

INTELLECTUAL PROPERTY AND TAX INCENTIVES: A COMPARATIVE ANALYSIS OF THE E.U. AND THE U.S. LEGAL FRAMEWORKS

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This article analyzes the use of intellectual property rights and the most common forms of tax measures to incentivize innovation, and it conducts a comparative analysis of the policies adopted by the European Union and the United States.

The first part of this article will focus on intellectual property (IP) rights, building a framework for conducting a more thorough analysis of the interaction between these rights and tax policy. When tax policy instruments are used for purposes that differ from revenue-raising and wealth-redistribution, several issues arise, and it becomes necessary to understand whether the objectives are pursued without disrupting status quo equilibriums. The tax system should be looked at holistically, and several assessments should be conducted to determine whether there might be different ways to accomplish the same objectives more efficiently and without compromising the tax system's neutrality. All in all, the proposed policy should be clear with its objectives and strive to avoid undesirable effects.

The most common ways to incentivize innovation through the tax system are research and development (R&D) tax credits and "IP Box Regimes." This article will provide an analysis of these different innovation-oriented tax measures. This evaluation will lead to the determination that expenses-based tax incentives, in the form of R&D tax credits, are a better complement to IP rights in incentivizing innovation than IP Box Regimes, whose scope only somewhat overlaps with IP rights.

The last part of this analysis will compare the innovation environments and legal frameworks of the European Union and the United States. In comparing these two different ways of achieving the same objective, it will consider the nature of these two tax policies, emphasizing potential causes and consequences of different choices. Consequently, this paper will highlight the conclusions of this analysis.

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I. INTRODUCTION

Intellectual property law receives particular attention from governments and institutions, mainly because of the economic growth, market failures, and positive externalities that are attributed to it.¹ The Musgrave model of public finance asserts that where the market is unable to achieve certain social goals that might lead to an increase in welfare, the government should intervene and try to fill the gap through mechanisms such as the tax system.²

Innovative projects can have a high social rate of return, positive externalities, and spill-over effects, generating an increase in productivity, employment, and economic growth. Therefore, states might want to intervene where the socially optimal amount of innovation-oriented investments is larger than the actual amount, which is generally the case.³ This is mainly due to the fact that externalities are not necessarily retained by investors, but generally go to the advantage of the community and, therefore, do not appeal to private investors as much as other profitable projects.⁴ Nonetheless, it must be noted that not all innovative projects have the same social return. Consequently, a debated topic is how to design subsidies to allocate resources more effectively and efficiently.⁵

The most common way to incentivize intellectual property is the use of intellectual property (IP) rights.⁶ However, there are some areas of the

¹ See VALENTINE KORAH, INTELLECTUAL PROPERTY RIGHTS AND THE EC COMPETITION RULES 1–2 (2006); Michele Boldrin & David Levine, *The Case Against Intellectual Property*, 92 AM. ECON. REV. (PAPERS & PROC.) 209, 209 (2002); Heidi L Williams, *Intellectual Property Rights and Innovation: Evidence from the Human Genome*, 121 J. POLIT. ECON. 1, 1 (2013); MICHELE BOLDRIN & DAVID K. LEVINE, AGAINST INTELLECTUAL MONOPOLY 9 (2008); LIONEL BENTLY ET AL., INTELLECTUAL PROPERTY LAW 413–15 (6th ed. 2022). See generally STEVEN D. ANDERMAN & JOHN KALLAUGHER, TECHNOLOGY TRANSFER AND THE NEW EU COMPETITION RULES: INTELLECTUAL PROPERTY LICENSING AFTER MODERNISATION 122–29 (2006) (providing a specific analysis of competition law and IP licensing).

² JAMES M. BUCHANAN & RICHARD A. MUSGRAVE, PUBLIC FINANCE AND PUBLIC CHOICE: TWO CONTRASTING VISIONS OF THE STATE 29–49 (1999); Paolo Arginelli, *Innovation Through R&D Tax Incentives: Some Ideas for a Fair and Transparent Tax Policy*, 7 WORLD TAX J. 3, 8–10 (2015).

³ Charles I. Jones & John C. Williams, *Measuring the Social Return to R & D*, 113 Q.J. ECON. 1119, 1119–20 (1998); Åsa Hansson & Cécile Brokelind, *Tax Incentives, Tax Expenditures Theories in R&D: The Case of Sweden*, 6 WORLD TAX J. 2, 168, 171–80 (2014); Michael Kremer, *Patent Buyouts: A Mechanism for Encouraging Innovation*, 113 Q.J. ECON. 1137, 1140–41 (1998).

⁴ Hansson and Brokelind, *supra* note 3, at 175–76; Arginelli, *supra* note 2, at 5.

⁵ See UNITED NATIONS & INTER-AM. CTR. FOR TAX ADMIN., DESIGN AND ASSESSMENT OF TAX INCENTIVES IN DEVELOPING COUNTRIES: SELECTED ISSUES AND A COUNTRY EXPERIENCE 77–81 (2018) [hereinafter U.N.]; Hansson & Brokelind, *supra* note 3, at 172.

⁶ See Jacob Nussim & Anat Sorek, *Theorizing Tax Incentives for Innovation*, 36 VA. TAX REV. 25, 26 (2017) (internal citation omitted); see also Brian D. Wright, *The Economics of Innovation Incentives: Patents, Prizes, and Research Contracts*, 73 AM. ECON. REV. 691, 691 (1983); Joseph E. Stiglitz, *Economic Foundations of Intellectual Property Rights*, 57 DUKE L.J. 1693, 1698–99 (2008); V.V. Chari, Mikhail Golosov & Aleh Tsyvinski, Prizes and

innovation process that do not seem to benefit from IP rights, such as non-patentable innovative ideas. In these cases, the tax system might play an important role in complementing IP rights.

Legal scholarship often sees IP rights, tax incentives and other forms of innovation subsidies as alternatives.⁷ Tax policy, instead, can be a good complement to target those dynamics in the innovation process that are not incentivized by widespread IP rights. However, tax measures need to be designed in a proper way that avoids the waste of public money or distortions in the system. The objective of this article is to analyze the role of tax incentives in innovation, analyzing the most common types of innovation-oriented incentives and their interaction with IP rights.

Part II will focus on intellectual property rights, building a framework for conducting a more thorough analysis of the interaction between these rights and tax policy. It will illustrate the most common forms of IP rights and analyze how they contribute to innovation.

Part III will focus on innovation-oriented tax incentives. It will describe how, when tax policy instruments are used for purposes that differ from revenue-raising and wealth-redistribution, several issues arise, creating strategic challenges for policymakers. Particularly with regard to tax incentives, it is fundamental to target the right activities to have an effective and efficient tax measure. Good tax design is fundamental to understanding whether the objectives are pursued without disrupting status quo equilibriums. Additionally, the most common ways to incentivize innovation through the tax system — research and development (R&D) tax credits and “IP Box Regimes” — are examined in this analysis according to their policy design. Based on the targeted activities of the two types of tax measures, this evaluation leads to the determination that expenses-based tax incentives, in the form of R&D tax credits, are a better complement to IP rights in incentivizing innovation than are IP Box Regimes, whose scope only somewhat overlaps with IP rights.

The last part of this analysis, part IV, compares the innovation environments and legal frameworks of the European Union and the United States. In investigating the divergences of the two systems, this examination will underline the different nature of these two tax policies, emphasizing the tax cooperation and tax competition processes that are in place between the two legal systems.

Patents: Using Market Signals to Provide Incentives for Innovations, 147 J. ECON. THEORY 781, 782 (2012); Benjamin N. Roin, *Intellectual Property Versus Prizes: Reframing the Debate*, 81 U. CHI. L. REV. 999, 1001–07 (2014).

⁷ Nussim & Sorek, *supra* note 6, at 26–36.

II. INTELLECTUAL PROPERTY RIGHTS

Before getting to whether there is a persuasive case for innovation-oriented tax incentives, it is important to understand IP rights and their role in the innovation debate. This is because in many cases, according to their design, the role of tax incentives can overlap with the role of IP rights. Therefore, the focus on IP rights helps to build a framework for drawing a more thorough analysis of the interaction between these rights and tax policy.

This section will provide a definition of IP rights and will describe their main characteristics, analyzing their relationship with innovation.

A. Definition of Intellectual Property Rights

Intellectual property is the set of legal rights associated with intangible property that results from creations of the mind. This includes inventions, literary and artistic works, designs and symbols, and also names and images used in commerce.⁸ These legal rights are generally embedded in legislation, interpreted by the courts and used by several actors, ranging from individual authors to multinational enterprises.⁹ The main types of intellectual property, analyzed *infra*, are patents, copyright, and trademarks. However, there are also other forms of intellectual property such as trade secrets, industrial designs, and geographical indications.¹⁰

IP rights grant exclusive rights to either the individual or entity that is responsible for the invention, to ensure that the potential economic benefits deriving from the invention are conferred to the inventor.¹¹ This is a general restriction to competition that is aimed both at protecting authors and third parties in the use and trade of creations of the mind and at incentivizing investments in desirable activities that would not be undertaken otherwise.¹²

1. Patents

Patents give the inventor of a specific product or process, satisfying certain requirements, a temporary monopoly over the use or sale of their invention. The requirements for the registration of a patent differ by country,

⁸ See WORLD INTELLECTUAL PROPERTY ORGANIZATION [hereinafter WIPO], *What is Intellectual Property?*, <https://www.wipo.int/about-ip/en/> (last visited Apr. 5, 2023).

⁹ See generally ARAM SINNREICH, *THE ESSENTIAL GUIDE TO INTELLECTUAL PROPERTY* 18–27 (2019) (discussing the architecture of IP law).

¹⁰ *Id.* at 17–18; BENTLY ET AL., *supra* note 1, at 1–5, 741–847, 1204–310; U.S. PATENT & TRADEMARK OFFICE [hereinafter USPTO], *Geographical Indications*, <https://www.uspto.gov/ip-policy/trademark-policy/geographical-indications#> (last visited Oct. 25, 2023).

¹¹ BENTLY ET AL., *supra* note 1, at 5–7.

