluding that a university professor was entitled to capital asset treatment under section 1235 for royalties received from the university).

<sup>238</sup> *Id.*

<sup>239</sup> See Benjamin A. Davidson et al., *‘Just Put It in My Research Account’: Transfers of RSA Rights*, 157 TAX NOTES (TA) 1791 (Dec. 18, 2017).

should be reviewed to determine whether they meet the requirements under section 1235 for capital asset treatment.<sup>240</sup>

In sum, a solution to the concerns raised here would be to expand section 1235's application beyond the current, limited category of beneficiaries. Consideration could be given to extending its application to non-individual creators, including employers who have "equitable" ownership of patents. Consideration could also be given to extending its application to employees who are hired to invent. In extending section 1235's capital asset treatment to both employers and employees with respect to revenue generated from patents, the regime would recognize that the individuals who invent and the entities that enable patented inventions should be rewarded. Additionally, in light of China's patent law favoring employee-inventors with statutory remuneration to promote innovations in China,<sup>241</sup> our proposed solution of expanding section 1235 to cover *both* employer and employee-inventors would situate the United States in a more competitive position in the current global tech war.<sup>242</sup>

### B. *Expand Patent Transfers Eligible for Capital Asset Treatment*

Section 1235 applies only to a transfer of all substantial rights to a patent or an undivided interest therein.<sup>243</sup> The term "all substantial rights" is limited and refers to all rights (whether or not then held by the grantor) that are of value at the time the rights to the patent (or an undivided interest in it) are transferred.<sup>244</sup> There are some transfers that logically should not fit the definition, and, thus, should not be eligible for capital asset treatment. For example, the grant of a patent that is limited in duration by the terms of the agreement to a period less than the remaining life of the patent does not, and should not, qualify.<sup>245</sup> Likewise, the grant of less than all the claims or inventions covered by the patent that exists and possesses value at the time of the grant does not, and should not, qualify.<sup>246</sup> And, no one would disagree that

<sup>240</sup> See Kyle Richard, *Does the Tax Cuts and Jobs Act Affect University Tech Transfer?*, 159 TAX NOTES (TA) 1927 (June 25, 2018).

<sup>241</sup> See *supra* notes 106–108 and accompanying text.

<sup>242</sup> *US-China Tech War: Everything You Need to Know About the US-China Tech War and Its Impact*, S. CHINA MORN. POST (Apr. 23, 2021, 6:00 AM), <https://www.scmp.com/tech/tech-war/article/3130587/us-china-tech-war-everything-you-need-know-about-us-china-tech-war> [<https://perma.cc/8VMC-6BLT>]; Matt Henry & Matthew Carney, *China and the US Are Locked in a Superpower Tech War to "Win the 21st Century,"* ABC NEWS (July 7, 2021, 2:00 PM, updated 8:44 PM), <https://www.abc.net.au/news/2021-07-08/trump-facebook-twitter-china-us-superpower-tech-war/100273812> [<https://perma.cc/DA23-KC49>].

<sup>243</sup> I.R.C. § 1.1235(a); Reg. § 1.1235-2(b).

<sup>244</sup> Reg. § 1.1235-2(b)(1). Whether or not all substantial rights to a patent are transferred in a transaction depends on the circumstances surrounding the entire transaction and not the particular terminology used in the transfer instrument. *Id.*

<sup>245</sup> Reg. § 1.1235-2(b)(1)(ii).

<sup>246</sup> Reg. § 1.1235-2(b)(1)(iv).

a transfer in which the grantor retained the right to terminate or revoke the transfer at will should not qualify.<sup>247</sup>

Nevertheless, there are several patent transfers that presently do not qualify for section 1235 treatment, but that, in our opinion, should qualify. These include (1) the grant of a patent in which nonexclusive rights are outstanding; (2) the grant of a patent that is limited geographically within the country of issuance; and (3) the grant of a patent that is limited to fields of use within particular trades or industries. Each is considered below.