¹² BENTLY ET AL., *supra* note 1; Edwin C. Hettinger, *Justifying Intellectual Property*, 18 PHIL. & PUB. AFFS. 31, 47–51 (1989).

although at times they can be quite similar.¹³ Inventions usually have requirements to be accepted as patents.¹⁴ In many jurisdictions, including the United States, inventions need to be useful, meaning that they achieve a specifically stated goal, novel, meaning that they need to be new compared to other inventions or to the general public awareness, and nonobvious, meaning that the invention should not sound obvious to a technician in the industry.¹⁵

- Utility patents cover any “new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.”¹⁶
- Design patents cover any “new original and ornamental design for an article of manufacture.”¹⁷
- Plant patents cover new varieties of plants, discovered or bred by explorers or horticulturalists.¹⁸

The protection granted by patents has a limited duration, often 20 years from the filing date of the application.¹⁹

2. Copyright

Copyright gives the author or the creator of a work, typically literary or artistic, “a temporary monopoly over certain uses of the work.”²⁰ However, copyright regulation can also cover the invention of software, such as computer programs or databases, which stands out from the general categories that copyright law was first designed for.²¹

In the majority of jurisdictions that adopt copyright law, including the United States and the European Union, the owner of a work has the exclusive right to reproduce, distribute, sell, perform publicly, and prepare derivative

¹³ See USPTO, *Patent Essentials*, <https://www.uspto.gov/patents/basics/essentials#questions> (last visited Aug. 17, 2023); EUR. PAT. OFF., *Patentability Requirements*, https://new.epo.org/en/legal/guidelines-epc/2023/g_i_1.html (last visited Aug. 17, 2023); WIPO, *Frequently Asked Questions: Patents*, https://www.wipo.int/patents/en/faq_patents.html (last visited Aug. 17, 2023).

¹⁴ USPTO, *supra* note 13; EUR. PAT. OFF., *supra* note 13; WIPO, *supra* note 13.

¹⁵ USPTO, *supra* note 13; EUR. PAT. OFF., *supra* note 13; WIPO, *supra* note 13.

¹⁶ SINNREICH, *supra* note 9, at 9.

¹⁷ *Id.* at 10.

¹⁸ *Id.*

¹⁹ See WIPO, *Patents*, <https://www.wipo.int/patents/en/> (last visited Aug. 17, 2023).

²⁰ BENTLY ET AL., *supra* note 1, at 62–97; SINNREICH, *supra* note 9, at 4–8; see USPTO, *Copyright Basics*, <https://www.uspto.gov/ip-policy/copyright-policy/copyright-basics> (last visited Aug. 17, 2023); EUR. UNION, *Copyright*, https://europa.eu/youreurope/business/running-business/intellectual-property/copyright/index_en.htm (last visited Aug. 17, 2023); WIPO, *Copyright*, <https://www.wipo.int/copyright/en/> (last visited Aug. 17, 2023).

²¹ BENTLY ET AL., *supra* note 1, at 62–97; SINNREICH, *supra* note 9, at 4; WIPO, *supra* note 20.

products based on it.²² Generally, the owner can also share with third parties the right to do those things.²³

In several countries, copyright protection is granted automatically, without the need for registration.²⁴ However, “most countries . . . have a system in place to allow for the voluntary registration of [these] works.”²⁵ This usually helps resolve disputes over ownership or creation and facilitates the transfer of rights, financial transactions concerning the work, and the sale of the work.²⁶

3. Trademarks

Trademarks are signs capable of and meant for distinguishing the goods or services of one enterprise from those of other enterprises.²⁷ They function as a guarantee to consumers that a good or service was produced or offered by a specific party, which means they will be responsible for the quality of the work.²⁸

In many jurisdictions, the legal merit of trademarks is granted even in the absence of registration, although filing an application for registration with the national/regional trademark office can help assure a higher standard of protection.²⁹ Indeed, within the territorial scope of the trademark office, “[r]egistration provides legal certainty and reinforces the position of the right holder[,]” especially in case of litigation.³⁰ As with copyrights and patents, trademark regulation also confers an “exclusive right to the use of the registered trademark.”³¹ This also implies the ability to license the trademark to another party for use in return for payment.³² The term of trademark

²² BENTLY ET AL., *supra* note 1, at 62–97; SINNREICH, *supra* note 9, at 4–8; USPTO, *supra* note 20; EUR. UNION, *supra* note 20; WIPO, *supra* note 20.

²³ BENTLY ET AL., *supra* note 1, at 62–97; SINNREICH, *supra* note 9, at 4–8; USPTO, *supra* note 20; EUR. UNION, *supra* note 20; WIPO, *supra* note 20.

²⁴ BENTLY ET AL., *supra* note 1, at 62–97; SINNREICH, *supra* note 9, at 4–8; USPTO, *supra* note 20; EUR. UNION, *supra* note 20; WIPO, *supra* note 20.

²⁵ WIPO, *supra* note 20.

²⁶ *Id.*

²⁷ SINNREICH, *supra* note 9, at 13–16; MICHELE BOLDRIN & DAVID LEVINE, AGAINST INTELLECTUAL MONOPOLY 7 (2008).

²⁸ SINNREICH, *supra* note 9, at 13–16.

²⁹ *Id.*; see also USPTO, *Trademark Basics*, <https://www.uspto.gov/trademarks/basics> (last visited Aug. 17, 2023); WIPO, *Trademarks*, <https://www.wipo.int/trademarks/en/> (last visited Aug. 17, 2023).

³⁰ WIPO, *supra* note 29.

³¹ SINNREICH, *supra* note 9, at 13–16; see also USPTO, *supra* note 29; WIPO, *supra* note 29.

³² SINNREICH, *supra* note 9, at 13–16; USPTO, *supra* note 29; WIPO, *supra* note 29.

registration is variable — usually ten years — although it can generally be indefinitely renewed.³³

B. Intellectual Property and Innovation

Intellectual property is often associated with the concept of innovation. Indeed, one of the justifications for intellectual property protection is to address the market failure related to the under-production of intellectual products, which appears to be highly intertwined with the reasons for incentivizing innovation.³⁴ Nonetheless, it is extremely complicated to understand how connected innovation and IP rights are, both empirically and theoretically, as the research has contrasting results.³⁵ Despite the motivation to stimulate knowledge-based activities and generate positive externalities in the system, IP rights tend to incentivize activities which are not necessarily related to innovation.

When it comes to patents, their link with innovation seems more straightforward. Indeed, patents, together with other variables, such as R&D investments, are generally used to approximate the level of innovation of a country.³⁶ Therefore, the more patents a country has, the more innovative it is going to be considered.³⁷ Nevertheless, as seen *infra*, not all patents are necessarily innovative, and innovation might also lie in non-patentable outcomes.

Trademarks, on the other hand, do not seem to be related to innovation, except indirectly in some very specific cases. When considering copyright, software-related copyright might be linked to innovation in a way that reflects patenting.³⁸ However, literary and artistic works do not necessarily

³³ SINNREICH, *supra* note 9, at 13–16; U.S. PATENT & TRADEMARK OFFICE, *supra* note 29; WORLD INTELLECTUAL PROPERTY ORGANIZATION, *supra* note 29.

³⁴ See *supra* note 1 and accompanying text.

³⁵ Boldrin and Levine, *supra* note 1, at 210; Williams, *supra* note 1, at 24–25; BOLDRIN & LEVINE, *supra* note 1, at 7–9, 208–35; MARIANA MAZZUCATO, THE ENTREPRENEURIAL STATE 57–58, 42–45 (2011); Paul W. Rhode, *Biological Innovation Without Intellectual Property Rights: Cottonseed Markets in the Antebellum American South*, 81 J. ECON. HIST. 198, 201 (2021); Stefanella Stranieri et al., *Geographical Indications and Innovation: Evidence from EU Regions*, 116 FOOD POL’Y 102425, 11 (2023); Fiona Murray & Scott Stern, *Do Formal Intellectual Property Rights Hinder the Free Flow of Scientific Knowledge? An Empirical Test of the Anti-Commons Hypothesis*, 63 J. ECON. BEHAV. & ORGAN. 648, 648–651 (2007).

³⁶ See, e.g., WIPO, GLOBAL INNOVATION INDEX 45 (Soumitra Dutta et al. eds., 2022), https://www.wipo.int/global_innovation_index/en/.

³⁷ *Id.* at 45, 248.

³⁸ See STEERING COMMITTEE FOR INTELLECTUAL PROPERTY ISSUES IN SOFTWARE, NATIONAL RESEARCH COUNCIL, INTELLECTUAL PROPERTY ISSUES IN SOFTWARE 21–23 (1991).

produce the typical positive externalities that the subsidization of innovation is generally related to.³⁹

1. Patentable vs. Non-Patentable Outcomes

The effort put towards the achievement of innovation, which is generally represented by the execution of R&D activities, can result in either patentable or non-patentable outcomes.⁴⁰ Many of the issues related to the patentability of new techniques or inventions are related to how patent law is designed.

Being a restriction to competition, patenting can temporarily prevent the development of new technologies that rely on the patented product or technique. This is the argument proposed by scholars who argue that patent law should be changed.⁴¹ Yet, it is generally assumed that in the absence of intellectual property protections, the overall level of private investment in knowledge-creating activities would be below the optimal level because of the market failures that arise from the compensation of R&D outcomes.⁴²

Patents, however, do not necessarily imply innovation⁴³:

- Patent law is highly complex and in continuous evolution. Patenting requires very strict specifications, and, especially in some sectors, it can be rather complicated to obtain a patent for a particular technique;⁴⁴
- Patenting requires a detailed description of the new technique or product.⁴⁵ Some creators are unwilling to disclose their ideas and prefer to keep them secret;⁴⁶
- Patentable techniques and products might meet patent law requirements and still not be innovative;⁴⁷

³⁹ See Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 284–93 (1970). *But see Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975) (the objective of copyright law is still to provide the economic incentives for creativity that ultimately promote the public welfare); USPTO, *supra* note 29.

⁴⁰ See *supra*, note 36 and accompanying text.

⁴¹ See Boldrin & Levine, *supra* note 1, at 209; BOLDRIN & LEVINE, *supra* note 1, at 75–78.

⁴² Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 609–10 (Univ.-Nat'l Bureau Comm. for Econ. Rsch. & Comm. on Econ. Growth of the Soc. Science Rsch. Council eds., 1962).

⁴³ MAZZUCATO, *supra* note 35, at 43; Boldrin & Levine, *supra* note 1, at 209–10.

⁴⁴ BENTLY ET AL., *supra* note 1, at 410–13.

⁴⁵ *Id.* at 433–44.

⁴⁶ See Sudipto Bhattacharya & Sergei Guriev, *Patents vs. Trade Secrets: Knowledge Licensing and Spillover*, 4 J. EUR. ECON. ASSOC. 1112, 1114 (2006).

⁴⁷ MAZZUCATO, *supra* note 35, at 43; BOLDRIN & LEVINE, *supra* note 1, at 81–85.

- Patenting can have a lock-in effect on the use of newly discovered innovative techniques, which might not be used to go further in the innovation process; indeed, some trends in economic literature relate the increase of “research tools patenting” to a fall in innovation, as it blocks the ability of science to move forward in an open exploratory way.⁴⁸

Hence, innovation might come both from patentable and non-patentable outcomes, and patentable outcomes do not necessarily bring innovation into the system.

2. Considerations on Trademarks

Trademarks are generally not the result of R&D and their connection to innovation is debated. Historically, the trademark doctrine has been deliberately “developed at arm’s length from an innovation incentivization rationale, since that is the remit of patent law.”⁴⁹

Trademarks can sometimes be indicators of innovative activity. They can signal that innovation is occurring by allowing companies to develop a relevant brand image which creates a feedback cycle of investment in future innovation.⁵⁰ For example, innovation can lead a company to have a good reputation, which translates into a more valuable trademark, which can then attract more investments for R&D and innovation-related activities.⁵¹ However, the role of trademarks in this process could be seen as primarily having publicity effects, as much as a good marketing campaign would be, while not necessarily increasing innovation. Thus, trademarks could signal a meaningless differentiation between the two, creating an investment bias towards projects that do not actually increase innovation.⁵²

Additionally, the indefinite time period in which they can operate might become a problem for competition, potentially inhibiting the diffusion of innovation in cases like functional trademarks.⁵³ Overall, trademarks are, in the

⁴⁸ See MAZZUCATO, *supra* note 35, at 42; Roberto Mazzoleni & Richard R. Nelson, *The Benefits and Costs of Strong Patent Protection: A Contribution to the Current Debate*, 27 RSCH. POL’Y 273, 281 (1998); BOLDRIN & LEVINE, *supra* note 1, at 42, (arguing strongly against the possibility of patent protection leading to innovation: “*patents protection is not the source of innovation, but rather the unwelcome consequence that, eventually, tames it . . .*”) (emphasis added).

⁴⁹ DEV GANGJEE, *Trade Marks and Innovation?*, in RESEARCH HANDBOOK ON TRADEMARK LAW REFORM, 192, 220–24 (Graeme B. Dinwoodie, Mark D. Janis eds., 2021).

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

majority of cases, not a direct outcome of innovation-oriented efforts, but rather they are indirectly linked to innovation.⁵⁴

III. TAX INCENTIVES FOR INNOVATION

The use of taxation as a tool to incentivize innovation has been discussed in legal scholarship, although not always within the framework of intellectual property law.⁵⁵ Tax incentives can be seen as an alternative or a complementary tool to the existing innovation-inducing mechanisms, mainly IP rights and cash-based transfers. The view taken here is that tax incentives cannot serve as a substitute for IP rights, but they ought to be considered a different tool that can help enhance other parts of the innovation process.

This part will provide a broad understanding of how tax incentives work, highlighting the policy recommendations of good tax design that are generally associated with the use of these measures. Additionally, it will analyze the use of the most common innovation-oriented tax incentives, R&D tax credits and IP Boxes, in an attempt to understand more clearly how these measures work and how they can interact with a system that adopts IP rights.

A. Definition and Typology

Tax incentives for innovation provide tax relief for taxpayers that are engaged in targeted innovation-related activities. They can be described as special provisions allowing for the exclusion, credit, refund, deferral, or any general time-related arbitrage or rate reduction of tax liability.⁵⁶

Therefore, they can take many forms, according to the way they allow for the reduction of tax liability and what causes them to be activated. The most widespread forms of tax incentives, applied to corporate and personal income taxes as well as value-added taxes, are generally the following:⁵⁷

- Tax holiday/Tax exemption
- Reduced Tax rate
- Investment allowance/Tax credit
- R&D tax incentives
- Super deductions

⁵⁴ *Id.*

⁵⁵ Nussim & Sorek, *supra* note 7, at 27 (arguing that the “economic literature strictly separates analyses of IPR and tax incentives.”); *see also* Bronwyn H. Hall, *Tax Policy for Innovation*, (Nat’l Bureau of Econ. Rsch., Working Paper No. 25773, 2020), <http://www.nber.org/papers/w25773.pdf> (the use of tax incentives for innovation).

⁵⁶ U.N., *supra* note 5, at 5.

⁵⁷ *Id.* at 23; Eric M. Zolt, *Tax Incentives: Protecting the Tax Base*, U.N. DEP’T ECON. & SOC. AFF., Apr. 2015, at 21–23; Sebastian James, *Tax and Non-Tax Incentives and Investments: Evidence and Policy Implications*, INV. CLIMATE ADVISORY SERV. WORLD BANK GRP., June 2014, at 41.

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However, in this article, only the main forms of tax incentives used by the United States and the European Union for incentivizing innovation will be analyzed.⁵⁸

The largest benefit of tax incentives is that, when properly designed and adopted in the right situations, they can reach a specific objective quite effectively.⁵⁹ For example, tax incentives can be used to modify the behavior of taxpayers, with the objective of correcting market inefficiencies or enhancing conduct that produces positive externalities in the system.⁶⁰ As explained *infra*, they are also easy to adopt, as they just modify a preexisting system and do not require an expenditure of funds because they are generally structured as a waiver to the otherwise incurred tax liability.

Nonetheless, tax incentives come at a cost, which, similar to the benefit, is often not easy to measure. This generates several issues when assessing a given tax policy. The main costs connected to the use of these measures are the loss of potential revenue, the resource allocation costs due to the potential distortions generated in the market, the enforcement and compliance costs, and the costs associated with corruption and lack of transparency, especially in developing countries.⁶¹

B. Tax Policy and Design Considerations

The main objectives of a tax system are generally considered to be raising revenue, redistributing wealth, and affecting behaviors in a way that is considered to positively affect society.⁶² Tax systems, to work properly, should maintain an overall equilibrium between these factors because some measures that target a specific objective might do so at the expense of another objective.⁶³ The most straightforward example of this is when a country, in an attempt to incentivize a specific behavior, allows for a tax reduction for taxpayers adopting that behavior.⁶⁴ The consequence is a reduction of the overall revenue collected in the system, which might be considered the cost of the policy.⁶⁵ Therefore, the policy must be designed effectively, otherwise,

⁵⁸ For a thorough analysis of all the forms of incentives, *see generally* Zolt, *supra* note 57; U.N., *supra* note 5; James, *supra* note 57.

⁵⁹ U.N., *supra* note 5, at 13, 20.

⁶⁰ *Id.* at 13.

⁶¹ *Id.* at 15.

⁶² *See* Reuven Avi-Yonah, *The Three Goals of Taxation*, 60 TAX L. REV. 1, 3–5 (2006); ALLISON CHRISTIANS, INTRODUCTION TO TAX POLICY THEORY 1–11 (2018); INSTITUTE FOR FISCAL STUDIES ET AL., TAX BY DESIGN: THE MIRRLEES REVIEW, 21–33 (2011).

⁶³ *See* INSTITUTE FOR FISCAL STUDIES ET AL., *supra* note 62, at 29–33.

⁶⁴ *Id.*

⁶⁵ U.N., *supra* note 5, at 18.

the reduction in revenue becomes a waste of public money. In general, when tax policy instruments are used for purposes that differ from revenue-raising and wealth-redistribution, several issues arise, and it becomes necessary to understand whether the objectives are pursued without hampering status quo equilibriums.

The system should be looked at as a whole and several assessments should be conducted to understand whether there might be different ways to reach the same objectives more efficiently and without affecting the neutrality of the tax system. All in all, the proposed policy should be coherent with its objectives and avoid undesirable effects.

1. Objectives and Targeting Abilities

To function properly, tax incentives need to be well targeted. Targeting, however, is not easy, as tax measures can cause unexpected and undesirable distortions in the system, which are sometimes difficult to identify.⁶⁶ Tax incentives can be broadly targeted, aiming at some general types of investment, or narrowly targeted, when they are designed for a specific action or sector.⁶⁷

When it comes to innovation-oriented tax incentives, unpacking the notion of innovation can help reveal how tax incentives can target one of the specific factors that are generally associated with innovation. The most relevant factors, which will be the main object of analysis in this paper, are R&D investments and patents, which constitute, respectively, an input and an output of innovation. As analyzed *infra*, the way the incentive is designed also affects the stage of the innovation process in which the incentive intervenes.

Incentives should ideally aim at selecting the projects that produce the largest amount of externality in the system, as those are the kinds of projects whose monetary benefits might not necessarily attract private investments, as their effects are spread broadly over society.⁶⁸ However, targeting these projects is difficult *per se* and can be even more difficult when designing a tax policy because the tax administration is not specialized enough for the task.⁶⁹ This is especially true when there is not a comprehensive criterion that can be used as a proxy for these externalities (a “nondiscretionary or minimally-discretionary” tax rule), such as what takes place when targeting a specific sector (e.g., healthcare or technology).⁷⁰ Therefore, it might be better for the tax system to intervene in a broader way, by incentivizing specific dimensions of the innovation process through prizes, grants or other

⁶⁶ *Id.* at 18–20.

⁶⁷ *Id.* at 20.

⁶⁸ See MUSGRAVE, *supra* note 2; Arginelli, *supra* note 2.

⁶⁹ See Nussim & Sorek, *supra* note 7, at 65–80.

⁷⁰ *Id.* at 77.

kinds of subsidies, rather than specific projects, leaving the latter task to other government agencies with more innovation-oriented expertise.

2. Principles of Tax Design in Behavioral Taxes

In this part, the most relevant dimensions of good tax design are described.⁷¹ These dimensions are presented within the framework of innovation-oriented tax incentives to highlight what the trade-offs are between these dimensions and provide an analogy with the use of direct subsidies provided by the State through specialized agencies.

(a) *Simplicity*

Simplicity can be divided into three main categories: simplicity of implementation, simplicity of administration, and simplicity of access.

Simplicity of Interpretation. Regarding simplicity of implementation, using the resources that are already in place in the tax system seems to be quite a relevant advantage, as compared to creating a government body that selects what inventions are worthy of direct subsidies from the state.⁷² Undeniably, it is easier to change a piece of the current legislation on tax incentives, like the deductible amount, rather than introducing *ex novo* a set of rules concerning direct subsidies to innovation.

Simplicity of Administration. Regarding simplicity of administration, it should be easier to administer innovation-oriented tax incentives as they leverage the already established tax system, which means that administrative structures would already be in place.⁷³ Direct subsidies would imply the realization of control structures aimed at discerning the kinds of projects to invest in.

Simplicity of Access. For taxpayers, it would be easier to obtain incentives that leverage the current tax system, rather than taking on additional learning costs to understand new forms of subsidy and state investment. Nevertheless, not all tax incentives are equally accessible.⁷⁴ However, firms generally need to be aware of tax compliance rules and get an understanding of the tax system anyway; therefore, knowing about the tax incentives becomes more straightforward as opposed to having to hire specialists to look for public grants or other forms of direct subsidies.

⁷¹ See INSTITUTE FOR FISCAL STUDIES ET AL. *supra* note 62.

⁷² See Arginelli, *supra* note 2, at 18.

⁷³ *Id.*

⁷⁴ See U.N., *supra* note 5, at 24.