### 1. *Transfers Subject to Nonexclusive Licenses*

It is well settled that section 1235 does not apply to the transfer of all patent rights held by the transferor if there are nonexclusive rights in the patent that are outstanding. The reason is because the Treasury regulations clearly provide that "all substantial rights to a patent" means "all rights (*whether or not then held by the grantor*) that are of value at the time the rights to the patent are transferred."<sup>248</sup>

Courts that have directly considered the issue have concluded that a prior license (whether exclusive or nonexclusive) constituted a substantial right such that the licensor could not be said to have transferred all substantial rights in a subsequent conveyance subject to the earlier license. In *Blake v. Commissioner*, the Sixth Circuit held that section 1235 did not apply to a transfer of rights in remaining fields of use after a prior transfer (exclusive license subject to a field-of-use restriction) to the same transferee.<sup>249</sup> The Sixth Circuit ruled that under section 1235, "all substantial rights" means all rights then in existence, whether or not held by the transferor.<sup>250</sup> In *First National Trust & Savings Bank of San Diego v. United States*, the district court similarly concluded that section 1235 did not apply to a second transfer of bifurcated patent rights.<sup>251</sup> According to the court:

The conveyance of a nonexclusive license . . . is not a transfer of a capital asset; nor, in our opinion, is a subsequent transfer of a so-called exclusive license of the same rights, but subject to the first license. That the end result

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<sup>247</sup> Reg. § 1.1235-2(b)(4). The regulations, however, provide examples of two rights that may be retained by the holder: (1) legal title for the purpose of securing performance or payment by the transferee and (2) rights in the property that are not inconsistent with the passage of ownership, such as a security interest (*e.g.*, a vendor's lien) or a reservation in the nature of a condition subsequent such as a provision for forfeiture or account of nonperformance. Reg. § 1.1235-2(b)(2)(i)-(ii).

<sup>248</sup> Reg. § 1.1235-2(b) (emphasis added).

<sup>249</sup> 615 F.2d 731 (6th Cir. 1980), *rev'g* 67 T.C. 7 (1976).

<sup>250</sup> *Id.* at 734-35; *but see* *Bell Intercontinental Corp. v. United States*, 381 F.2d 1004 (Ct. Cl. 1967) (concluding that "a sale is not defeated because the agreement was subject to an existing limited license previously granted").

<sup>251</sup> 200 F. Supp. 274 (S.D. Cal. 1961).

of such latter conveyance may accomplish a divestiture of all substantial rights which the transferor had in the patent at the time, is not the proper criterion.<sup>252</sup>

The Tax Court once questioned the validity of the Regulation and this approach.<sup>253</sup> The Service, however, has made clear that the Regulation is controlling for purposes of section 1235,<sup>254</sup> and caselaw, as discussed above, has sanctioned that approach. Under present law, for section 1235 to apply there must be a transfer of all substantial rights to the patent, not only those rights held by the transferor immediately prior to the conveyance.

The scope of section 1235 should be expanded to cover complete transfers of patents even if subject to a nonexclusive license. It is not uncommon for an outstanding license to already exist at the time a transferor wishes to convey all remaining rights to another party (subject to the previous agreement). Moreover, in recent years, the practice of patent transfers subject to outstanding nonexclusive licenses has become the tech industry norm. Illustratively, there are more than 1,400 tech companies that have joined the License on Transfer (LOT) Network.<sup>255</sup> Google, Canon, SAP, Newegg, Dropbox, and Asana are examples of companies that have joined the LOT Network and listed 300,000 patents into the LOT portfolio.<sup>256</sup> As members of LOT, whenever another member sells or transfers a patent to a third party, the transaction is subject to a license of the transferred patent to all the members.<sup>257</sup> The reason for such a patent-transfer-subject-to-license scheme is that LOT members want to avoid lawsuits brought by third parties who are patent assertion entities (PAEs).<sup>258</sup> PAEs are known to demand payments through asserting patent infringement suits against tech companies causing companies to incur large litigation costs.<sup>259</sup> The Federal Trade Commission's PAE Study reveals

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<sup>252</sup> *Id.* at 281–82.

<sup>253</sup> *MacDonald v. Commissioner*, 55 T.C. 840 (1971), *acq.*, 1973-2 C.B. 2.

<sup>254</sup> Rev. Rul. 78-328, 1978-2 C.B. 215.

<sup>255</sup> *Prevent Unwanted Litigation While Preserving the Use of Your Patents*, LOT NETWORK, <https://lotnet.com/> [<https://perma.cc/8NPX-DFHD>] (“Join the community of 1400+ global industry leaders who have collaboratively immunized themselves against lawsuits from Patent Assertion Entities”).

<sup>256</sup> See James M. Rice, *The Defense Patent Playbook*, 30 BERK. TECH. L.J. 725, 773 (2015).