(b) *Neutrality*

Neutrality is quite a controversial variable to evaluate. The idea is that a neutral system is one that minimizes distortions over society's choices.⁷⁵ However, when a policy is deliberately aimed at changing people's behavior, like tax incentives for innovation, neutrality can be considered the least distortive way to do so. This translates into a policy that reaches the same end with the maximum amount of effectiveness and efficiency.

(c) *Effectiveness (Affecting Taxpayers' Behavior)*

The objective to increase the targeted measure, such as the number of patents or the amount of R&D, can be reached with different levels of effectiveness. For instance, considering the cash dimension, direct subsidies constitute resources at firms' disposal and ready for use, whereas tax incentives are generally a form of debt waiver for the firm, which means that the firm might lack the cash resources to invest in these activities. Additionally, a firm must have some tax liability to be able to enjoy the benefit of the tax incentive, which is generally not the case for loss-making firms, as firms in their start-up stage usually are.⁷⁶ Consequently, in the example, direct subsidies seem to be a more effective way to change firms' behavior. In this case, it is possible to witness a trade-off between simplicity and effectiveness. Therefore, the advantages of effectiveness should be weighed against the higher cost of administering the system.

(d) *Efficiency (Opportunity Cost)*

As governments operate with limited resources, they ought to use their public budgets in the most efficient way. Even when trying to achieve a desirable objective, such as the incentivization of innovation, they choose to do so over other policy objectives, which might be more impactful.

When the objective of the policy is defined, but there are different ways to reach it, the government should opt for the most efficient one. For example, if the government needs to incentivize economic growth, tax incentives for innovation might not be the only way to do that. Before choosing to adopt tax incentives, the government should consider whether the same objective of economic growth could be reached through other kinds of non-tax or tax measures.⁷⁷

⁷⁵ INSTITUTE FOR FISCAL STUDIES ET AL., *supra* note 62, at 40–41.

⁷⁶ See, e.g., IOANNIS KOMNINOS, *PRODUCT LIFE CYCLE MANAGEMENT* 5 (2002).

⁷⁷ See Louis Kaplow, *How Tax Complexity and Enforcement Affect the Equity and Efficiency of the Income Tax*, in *TAX POLICY IN THE REAL WORLD* 381–93 (Joel Slemrod ed., 1999), <https://www.cambridge.org/core/product/identifier/9780511625909/type/book> (last visited Apr. 5, 2023).

Innovation-oriented tax incentives might be considered not extremely efficient as they generally do not distinguish projects with larger externalities from projects with smaller externalities.⁷⁸ On the contrary, direct subsidies may allow the government to pick research projects with larger externalities over other kinds of projects, especially because the government agencies that are responsible for overseeing these processes are generally more suitable for this job than the tax administration.⁷⁹ However, there is also a trade-off between efficiency and simplicity, as the greater the efficiency of direct subsidies, the higher the cost of administration.

(e) Fairness

Fairness concerns the equity dimension of the tax system, which should be considered as a whole and not necessarily focus on one metric. Fairness is very hard to measure, and often it is only possible to provide some general considerations concerning this dimension. With respect to innovation-oriented tax incentives, the fact that innovation affects growth and produces positive externalities in the system might make it a “fair” objective, although one could argue about the accessibility of these measures to the whole population and not to specific types of individuals. In this case, not much can be said about equity and redistribution, as it is hard to tell who gains from innovation-oriented incentives. Also, especially in the presence of corporate tax incentives, it is impossible to detect a link between a corporation paying fewer taxes and the distribution of wealth in a country.

Fairness is related to all the other dimensions, as the more effective, simple, efficient, and neutral a tax policy is, the fewer resources are used for the stated objective, and the more resources are at disposal of the country to redistribute wealth or intervene in other policy areas to the benefit of the community. Additionally, a measure that is less distortive and more effective can be considered fairer, as it would be unfair to advantage certain actors over others for no reason.

(f) Stability

Stability concerns the ability of a tax system to be sustainable enough not to need changes too often, as taxpayers should not have to pass a great deal of tax legislation. They should rather be able to rely on the tax system to remain unmodified unless it really needs an update due to specific circumstances.

⁷⁸ See U.N., *supra* note 5, at 78–79; Arginelli, *supra* note 2, at 17.

⁷⁹ Nussim & Sorek, *supra* note 7, at 65–80.

Tax incentives might not be extremely stable, as they may contain mechanisms that require continuous changes in legislation.⁸⁰ In particular, some dynamics related to tax avoidance and international tax competition make some countries want to change their tax incentives to make them more attractive, as other countries adopt similar incentives. At the same time, these dynamics make some countries want to make qualifications for their tax incentives stricter, to reduce the possibility of actors abusing the law.⁸¹ Direct subsidies might generate similar dynamics, although the supervision of a government agency might make them less subject to abuse.

3. Tax Competition and Coordination

One of the reasons that countries adopt innovation-oriented tax incentives is international tax competition. Some countries wish to attract foreign investments through advantageous tax policies.⁸² Indeed, in the globalized economy, states do not compete for the provision of a “take-it-or-leave-it package” but also over specific tax rates, particular regimes for determined assets, and various benefits.⁸³ As a defense mechanism against tax competition, countries forcefully choose to adopt similar kinds of incentives, in order to protect their national investments.⁸⁴ This process leads to an overall decrease in taxes levied on mobile capitals and corporate taxation, often referred to as a “race to the bottom.”⁸⁵ In the case of IP Boxes, this was a quite clear reaction, especially within the European Union.⁸⁶

Nonetheless, when a country incentivizes innovation, especially involving positive externalities, an opposite phenomenon kicks in. Indeed, in the context of international spillovers, some countries might be better off free-riding off of other countries’ innovation-related efforts.⁸⁷ The problem with the externalities that derive from innovative products is that they cannot be measured and that they can also have positive effects on other countries, despite the revenue-related effort being put in by only one country.⁸⁸ Similar to what happens amongst firms investing in innovative activities, this can create

⁸⁰ A similar kind of destabilisation of the tax system is described in Michael P. Devereux & John Vella, *Are We Heading Towards a Corporate Tax System Fit for the 21st Century?*, 35 FISCAL STUD. 449, 451–53 (2014).

⁸¹ U.N., *supra* note 5, at 79.

⁸² Devereux & Vella, *supra* note 80, at 457–58.

⁸³ TSILLY DAGAN, INTERNATIONAL TAX POLICY: BETWEEN COMPETITION AND COOPERATION 2–4 (2018) (ebook).

⁸⁴ *Id.*

⁸⁵ See Michael P. Devereux & Simon Loretz, *What Do We Know About Corporate Tax Competition?*, 66 NAT’L TAX J. 745, 749 (2013).

⁸⁶ Arginelli, *supra* note 2, at 44–55.

⁸⁷ *Id.* at 24.

⁸⁸ *Id.*

a disincentive for countries to adopt innovation-related incentives as other countries might benefit from them at their expense.⁸⁹

This also happens with environment-oriented efforts, where some countries might free-ride off of the efforts of other countries in reducing pollution by imposing stricter regulations and environmental taxes on their businesses.⁹⁰ However, there is a fundamental difference between incentives and disincentives. In tax competition, countries that have innovation-oriented incentives or green incentives tend to attract more businesses and foreign investments.⁹¹ Therefore, there is a double positive effect to adopting these kinds of measures — the positive externalities but also the increased competitiveness in attracting businesses and investments. This is probably the reason why many countries now seem to be competing on these measures, like what happened with the United States' Inflation Reduction Act 2022, which heavily increased the budget for green incentives, and the European Union's immediate response via the Green Deal Industrial Plan.⁹²

Therefore, it is clear how national policies are often internationally influenced and do not come from univocal reasons.⁹³ In some cases, they might come from competitive efforts, whereas in other cases they might be the consequence of some sort of coordination.⁹⁴ This latter case includes what gets decided in some international policy forums, such as the G20 or the OECD, or even by supranational bodies, which can set specific policy objectives that lead to the adoption of specific measures.⁹⁵ The main example of this is the European Union, which in the context of innovation incentives often sets some levels of desired R&D activities that E.U. countries should reach.⁹⁶

⁸⁹ *Id.*

⁹⁰ Zeynep Burcu Irfanoglu, Juan P. Sesmero, & Alla Golub, *Potential of Border Tax Adjustments to Deter Free Riding in International Climate Agreements*, 10 ENV'T RSCH. LETT. 1, 1–2 (2015).

⁹¹ See, e.g., Ronald Wall et al., *Which Policy Instruments Attract Foreign Direct Investments in Renewable Energy?*, 19 CLIMATE POL'Y 59, 64–69 (2019).

⁹² H.R. 5376 “Inflation Reduction Act” of 2022, Pub. L. No. 117-169, 136 Stat. 1865 (2022); *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions*, COM (2023) 62 final (Feb. 1, 2023); see EU's Response to the US Inflation Reduction Act (IRA), Eur. Parl. Doc. (PE 740.087) (2023).

⁹³ Arginelli, *supra* note 2, at 5–7; Carlo Garbarino, *Tax Transplants and Circulation of Corporate Tax Models*, 2 BRIT. TAX REV. 159, 159–67 (2011).

⁹⁴ Garbarino, *supra* note 93, at 167–87; DAGAN, *supra* note 83, at 142–45.

⁹⁵ DAGAN, *supra* note 83, at 146–65.

⁹⁶ For example, the Europe 2020 Strategy had the long-standing objective for the E.U. countries to devote 3 percent of their GDP to R&D activities. See Commission Regulation 1291/2013 2013 O.J. (L 347-104) (EC) (“[E]stablishing *Horizon 2020 — the Framework Programme for Research and Innovation (2014–2020)* and repealing Decision No 1982/2006/EC.”) (emphasis added). Also, the proposal for the CCCTB had a super-deduction for R&D expenses. See *Proposal for a Council Directive on a Common Consolidated Corporate Tax Base (CCCTB)*, COM (2016) 683 final (Oct. 25, 2016).

C. Policy Analysis of the Most Common Forms of Incentives

There are several ways to incentivize innovation through taxation. The main distinction, which will constitute the fil rouge of this subpart, regards whether the incentive is “expenses-centered” or “revenue-centered.”⁹⁷ Both expenses-centered and revenue-centered policies aim at incentivizing input activities and output activities of innovation. However, in doing so, one kind of policy, the expenses-centered, is based on the first phase of the innovation process, which is the moment in which private companies use their resources to invest in R&D. The other kind of policy, the revenue-centered, is based on the last phase of the process, which is the exploitation of the possible outcome of the R&D activities.

1. Expenses-Centered Incentives: R&D Tax Credits

Expenses-centered incentives are mostly represented by R&D tax credits, although they do not only consist of tax credits; however, this analysis will refer to the whole category as “R&D tax credits”. These kinds of incentives are conceived as a way to intensify firms’ possibility to deduct R&D expenses. The most common ways they are designed are generally: enhanced deductions, accelerated depreciation/amortization, and tax credits.

2. Revenue-Centered Incentives: IP Boxes

Revenue-centered incentives can be generally identified with IP Boxes. They are designed as a tax reduction on the revenues obtained by the exploitation of intellectual property.

According to the country of adoption, IP Boxes can target various kinds of intangibles, normally patents, designs and models, secret formulas and processes, know-how, software, copyrights and trademarks.⁹⁸ However, the scope that is approved by the OECD Action 5 is narrowed down to a specific set:⁹⁹

- Patents, broadly defined;
- Copyrighted software;

⁹⁷ This is a derivation of the very helpful distinction between *input* and *output* research activities operated by Arginelli, *supra* note 2, at 19–20. The analysis opts for this *expenses/revenue* differentiation because both kinds of measures are aimed, to some extent, at incentivising both input and output activities but they do so in different ways.

⁹⁸ For an extensive analysis of the main IP Box regimes, see Lisa Evers, Helen Miller & Christoph Spengel, *Intellectual Property Box Regimes: Effective Tax Rates and Tax Policy Considerations*, 22 INT’L TAX & PUB. FIN. 502 (2015).

⁹⁹ OECD, ACTION 5: AGREEMENT ON MODIFIED NEXUS APPROACH FOR IP REGIMES 5 (2015).

- In certain circumstances, and only for small and medium enterprises, other IP assets that are non-obvious, useful, and novel.

3. Policy Analysis

In attempting to conduct a policy analysis of the two most common forms of innovation-oriented tax incentives, this section takes into account the most relevant diverging features of the two policies. In particular, it focuses on the targeted input and output activities of the two measures, on the empirical evidence that emerges from the economic literature, and on the ease of administration.

(a) Targeted Input Activities

As the objective of innovation-oriented tax incentives is the enhancement of private sector innovative activities, it is fundamental to analyze whether the two policies are designed to successfully do so.¹⁰⁰

In attempting to understand the potential targeting of genuine R&D investments, considered as inputs of the innovation process, there are three main types of R&D activities that can be conducted by a firm, according to their prospective success:

- Unsuccessful R&D;
- R&D that would have been successful with more funds to invest; and
- Successful R&D.

Among these three categories, a policy designed with the scope of enhancing innovation through R&D activities in the private sector should mainly target the second category, namely R&D which would have been successful with more funds available. The public budget invested in unsuccessful R&D is wasted. Public investments in R&D that would be successful anyway might be considered an inefficient investment as they do not increase the number of successful activities and, supposedly, innovation. In this latter case, there might be a reason for subsidizing this kind of activity as a prize. Nonetheless, IP rights are generally in the system to grant the creator of the successful project the right economic return from their investment.¹⁰¹

R&D tax credits indistinctly target all kinds of R&D activities, whereas IP Boxes indirectly target only successful R&D activities, which were able to result in the exploited IP.¹⁰² Even if they theoretically provide a behavioral incentive to private firms to increase their effort towards R&D that might be

¹⁰⁰ Arginelli, *supra* note 2, at 5–6.

¹⁰¹ See *supra* note 11 and accompanying text.

¹⁰² The same view is expressed by Evers, Miller, & Spengel, *supra* note 98.

successful with more funds, IP Boxes do not grant the financial resources to behave accordingly. Additionally, it is important to note that the role of IP rights is already to provide an incentive of this kind, as successful R&D can be patented or copyrighted, which grants the owner the economic enjoyment of the output. In this context, the roles of IP Boxes and IP rights seem to overlap, whereas R&D tax credits seem to be a better match for incentivizing all kinds of innovation inputs.

Therefore, R&D tax credits seem to more effectively target what the system might need, especially if they are refundable, as they might help R&D that is unsuccessful for lack of funds even more than nonrefundable R&D incentives. However, it might be useful for further research to understand the level of wasted government resources in unsuccessful R&D.

FIGURE 1. TARGETED INPUT ACTIVITIES

INPUT ACTIVITIES	Unsuccessful R&D	R&D unsuccessful for lack of funds	Successful R&D
R&D Tax Credit	✓	✓	✓
IP Box	✗	✗	✓

(b) Targeted Output Activities

Although it is generally assumed that incentivizing R&D is already a desirable policy objective, it might be useful to examine the effects that these measures have on the output activities, to get an idea of what happens next. We can identify three kinds of output activities, according to their patentability and level of innovation:

- Patentable innovative outcomes;
- Non-patentable innovative outcomes;
- Patentable and non-patentable non-innovative outcomes.

Then we have another category, which is not an output activity of R&D but is still in the scope of certain tax incentives:

- Other non-R&D outcomes (e.g., trademarks).

It would be ideal for a policy to target only innovative outcomes, but it is extremely complex to isolate these outcomes, even at a theoretical level. On the other hand, subsidizing non-R&D outcomes is certainly out of the policy scope.

R&D tax credits indirectly target all outcomes, except for the non-R&D one, although, as seen *supra*, in some cases they might even have positive effects on trademarks, although this is outside the scope of the tax measure. IP Box regimes tend to mainly target patentable outcomes, but the way they

work heavily depends on their policy design. Before the OECD created recommendations for their design,¹⁰³ they tended to also enhance the use of non-R&D outcomes, which made them an extremely inefficient policy.¹⁰⁴

IP rights already tend to incentivize all these outcomes, except for the non-patentable innovative outcomes, which might be, for instance, know-how, methods of doing business, or discoveries.¹⁰⁵ When these outcomes are the result of R&D, then R&D tax credits do indirectly incentivize them.

FIGURE 1. TARGETED OUTPUT ACTIVITIES

OUTPUT ACTIVITIES	Patentable innovative outcomes	Non-patentable innovative outcomes	Non-innovative outcomes	Non-R&D outcomes (e.g., trademarks)
R&D Tax Credit	✓	✓	✓	✗
IP Box	✓	*	✓*	*
* depending on how it is designed				

(c) Empirical Evidence

In order to fully understand the economic efficiency of tax incentives, it is important to consider their effects according to the empirical analyses that have been conducted in economic literature.

Empirical evidence shows there is a positive effect of R&D tax credits on private R&D activities.¹⁰⁶

$$R\&D = f(\text{tax benefit}_{R\&D}) +$$

However, there are still some uncertain features, such as the heterogeneous responsiveness and elasticity of R&D tax incentives, cross-country

¹⁰³ OECD, *supra* note 99.

¹⁰⁴ For an up-to-date policy analysis on IP Boxes and other income-based tax incentives in the OECD, see Ana Cinta González Cabral et al., *Design Features of Income-based Tax Incentives for R&D and Innovation* (OECD Tax'n, Working Paper No. 60, 2023), https://www.oecd-ilibrary.org/taxation/design-features-of-income-based-tax-incentives-for-r-d-and-innovation_a5346119-en; Silvia Appelt et al., *Cost and Uptake of Income-based Tax Incentives for R&D and Innovation* 7, 9 (OECD Sci., Tech. & Indus., Working Paper No. 3, 2023), https://www.oecd-ilibrary.org/science-and-technology/cost-and-uptake-of-income-based-tax-incentives-for-r-d-and-innovation_4f531faf-en.

¹⁰⁵ BENTLY ET AL., *supra* note 1, 5–7, 469.

¹⁰⁶ Irem Guceri & Li Liu, *Effectiveness of Fiscal Incentives for R&D: Quasi-experimental Evidence*, 11 AM. ECON. J. ECON. POL'Y 266, 289 (2019); Nick Bloom, Rachel Griffith & John Van Reenen, *Do R&D Tax Credits Work? Evidence from a Panel of Countries 1979–1997*, 85 J. PUB. ECON. 1, 21–22 (2002).

differences, the effects on productivity and the composition and location of R&D.¹⁰⁷

As regards IP Boxes, the tax reduction on the exploitation of IP and intangibles does not necessarily relate to an increase in R&D activities.¹⁰⁸

$$R\&D = f(\text{tax benefit}_{IP})$$

?

Nevertheless, when adopted, IP Boxes were advertised as a way to increase the levels of R&D investments, as they would create an incentive for firms to invest more based on the expected reward.¹⁰⁹ There is mixed empirical evidence on the actual effects of IP Boxes. In general, current analyses face the following problems when analyzing IP Boxes:

- Identification issues: some variables are difficult to measure. For example, some economic literature¹¹⁰ uses the number of patent applications, grants, and highly-skilled employees to measure innovation, even though they are inaccurate proxies;¹¹¹
- When estimating the effects of IP Boxes, it is difficult to disentangle the desirable increase in IP investments from profit-shifting.¹¹²

(d) Ease of Administration

The notable advantage of R&D tax credits is that they are easy to implement and administer, as they make large use of what is already deductible for tax purposes and modify the way it is deducted, generally enhancing it or changing its timing.¹¹³ Tax administrations witness a slight change in the rules that are already in place, which does not create much of a burden. Although R&D deductions are enhanced, this might not necessarily lead to an

¹⁰⁷ Gucer & Liu, *supra* note 106, at 289; Boris Lokshin & Pierre Mohnen, *Do R&D Tax Incentives Lead to Higher Wages for R&D Workers? Evidence from the Netherlands*, 42 RSCH. POL'Y 823, 829 (2013).

¹⁰⁸ Annette Alstadsæter et al., *Patent Boxes Design, Patents Location, and Local R&D*, 33 ECON. POL'Y 131, 166–67 (2018); Shannon Chen et al., *The Effect of Innovation Box Regimes on Income Shifting and Real Activity*, SSRN ELECTRON. J. 32–33 (2019), <https://www.ssrn.com/abstract=3486428> (last visited Apr. 5, 2023).

¹⁰⁹ Augustin Redonda, *Boosting R&D Through Patent Boxes. Panacea or Not?*, COUNCIL ON ECON. POLICIES (Dec. 10, 2015), <https://www.cepweb.org/boosting-rd-through-patent-boxes-panacea-or-not/>.

¹¹⁰ See Tobias Bornemann, Stacie Kelley Laplante & Benjamin Osswald, *The Effect of Intellectual Property Boxes on Innovative Activity & Effective Tax Rates*, SSRN ELECTRON. J., 3 (2018), <https://www.ssrn.com/abstract=3115977> (last visited Apr. 5, 2023).

¹¹¹ It is useful to see the correlation between IP Boxes and these factors, but they do not necessarily approximate innovation in the system.

¹¹² IP Boxes can result in aggressive tax competition and lead to a decrease in tax revenue. See Rachel Griffith, Helen Miller & Martin O'Connell, *Ownership of Intellectual Property and Corporate Taxation*, 112 J. PUB. ECON. 12, 19 (2014).

¹¹³ See *supra* note 73 and accompanying text.

excessive increase of the usual audits that tax administrations conduct on corporate expenses, except for the fact that there might be abusive behaviors from taxpayers trying to make other expenses count as R&D.¹¹⁴ However, they do not add a great deal of complexity to this already complex system, as abuses and audits occur anyway.