<sup>257</sup> See Andrew C. Michaels, *Patent Transfer and the Bundle of Rights*, 83 BROOK. L. REV. 933, 934 (2018) (describing the LOT transfer and license strategy for its members). See also Brian J. Love et al., *An Empirical Look at the “Brokered” Market for Patents*, 83 MO. L. REV. 359, 405–06 (2018) (identifying LOT Networks as an example of “self-help solutions that facilitate the “mutual disarmament” of patent assets among operating companies”).

<sup>258</sup> See Love, *supra* note 257, at 405–06.

<sup>259</sup> FED. TRADE COMM'N, PATENT ASSERTION ENTITY ACTIVITY: AN FTC STUDY 15 (Oct. 2016) [hereinafter PAE STUDY] (a PAE refers to “a firm that primarily acquires patents and seeks to generate revenue by asserting them against accused infringers”). The PAE Study found

that “nuisance infringement litigation [brought by some PAEs] can tax judicial resources and divert attention away from productive business behavior.”<sup>260</sup> Accordingly, to act collectively against PAEs who acquire patents through purchases and transfers from a member of the LOT Network, the other members of LOT enjoy automatic immunity against the acquirer’s lawsuits involving the transferred patent for the life of that patent.<sup>261</sup>

In short, section 1235 should apply if a taxpayer is transferring all the rights it holds at the time of conveyance. The fact that the taxpayer previously granted nonexclusive rights to someone else should not matter. The same approach should apply if the taxpayer acquired the patent already subject to a nonexclusive license and the taxpayer otherwise satisfies the requirements of section 1235.

Support for our recommendation can be found in the legislative history to section 1235. According to the legislative history, the “all substantial rights” test of section 1235 “recognizes the basic criteria of a ‘sale or exchange’ under existing law” (*i.e.*, general characterization provisions).<sup>262</sup> Interestingly, under the general characterization provisions of the Code, transfers of patents already subject to a nonexclusive license *do* qualify for “sale or exchange” treatment. In *MacDonald v. Commissioner*,<sup>263</sup> the Tax Court held that the transfer of all the rights a taxpayer ever held in a patent, but did not include all

two types of PAEs that use distinctly different business models. One type, referred to in the report as Portfolio PAEs, were strongly capitalized and purchased patents outright. They negotiated broad licenses, covering large patent portfolios, frequently worth more than \$1 million. The second, more common, type, referred to in the report as Litigation PAEs, frequently relied on revenue sharing agreements to acquire patents. They overwhelmingly filed infringement lawsuits before securing licenses, which covered a small number of patents and were generally less valuable.

Press Release, Fed. Trade Comm’n, FTC Report Sheds New Light on How Patent Assertion Entities Operate; Recommends Patent Litigation Reforms (Oct. 6, 2016), <https://www.ftc.gov/news-events/press-releases/2016/10/ftc-report-sheds-new-light-how-patent-assertion-entities-operate> [<https://perma.cc/3NW5-NQNN>]. PAEs are also referred to derogatorily as “patent trolls.” Michaels, *supra* note 257, at 933–34 (explaining patent trolls). See also Kristen Osenga, *Formerly Manufacturing Entities: Piercing the “Patent Troll” Rhetoric*, 47 CONN. L. REV. 435, 439 (2014); Christopher A. Cotropia et al., *Unpacking Patent Assertion Entities (PAEs)*, 99 MINN. L. REV. 649 (2014); Michael Risch, *Patent Troll Myths*, 42 SETON HALL L. REV. 457 (2012).

<sup>260</sup> PAE Study, *supra* note 259, at 9. The PAE Study found that “royalties typically yielded by Litigation PAE licenses were less than the lower bounds of early-stage litigation costs. This data is consistent with nuisance litigation, in which defendant companies decide to settle based on the cost of litigation rather than the likelihood of their infringement.” Press Release, Fed. Trade Comm’n, *supra* note 259.

<sup>261</sup> See *How We Protect Members*, LOT NETWORK, <https://lotnet.com/how-we-protect-members/> [<https://perma.cc/3GX2-RPWS>] (describing the benefits of becoming a LOT Network member).

<sup>262</sup> S. REP. NO. 83-1622, at 439–40, as reprinted in 1954 U.S.C.C.A.N. at 5082–83.

<sup>263</sup> 55 T.C. 840 (1971), *acq.*, 1973-2 C.B. 2.

then existing rights in the patent because the patent was already subject to a nonexclusive license, may qualify for capital asset treatment under the general characterization provisions of the Code.<sup>264</sup> In Revenue Ruling 78-328,<sup>265</sup> the Service addressed a situation similar to that in *MacDonald* and held that a transfer could qualify for capital asset treatment under general characterization provisions. The Service noted that the transferor acquired the patent already subject to a license, transferred no interest in the patent prior to its sale, and thus transferred all the rights it had ever held in the patent.

If a preexisting nonexclusive license is not fatal in satisfying the “sale or exchange” requirement under general characterization principles, it should not be fatal in obtaining capital asset treatment under section 1235. This is especially true as the legislative history suggests that the transfer of “all substantial rights” should equate to a “sale or exchange” under general characterization principles.

## 2. Transfers That Are Limited Geographically

Under current Treasury regulations, patent transfers that are limited geographically within the country of issuance do not qualify for capital asset treatment under section 1235.<sup>266</sup> The Tax Court in *Keuneman v. Commissioner*<sup>267</sup> reversed its earlier decision in *Rodgers v. Commissioner*,<sup>268</sup> which had held that the regulation involving geographical limitations was invalid. Thus, a transfer subject to a geographical limitation will not qualify for section 1235 treatment.

This approach, however, fails to recognize realities in the patent marketplace. Grants with geographical restrictions reflect the understanding of both the grantor and the grantee that the grantee’s capability to use and commercialize the patent may be limited to a particular geographical territory.<sup>269</sup> The grantor may want to transfer the technology to multiple grantees, each of

<sup>264</sup> I.R.C. § 1231. Section 1235 did not apply in *MacDonald* because the transferor was not an individual.

<sup>265</sup> 1978-2 C.B. 215.

<sup>266</sup> Reg. § 1.1235-2(b)(1)(i). A transfer subject to a geographical limitation will not qualify for section 1235 treatment, unless the invention only has value in that geographical area (retained rights are valueless) and all other criteria are met. Only transfers limited geographically within the country of issues are precluded from qualifying under section 1235. Therefore, the transfer of rights to a U.S. patent, while retaining foreign rights (foreign patent on U.S. invention) is not a precluded transfer in the regulations.

<sup>267</sup> 68 T.C. 609 (1977), *aff’d*, 628 F.2d 1196 (9th Cir. 1980).

<sup>268</sup> 51 T.C. 927 (1969).

<sup>269</sup> See Frank X. Curci, *Technology Licensing: Strategic Issues Every Licensor and Licensee Should Consider*, in *INTELLECTUAL PROPERTY AND COMPETITIVE RESTRICTIONS* ch. 64.8 (2018).

whom can maximize the value of the patent in a particular territory.<sup>270</sup> Similarly, a grantee does not want to acquire all of the rights under the patent if the grantee does not have the capacity and feasibility to exploit the patent outside a particular territory.<sup>271</sup>

Moreover, the Federal Circuit in *Rite-Hite Corp. v. Kelley Co., Inc.* recognized that “a conveyance of legal title” by the patent owner “can be made only of the entire patent, an undivided part or share of the entire patent, or all rights under the patent in a specified geographical region of the United States.”<sup>272</sup> All three types of transfers would entitle the assignees to sue others for patent infringement.<sup>273</sup> In reaching its decision, the Federal Circuit relied on the Supreme Court’s famous opinion in *Waterman v. Mackenzie* decided in 1891.<sup>274</sup> The *Waterman* court recognized the transfer of a patent subject to geographical restrictions as an assignment of legal title in the patent and further recognized that the transferee could bring an infringement suit without joining the transferor.<sup>275</sup> In light of the patent marketplace and patent law, transfers subject to a geographical limitations should be within the scope of section 1235 treatment.

Regulatory restrictions on geographical limitations is also inconsistent with the approach taken under the general characterization provisions of the Code. Prior to the enactment of section 1235 in 1954, courts concluded that transfers with geographical limitations could qualify for “sale or exchange” treatment so long as the entire bundle of rights regarding such geographical designation were transferred. In *Watson v. United States*, for instance, the Tenth Circuit noted that “[i]t is a firmly accepted principle of law that if the patentee conveys by an instrument in writing the exclusive right to make, use, and vend the invention . . . within a specified area within the United States, the conveyance constitutes an assignment of the patent” eligible for capital asset treatment.<sup>276</sup>

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<sup>270</sup> *Id.*

<sup>271</sup> *Id.*

<sup>272</sup> 56 F.3d 1538, 1551 (Fed. Cir. 1995) (en banc).