In contrast with this scenario, IP Boxes are quite difficult to administer. Despite what could seem like a simple tax reduction on the use of specific intangibles, there are several difficulties in the administration of such a tax advantage.

The first difficulty concerns the objective scope of the IP Box. Only certain specific kinds of intangible assets can enjoy the tax reduction.¹¹⁵ Therefore, tax administrations have the task of checking whether the intangible assets exploited by the firm fall within the scope of the tax policy. This is a costly task both when operated ex-ante and ex-post. The second difficulty is determining the amount of revenue that can enjoy the reduction. Externalized IPs imply the payment of royalties, which can be considered the revenue that is derived from the IP. For internalized IPs, the amount of revenue that is related to the use of the IP must be unraveled. Additionally, IP Boxes that are in line with OECD recommendations contemplate a further factor, which is aimed at determining the amount of this IP revenue that can be associated with the R&D activities (the “nexus”).¹¹⁶ These specific calculations can be conducted together with the tax administration, in an advanced tax ruling.¹¹⁷ The one-by-one analysis by the tax administration, as well as the ex-post auditing, make the application of IP Box regimes rather burdensome.

In light of this policy analysis, expenses-centered incentives, in particular in the form of refundable R&D tax credits, might be a better complement to IP rights for boosting innovation-related activities. This is due to the fact that they target activities that are not incentivized by IP rights, as opposed to IP Boxes, which instead rather overlap in scope with IP rights.

However, it is important to underline that targeting these kinds of complementary activities does not necessarily lead to innovation and that further, more targeted research would be needed to fully understand the effects and the costs (i.e., the amount of revenue wasted in unsuccessful research) of these incentives. Additionally, it must be noted that both R&D tax credits and IP Boxes might be subject to abuses aimed at tax avoidance, and, therefore, their effects might also depend on the effectiveness in the country of

¹¹⁴ U.N., *supra* note 5, at 24–28.

¹¹⁵ *See infra*, Figure 6.

¹¹⁶ OECD, *supra* note 99; the “modified nexus approach” includes a further passage.

¹¹⁷ *See, e.g.*, Barbara Scampuddu & Gian Luca Nieddu, *Italian Patent Box Regime Becomes More Accessible for R&D*, 30 INT’L TAX REV. 76 (2019).

anti-abuse legislation and the ability of the tax administration to identify and stop these cases.

IV. U.S.–E.U. COMPARATIVE ANALYSIS ON TAX INCENTIVES

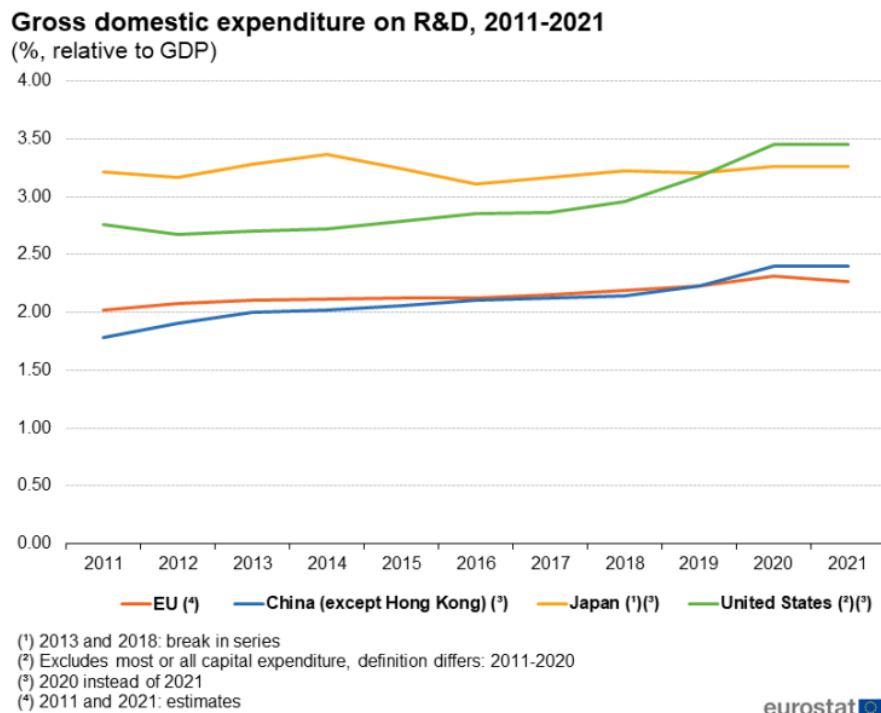
Both the United States and the Member States of the European Union put great value in innovation and R&D investments. In absolute values, in 2021 the United States had investments in R&D activities totaling \$791.9 billion,¹¹⁸ almost doubling the total E.U. absolute investments in R&D, which in 2021 amounted to €328 billion.¹¹⁹ In relative terms, amongst E.U. Member States, the highest R&D intensity, measured as gross domestic R&D expenditures to GDP, was recorded in Sweden (3.35 percent), Austria (3.22 percent) and Belgium (3.19 percent).¹²⁰ Only six Member States reported an R&D intensity below 1 percent in 2021.¹²¹ Also, when dividing by the GDP, as shown in Figure 1, the United States (3.45 percent) still had a higher research intensity than the E.U. average (2.31 percent).

¹¹⁸ Gary Anderson, John Jankowski & Mark Boroush, *U.S. R&D Increased by \$51 Billion in 2020 to \$717 Billion; Estimate for 2021 Indicates Further Increase to \$792 Billion* (Jan. 4, 2023), NAT'L CTR. FOR SCI. & ENG'G STATS., <https://ncses.nsf.gov/pubs/nsf23320>.

¹¹⁹ *EU Investment in R&D Increased to €328 Billion in 2021*, EUROSTAT, <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20221129-1> (Nov. 29, 2022).

¹²⁰ *Id.*

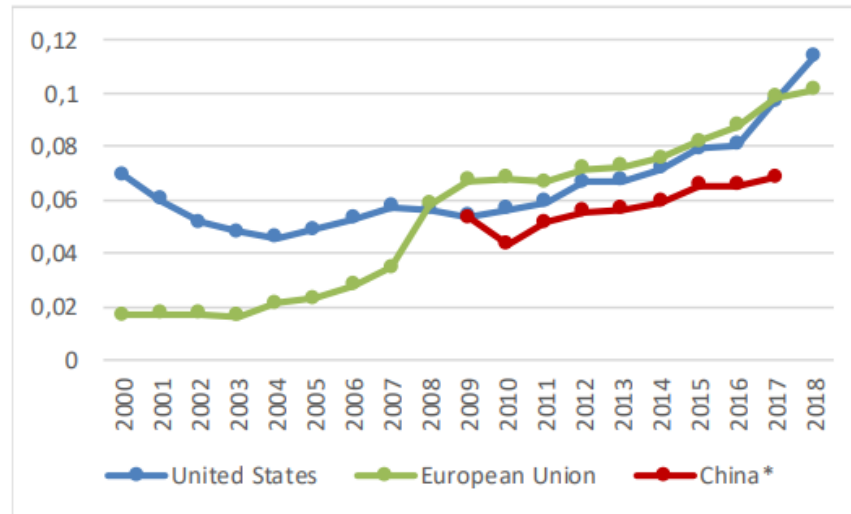
¹²¹ *Id.*

FIGURE 3. EUROSTAT GROSS DOMESTIC EXPENDITURE ON R&D CHART¹²²

Tax incentives for R&D have been a very popular tool in both the United States and the European Union, rising steadily over the past two decades, as shown in Figure 3. In 2018, the United States overtook the European Union in terms of R&D tax incentives to GDP, after ten years of E.U. primacy in this figure.

¹²² EUROSTAT, *R&D Expenditure*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=R%26D_expenditure (last visited Apr. 5, 2023).

FIGURE 4. OECD – E.U. PARLIAMENT, R&D TAX INCENTIVES AS A PERCENTAGE OF GDP¹²³



Source: OECD, *China data missing for 2000-2008 and 2018.

This section is dedicated to analyzing the differences between the innovation-oriented tax incentives in the European Union and the United States and understanding the divergences within the framework of the tax policy approach that the two legal systems generally adopt.

A. U.S. Measures

In the United States, the most significant kinds of innovation-oriented tax reductions are the expensing of research and experimental expenditures, under section 174 of the Internal Revenue Code (Code), and the credit for increasing research activities, under Code Section 41 (Research & Experimentation Tax Credit).¹²⁴

In order to target expenditures that are more likely to generate positive externalities and to reduce the cost of the policy, the benefit applies only to Qualified Research Expenditures (QRE), which are typically wages to employees for qualified services, supplies used in the R&D process, and contract research expenses for third parties performing qualified research.

In the Tax Cuts and Jobs Act of 2017, the United States adopted several policies to make itself a more attractive location for intellectual property. First, in line with the global trend, the United States reduced its corporate tax

¹²³ EUR. PARLIAMENTARY RSCH. SERV., *The Role of Tax Incentives in Corporate Taxation*, [https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/733578/EPRS_ATA\(2022\)733578_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/733578/EPRS_ATA(2022)733578_EN.pdf) (last visited Apr. 5, 2023).

¹²⁴ BLOOMBERG TAX, *R&D Tax Credit and Deductions* (Aug. 23, 2022) <https://pro.bloombergtax.com/brief/rd-tax-credit-and-deducting-rd-expenditures/>.

rate to 21 percent, to be more competitive with other countries' tax rates.¹²⁵ Additionally, it introduced a new tax on foreign income, the Global Intangible Low-Tax Income (GILTI), ensuring that companies pay a 10.5 to 13.125 percent rate on income from overseas.¹²⁶ This was adopted to assure a minimum level of taxation on IP moved outside of the United States in an attempt of searching for better tax treatments. As a counterbalance to GILTI, the reform reduced the tax rate on Foreign Derived Intangible Income (FDII) to 13.125 percent.¹²⁷

GILTI and FDII are quite similar measures. GILTI uses a formulary approach to tax non-US earnings above a 10 percent return on assets, even when those earnings are not derived from intangibles.¹²⁸ The assumption is that the “supernormal” returns are associated with IP or other intangibles.¹²⁹ FDII provides a tax reduction on the income produced outside of the United States, deriving from the use of US-based intangibles. It provides a special lower tax rate of 13.125 percent.

The FDII had been put under review by the Inclusive Framework in 2018.¹³⁰ However, the United States has confirmed to the OECD its intention to abolish the FDII regime, which has therefore been classified as “under review.”¹³¹

FIGURE 5. OECD CLASSIFICATION OF IP TAX REGIMES – UNITED STATES¹³²

Regime Name	IP Qualifying Assets	Peer Review Status	Tax Rate Under Regime	Tax rate that would otherwise apply
Foreign derived intangible income (FDII)	Assets not restricted to three allowed asset categories	Under review/ in the process of being eliminated	13.13%	21.00%

¹²⁵ Pub. L. No. 115-97 § 13001, 131 Stat. 2096 (codified at I.R.C. § 11(b) (2017)).