<sup>273</sup> *Id.* at 1551–52. See also *Minco, Inc. v. Combustion Eng'g, Inc.*, 95 F.3d 1109, 1117 (Fed.Cir.1996).

<sup>274</sup> *Rite-Hite Corp.*, 56 F.3d at 1551 (citing *Waterman v. Mackenzie*, 138 U.S. 252, 255 (1891)).

<sup>275</sup> See *Waterman*, 138 U.S. at 255 (“The patentee or his assigns may, by instrument in writing, assign, grant, and convey, either, 1st, the whole patent, comprising the exclusive right to make, use, and vend the invention throughout the United States; or, 2d, an undivided part or share of that exclusive right; or, 3d, the exclusive right under the patent within and throughout a specified part of the United States. . . . A transfer of either of these three kinds of interests is an assignment, properly speaking, and vests in the assignee a title in so much of the patent itself, with a right to sue infringers: in the second case, jointly with the assignor; in the first and third cases, in the name of the assignee alone.”).

<sup>276</sup> 222 F.2d 689, 690 (10th Cir. 1955).

If a geographical limitation does not preclude capital asset treatment under general characterization principles, we see no reason it should preclude capital asset treatment under section 1235. This is especially true now after the TCJA, which left section 1235 as the only *ex post* tax incentive for individual inventors.

### 3. Transfers That Are Limited to Fields of Use

It is not uncommon for a patent transfer to include a field-of-use limitation (*i.e.*, a restriction that the patent granted can only be used by the transferee in a certain industry). Section 1235 generally does not apply to such transfers.<sup>277</sup>

Field-of-use limitations have generated considerable, and conflicting, litigation. For example, in *Rouverol v. Commissioner*, a 1964 decision, the Tax Court held that a transfer of the exclusive rights in one field of use qualified for section 1235 treatment (*i.e.*, constituted a transfer of all substantial rights in that field).<sup>278</sup> Five years later, in *Fawick v. Commissioner*, the Tax Court followed its earlier decision in *Rouverol*.<sup>279</sup> The Sixth Circuit, however, soon reversed the Tax Court's *Fawick* decision.<sup>280</sup> A few years later, the Ninth Circuit agreed with the Sixth Circuit in *Mros v. Commissioner*.<sup>281</sup> In a more recent case, *Spiereas v. Commissioner*, the Third Circuit affirmed a Tax Court decision holding that a transfer that dealt with only the pharmaceutical field of use (and not other fields of use) did not qualify for capital asset treatment under section 1235.<sup>282</sup>

In our opinion, field-of-use limitations can be compared to geographical limitations, discussed above. Neither should be fatal in obtaining section

<sup>277</sup> Reg. § 1.1235-2(b)(1)(iii); *Mros v. Commissioner*, 493 F.2d 813 (9th Cir. 1974), *rev'g* 30 T.C.M. (CCH) 519, T.C.M. (P-H) ¶ 71,123 (1971) (concluding that the transfer of a patent subject to a field-of-use restriction was not the transfer of all substantial rights to the patent). If a patent is limited to a field of use, one issue that arises is whether the patent has any reasonable application in any other field of use. A field-of-use restriction would not present a problem for purposes of section 1235 if the restricted use was in the only industry (field) in which the patent had value and the other requirements of section 1235 were satisfied. *Compare* *United States v. Carruthers*, 219 F.2d 21 (9th Cir. 1955) (concluding that a transfer limiting the transferee's right to use a patent in the tuna industry was a transfer of all substantial rights when the patent had no value for any purpose other than processing tuna fish) *with* *Fawick v. Commissioner*, 436 F.2d 655 (6th Cir. 1971), *rev'g* 52 T.C. 104 (1969), *nonacq.*, 1978-2 C.B.1 (concluding that the exclusive patent license for the marine service industry only was not a transfer of all substantial rights to the patent when the patent had known value outside that field of use).

<sup>278</sup> 42 T.C. 186 (1964).

<sup>279</sup> 52 T.C. 104 (1969), *rev'd*, 436 F.2d 655 (6th Cir. 1971).

<sup>280</sup> 436 F.2d 655 (6th Cir. 1971).