¹²⁶ Pub. L. No. 115-97 § 14201, 131 Stat. 2208 (codified at I.R.C. § 951A (2017)).

¹²⁷ Pub. L. No. 115-97 § 14201, 131 Stat. 2213 (codified at I.R.C. § 250 (2017)).

¹²⁸ Kartikeya Singh & Aparna Mathur, *The Impact of GILTI and FDII on the Investment Location Choice of U.S. Multinationals* 9–11 (AEI Economics, Working Paper No. 2018-5, 2018).

¹²⁹ *Id.* at 1, 8.

¹³⁰ OECD, *Intellectual Property Regimes*, https://qdd.oecd.org/data/IP_Regimes (last visited Apr. 5, 2023).

¹³¹ *Id.*

¹³² *Id.*

B. E.U. Measures

The European Union seems to encourage countries to invest in R&D and adopt innovation-oriented tax measures, despite understanding the potentially problematic consequences of incentives that are not well designed on the internal market.¹³³ Indeed, it is trying to coordinate the use of tax incentives in its current direct taxation-related proposals, such as the debt-equity bias reduction allowance (DEBRA) or the Business in Europe: Framework for Income Taxation (BEFIT).¹³⁴

The European Union often reminds Member States of its objective to increase research and innovation, in order to promote “resilience, prosperity, competitiveness, and economic and social well-being.”¹³⁵

The majority of E.U. countries have a form of R&D tax incentives. As presented in an analysis conducted by the European Commission, in 2017 only 3 Member States did not have an R&D tax incentive.¹³⁶ However, the shape of tax incentives varies from country to country.¹³⁷ E.U. member states tend to adopt tax credits, enhanced allowances, accelerated depreciation, and targeted expense-based incentives.¹³⁸

As for the IP Box regimes, by 2014 12 E.U. Member States had introduced an IP Box in their jurisdiction.¹³⁹ When introduced, they had some similarities in the way they worked, but also many divergences in their scopes and tax rates. After the publication of the OECD Action 5, which suggested some restrictions in the qualifying assets that IP Boxes had to allow, the E.U. witnessed some sort of harmonization, at least in the scope of its IP Boxes. For instance, the possibility of applying the tax reduction on trademarks was

¹³³ See DIANA OGNANOVA, R&D TAX INCENTIVES: HOW TO MAKE THEM MOST EFFECTIVE? (2017). See also *Communication from the Commission to the European Parliament, The Council, the European Economic and Social Committee, and the Committee of the Regions on the Global Approach to Research and Innovation*, at 1–19, COM (2021) 252 final (May 18, 2021).

¹³⁴ European Commission Press Release IP/22/22884, *Corporate Taxation: Commission Proposes Tax Incentive for Equity to Help Companies Grow, Become Stronger and More Resilient* (May 11, 2022) (“Commissioner Paolo Gentiloni said: “Today we are taking action to make the tax advantages of equity comparable to those of debt for firms wanting to raise capital. We want to give a shot in the arm to innovative start-ups and SMEs throughout the EU. This harmonised solution to the debt-equity bias will make Europe’s business environment more predictable and competitive, spurring the development of our capital markets union.”) (emphasis omitted) (internal quotations omitted). See also *Business in Europe: Framework for Income Taxation (BEFIT)*, EUROPEAN COMMISSION, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13463-Business-in-Europe-Framework-for-Income-Taxation-BEFIT_en (last visited Aug. 25, 2023).

¹³⁵ COM (2021) 252 final, *supra* note 133, at 1.

¹³⁶ OGNANOVA, *supra* note 133, at 6.

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ Evers, Miller, & Spengel, *supra* note 98, at 502.

removed by all Member States.¹⁴⁰ After the modifications, these regimes were analyzed by the OECD Inclusive Framework to check their level of harmfulness, as shown in Figure 6.

FIGURE 6. OECD CLASSIFICATION OF IP TAX REGIMES – EUROPEAN UNION¹⁴¹

Country	Regime Name	IP Qualifying Assets	Peer Review Status	Tax Rate Under Regime	Tax rate that would otherwise apply
Belgium	Patent income deduction	Patents, Software ¹⁴²	Not harmful (amended)	3.76%	25.00%
France	Reduced rate for long-term capital gains and profits from the licensing of IP rights	Patents, Action 5 Categories ¹⁴³	Not harmful (amended)	10.00%	25.83%
Hungary	IP regime for royalties and capital gains	Patents, Software ¹⁴⁴	Not harmful (amended)	0.00% in case of capital gains of reported Qualifying IP 4.50% in case of the benefits related to royalty income.	9.00%

¹⁴⁰ Compare *id.* at 508, which constitutes the situation in 2014, with Figure 6, which constitutes the updated version. See also OECD, *supra* note 99, at 5.

¹⁴¹ OECD, *supra* note 130. The following footnotes, which refer to the table, are taken from the OECD website.

¹⁴² *Id.* (“Qualifying assets refers to patents and supplementary protection certificates. Copyrighted computers programs (software). Plant variety rights. Orphan drugs.”).

¹⁴³ *Id.* (“Qualifying assets refers to patent, patentable inventions or improvements thereto provided they are capitalized as a fixed asset. Industrial manufacturing processes may also qualify provided they are necessary accessories to the use of eligible patents and patentable inventions.”).

¹⁴⁴ *Id.* (“Qualifying assets refers to patents and supplementary protection certificates, copyrighted computers programs (software), plant variety rights, orphan drugs.”).

Ireland	Knowledge development box	Patents, Action 5 Categories ¹⁴⁵	Not harmful	6.25%	12.50%
Italy	Taxation of income from intangible assets	Patents, Software ¹⁴⁶	Abolished	12.00% + 1.95% IRAP	24.00% + 3.90%IRAP
Luxembourg	IP regime	Patents, Software ¹⁴⁷	Not harmful	4.988%	24.94%
Netherlands	Innovation box	Patents, Software, Action 5 Categories ¹⁴⁸	Not harmful (amended)	7.00%	20.00%-25.00%

¹⁴⁵ *Id.* (“Qualifying assets refers to computer programs, qualifying patents, plant breeders rights and supplementary certificates e.g. under Council Regulation (EC) No. 469/2009, which are the result of R&D, may qualify for relief. Qualifying patents means: any patent granted following a substantive examination for inventive step; any patent granted prior to 1 January 2016; and a patent granted between 1 Jan 2016 and 1 Jan 2017 without a full examination which is certified by a patent agent as having met the patentability criteria. Short term patents, petty patents and utility models are excluded. Marketing and brand-related IP are excluded . . . In order to qualify for the KDB under the third category of IP, the IP asset must be certified as patentable, meaning it meets the patentability criteria and is not yet part of the prior art at a given date, but has not been patented.”).

¹⁴⁶ *Id.* (“Software protected by copyright, industrial patents, trademarks, designs and models, as well as processes, formulas and information relating to experience acquired in the industrial, commercial or scientific field, capable of legal protection.”).

¹⁴⁷ *Id.* (“Qualifying assets refers to patents, utility models, supplementary protection certificates, prorogations of supplementary protection certificates, plant breeders’ rights, orphan drug designations and copyrighted software.”).

¹⁴⁸ *Id.* (“Qualifying assets refers to SME’s certain IP derived from R&D activities for which an R&D declaration has been issued; and to non-SME’s certain IP derived from R&D activities for which an R&D declaration has been issued and: 1. Patents and breeders rights 2. Applications for patents and breeders rights 3. Software (The term software, in Dutch “programmatuur”, means software as it is understood in spoken language within the social standards. The demanded innovative element of software is ensured by the aforementioned R&D declaration which is obliged to have for every taxpayer opting for the regime of the innovation box.) 4. Market authorisation of a medical product 5. Extensions of patent protection 6. Utility models 7. Exclusive licence to exploit IP connected to items 1-6 8. IP connected to items 1-7, which is meant to qualify IP assets which are so closely connected to each other that it would require an unrealistically detailed level of administration by the tax payer that the taxpayer would be engaged in a complex track-and-trace-system to monitor the costs related to the IP . . . IP can therefore qualify for the innovation box if they are closely related to IP mentioned in 1-7 . . . Third Category: IP derived from R&D activities for which a so called R&D

Portugal	Partial exemption for income from patents and other industrial property rights	Patents ¹⁴⁹	Not harmful (amended)	10.50%	21.00%
Slovak Republic	Patent-box	Patents, Software ¹⁵⁰	Not harmful	10.50%	21.00%
Spain	Partial exemption for income from certain intangible assets (Federal regime)	Patents, Software ¹⁵¹	Not harmful (amended)	10.00%	25.00%
Greece	Tax patent incentives	Patents	Not harmful (amended)	10.00%	22.00%
Malta	Patent box deduction rules	Patents, Action 5 Categories	Not harmful	0.00%	35.00%

declaration has been issued . . . The issuance of a R&D-declaration is done by an organization (RVO.nl) which is a part of the central government (part of the Ministry of Economic affairs) . . . These are technological-scientific research and research to the development of new (parts of) physical products, physical processes or new technical software. The tax payer is obliged to describe the R&D-activities that will be done. RVO.nl checks this and will judge this on its content. The judgement is done by professional, technical experts with technical knowledge and background.”).

¹⁴⁹ *Id.* (“Only patents and industrial designs or models (utility models) subject to registration on National Institute of Industrial Property (INPI) can qualify for the regime. The industrial property rights must be granted (patented) prior to the use of the benefits under the Portuguese IP Regime . . . Marketing and brand related IP are excluded.”).

¹⁵⁰ *Id.* (“Qualifying IP assets are: patents or utility models, and copyrighted software. Assets that are in process of patent/utility model application can benefit from the regime. If application is eventually rejected, the taxpayer is obliged to submit an additional tax declaration and to pay back provided benefits and relevant sanctions.”) (citation omitted).

¹⁵¹ *Id.* (“Spain’s partial exemption for income from certain intangible assets was inconsistent with the nexus approach for IP assets acquired from related parties for the period from 1 January 2017 to 31 December 2017 and for new taxpayers entering the regime in the period from 1 July 2016 to 31 December 2017. Qualifying assets refers to IP assets that generate income derived from the transfer or the assignment of the right to use of any patent, design or model, plan, secret formula or process or from the assignment of information concerning industrial, commercial or scientific experience. In no case shall be eligible for reduction income arising from the assignment of a right to use, of from the transfer of, trademarks, literary, artistic or scientific works including cinematographic films, or from individual rights that might be assigned such as image rights, from software, industrial, commercial or scientific equipment or derived from any other right or asset different from those mentioned in the previous paragraph.”).