<sup>281</sup> 493 F.2d 813 (9th Cir. 1974).

<sup>282</sup> 886 F.3d 315 (3d Cir. 2018), *aff'g* 112 T.C.M. (CCH) 262, 2016 T.C.M. (RIA) ¶ 2016-163.

1235 capital asset treatment so long as the transferor has transferred the right to make, use, and sell within that field of use. Moreover, transfers with field-of-use limitations are beneficial to both the grantor and grantee because both recognize that the field-of-use restrictions are useful for technology that may contain multiple and distinct usages.<sup>283</sup> The grantor transfers its rights in a particular field of use, enabling the grantee to acquire exactly what is needed for a distinct area of technology or research.<sup>284</sup> In other words, transfers with field-of-use restrictions reduce waste. Further, other scholars have noted that a field-of-use limitation might incentivize investment in a particular niche technology by small enterprises that do not possess the necessary resources to “risk their startup costs if an established firm were already in the field.”<sup>285</sup> Such transfers should be encouraged, not penalized, under section 1235.

Interestingly, under the general characterization provisions of the Code, a patent transfer with a field-of-use restriction may qualify as a “sale or exchange.” Indeed, prior to section 1235’s enactment, courts held that transfers of patents broken into different fields of use could enjoy capital asset treatment under general characterization principles (provided the transferors conveyed the right to make, use, and sell).<sup>286</sup>

Unfortunately, and as noted previously, general characterization provisions of the Code no longer allow capital asset treatment for individual inventors.<sup>287</sup> The reason is because self-created patents and inventions are not considered capital assets in their hands, a prerequisite for capital asset treatment under the general characterization rules. Section 1235 is their only path to capital asset treatment and should, thus, be expanded to cover transfers of patents that have been divided into different fields of use.

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<sup>283</sup> Tim Smith, *Field of Use*, INVESTOPEDIA (Feb 12, 2021), [https://www.investopedia.com/terms/f/field\\_of\\_use.asp](https://www.investopedia.com/terms/f/field_of_use.asp) [<https://perma.cc/3TRL-H457>] (noting that field-of-use restrictions are “particularly useful for technology and scientific research that has, or may come to have, multiple, distinct uses”).

<sup>284</sup> See *id.* For samples of field-of-use restrictions, see *Exclusive Field of Use License Agreement*, <https://www.sec.gov/Archives/edgar/containers/fix120/885780/000119312503078898/dex108.htm> [<https://perma.cc/M3EJ-HT8N>] (providing the definition of “Licensed Field”); *Patent License Agreement with University of Pennsylvania*, <https://www.sec.gov/Archives/edgar/data/1338042/000119312510184678/dex106.htm> [<https://perma.cc/HM2S-ERQ4>] (defining the “Field of Use”).

<sup>285</sup> See Thomas C. Meyers, *Field-of-Use Restrictions as Precompetitive Elements in Patent and Know-How Licensing Agreements in the United States and the European Communities*, 12 N.W. J. OF INT’L L. & BUS. 364, 366 (1991).

<sup>286</sup> See, e.g., *Merck & Co. v. Smith*, 261 F.2d 162 (3d Cir. 1958); *Watson v. United States*, 222 F.2d 689 (10th Cir. 1955). See also *Estate of Laurent v. Commissioner*, 34 T.C. 385 (1960).

<sup>287</sup> See *supra* notes 194–196 and accompanying text.

## V. Conclusion

In contrast to most industrialized nations, the United States has never fully embraced the use of *ex post* tax incentives for R&D efforts. Instead, the chosen tax policy tool to incentivize risky R&D investments in the United States exemplifies an *ex ante* incentive—the current tax credit for incremental increases in qualified R&D spending. In light of fundamental design flaws with *ex ante* incentives, consideration should be given to rewarding risky R&D investment on the back end of the innovation cycle. An appropriate framework should take into consideration the key players in the R&D landscape—not only the giant corporate entities, such as those receiving credit for the COVID-19 vaccine, but also individual inventors who often work quietly behind the scene on research. Because these players are often treated differently under the tax laws, different R&D tax incentives may be justified for each. Moreover, with the new R&D tax incentives, the United States would provide additional encouragements to innovations by individuals that may position the country on a better footing in the current global tech war with China, whose patent law bestows statutory remuneration to individuals based on the employer's exploitation of an employee's patents.