Poland	IP Box	Patents, Software	Not harmful	5.00%	19.00%
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C. Tax Policy Considerations

Despite the similar objectives, there is a substantial difference between the approaches taken by the United States and the European Union, which is deeply linked to the structural divergences between these two legal systems. This is reflected in particular in their approach to internal and external competition when it comes to tax law. Indeed, the United States deals with its corporate tax at the federal level, and therefore tends to have problems with internal corporate tax competition at a lower level, especially when compared to the European Union. E.U. Member States, on the other hand, retain full autonomy over their corporate taxation decisions, despite having some forms of coordination and harmonization. Therefore, they can fully compete to attract international investments, and this creates very idiosyncratic dynamics.

1. U.S. Approach to Tax Competition

In international tax policy, the United States has been a trendsetter on many occasions, including the exchange of information, through the Foreign Account Tax Compliance Act (FATCA), and, to some extent, the minimum tax, with GILTI.¹⁵² These policies were quite peculiar, as they were unilaterally imposed on the rest of the world, without resorting to multilateral treaties or international forums.

It must be noted that on these occasions, the US tax decisions were often triggered by the idea that US-headquartered multinational groups were not paying enough taxes in the United States because of international profit shifting.¹⁵³ Indeed, the US approach to intangibles-based tax incentives has been a form of reaction to the IP Boxes that were adopted overseas.¹⁵⁴ The reduction of corporate taxation, together with the introduction of FDII and GILTI, seem to have been adopted as a defensive form of tax competition to not lose

¹⁵² See, e.g., Rosanne Altshuler & Timothy J. Goodspeed, *Follow the Leader? Evidence on European and US Tax Competition*, 43 PUB. FIN. REV. 485, 485–87 (2015).

¹⁵³ Javier Garcia-Bernardo, Petr Janský, and Gabriel Zucman, *Did the Tax Cuts and Jobs Act Reduce Profit Shifting by US Multinational Companies?* 1-6, (Nat'l Bureau of Econ. Rsch., Working Paper No. 30086, 2022), https://www-nber-org.ezproxy-prd.bodleian.ox.ac.uk/system/files/working_papers/w30086/w30086.pdf; Daniel Bunn, *The Balancing Act of GILTI and FDII*, TAX FOUNDATION (Apr. 7, 2021) <https://taxfoundation.org/blog/intellectual-property-ip-tax-gilti-fdii/>.

¹⁵⁴ Bunn, *supra* note 153.

intangible assets. In a broader context, in 2020, the United States also adopted some trade tariffs in response to the digital services taxes imposed by some E.U. countries, in particular Austria, France, Italy, and Spain, but also the United Kingdom.¹⁵⁵ This was justified by the fact that the digital service taxes were targeting mainly the US multinational technological giants, such as Google, Facebook, Apple, and Amazon. Similar reactions were triggered by E.U. state aid investigations on these companies.¹⁵⁶

However, at the same time, when it comes to technology and incentives, the United States has quite a large level of cooperation in place with the European Union. In 2020, the new E.U.–U.S. agenda for global change stated that the EU-US relationship “is unique and built on shared history, shared values and shared interests.”¹⁵⁷ The document also refers to coordination and coherence between the research investments of the European Union and the United States. In the context of the technological agenda, after mentioning several projects involving artificial intelligence, cybersecurity, online platforms, and digital supply chain cooperation, the agenda mentions the objective of establishing fair taxation in the digital economy through innovative solutions on both sides of the Atlantic, and to strengthen trade connections and address the challenges caused by protectionism and unilateralism.

2. E.U. Inward Competition and Coordination

As anticipated, in a different way from the United States, the European Union primarily has a problem concerning its tax competition within the internal market.

When IP Boxes obtained their popularity at the international level, they became particularly common in the European Union.¹⁵⁸ They had been adopted by the Member States with the objective of incentivising

¹⁵⁵ See EY, *USTR Announces 25% Punitive Tariffs on Six Specific Countries in Response to Their Digital Services Taxes; Suspends Tariffs for 180 Days* (June 4, 2021) <https://glob-altaxnews.ey.com/news/2021-5627-ustr-announces-25-percent-punitive-tariffs-on-six-specific-countries-in-response-to-their-digital-services-taxes-suspends-tariffs-for-180-days>. See also, e.g., Yue Dai & Amedeo Rizzo, *How Will the Italian Digital Services Tax Affect the Trade Relations with the U.S. and China?*, n. 7/2020 FISCALITÀ & COMMERCIO INTERNAZIONALE (2020), <https://ssrn.com/abstract=3653438>.

¹⁵⁶ See, e.g., James Moore, *Deutsche Bank's \$14bn Mega Fine – America's Revenge for Apple's Tax Bill or Another Example of Flawed Regulation*, INDEPENDENT (Sept. 16, 2016, 6:40 PM) <https://www.independent.co.uk/news/business/comment/deutsche-bank-s-14bn-mega-fine-america-s-revenge-for-apple-s-tax-bill-or-another-example-of-flawed-regulation-a7311036.html>.

¹⁵⁷ *Joint Communication to the European Parliament, the European Council and the Council, a New EU-US Agenda for Global Change*, JOIN (2020) 22 final (Dec. 2, 2020).

¹⁵⁸ Evers, Miller, & Spengel, *supra* note 98, at 503.

technological innovation, and therefore sustainable growth and public welfare.¹⁵⁹ Nevertheless, the adoption of such regimes generated controversial fiscal dynamics, through the attraction of investments at the expense of other national economies. Particularly, criticisms were made about the profit shifting toward countries adopting favoured taxation on intangibles, often creating an exaggerated reduction or even an absolute lack of taxation on the income generated by such goods.¹⁶⁰ During the G20 of July 2013, the German Minister of Finance Wolfgang Schäuble expressed himself on this point, defining IP Boxes as being against the “European spirit” and advocating for their prohibition.¹⁶¹

This “beggar-thy-neighbour” kind of problem was particularly felt within the European Union, because of the rules on the European Single Market.¹⁶² Indeed, fundamental freedoms can often limit the possibilities of Member States to adopt restricting countermeasures to these kinds of dynamics. In a way, they counterbalance the national sovereignty over direct taxation that Member States retain under the subsidiarity principle of the European Union, which allows them to adopt any kind of measure in direct taxation and apply any kind of tax rate.

In this context, IP Boxes were also adopted as defensive items, to protect Member States’ economies. In fact, even Germany, the leading opponent in the debate on IP Boxes, considered adopting one.¹⁶³ They constituted quite an aggressive piece of tax policy, as they were trying to attract completely immovable property, which is quite easily transferrable for tax purposes. Indeed, before the OECD guidelines contained in Action 5, proposed as a compromise between Germany and the United Kingdom, there was a freefall of effective tax rates on intangible assets caused by IP Boxes, which probably

¹⁵⁹ See, e.g., HM TREASURY & HM REVENUE & CUSTOMS, *Consultation on the Patent Box* (June 2011), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/81512/consult_patent_box.pdf.

¹⁶⁰ *Germany May Close Foreign ‘Patent Box’ Tax Loophole – Report*, REUTERS (Sept. 27, 2014) <https://www.reuters.com/article/uk-germany-taxavoidance-patentbox-idUK-KCN0HM0BY20140927>; Alexandra Thornton, *Patent Tax Dodge: Why the Patent Box Does Not Answer America’s Need for Tax Reform*, CENTER FOR AMERICAN PROGRESS (June 1, 2015), <https://www.americanprogress.org/article/patent-tax-dodge-why-the-patent-box-does-not-answer-americas-need-for-tax-reform/>.

¹⁶¹ Annika Breidhardt, *Germany Calls on EU to Ban “Patent Box” Tax Breaks*, REUTERS (July 9, 2013) <https://www.reuters.com/article/uk-europe-taxes-idUK-BRE9680KY20130709>.

¹⁶² BEN J. KIEKEBELD, *HARMFUL TAX COMPETITION IN THE EUROPEAN UNION: CODE OF CONDUCT, COUNTERMEASURES AND EU LAW* 3–34 (2006).

¹⁶³ Tim Szent-Ivanyi, *Lizenz zum Steuersparen*. FRANKFURTER RUNDSCHAU (Jan. 16, 2019), <https://www.fr.de/wirtschaft/lizenz-steuersparen-11245482.html>. The German newspaper originally reported that the Minister of Finance Schäuble declared that taking a step back on IP Boxes would have been impossible, so Germany had to “fight the other States with their own weapons: creating a German IP Box.” *Id.* The scope would have been to prevent German companies from transferring their patents to foreign countries for fiscal reasons.

led the European Commission to start investigations about the possibility of IP Boxes to represent unlawful State aid, namely the infringement of articles 107, 108, and 109 of the Treaty of Functioning of the European Union.¹⁶⁴ The reasoning of the Commission was based on the possibility of having a de facto material selectivity considering the distribution of the benefit a fortiori, verifying whether a specific characteristic, which had not been considered in the legislative intent, recurred between favored undertakings.¹⁶⁵

In its BEPS Action 5 report, the OECD imposes some conditions on IP Box regimes to avoid harmful tax practices related to their usage, in an attempt to align their theoretical objectives and their actual effects.¹⁶⁶ Besides reducing the kinds of intangible assets that can benefit from the tax reduction to the ones that clearly require R&D activities,¹⁶⁷ Action 5 affects the way of calculating such reductions, introducing the obligation to adopt a specific nexus for the countries who intend to maintain their IP Boxes.¹⁶⁸ This nexus

¹⁶⁴ See, e.g., Joris Luts, *Compatibility of IP Box Regimes with EU State Aid Rules and Code of Conduct*, 23 EC TAX REV. 258, 260–74 (2014); Chu Shi, *IP Boxes in Light of the BEPS Project and EU Law – Part II*, 56 EUR. TAX’N 371, 377 (2016); Fabian Mang, *The (In)Compatibility of IP Box Regimes with EU Law, the Code of Conduct and the BEPS Initiatives*, 55 EUR. TAX’N 78, 84–87 (2015); Ivan Zammit, *Centralized Intellectual Property Business Model – Tax Implications of EU Patent Box Regimes*, 69 BULL. INT. TAX’N 540, 540 (2015).

¹⁶⁵ A previous case of selectivity analysis has been conducted by the European Commission on the Spanish IP Box, which is reported in Directorate-General for Competition, European Commission, State Aid N 480/2007 – Spain – The Reduction of Tax From Intangible Assets, of 13 Feb. 2008. This was an *ex ante* evaluation in order to comprehend the compatibility of the introduction of the Spanish IP Box with the state aid legislation. The Commission analysed the undertakings that asked to take advantage of the measure, focusing in particular on sectors and dimensions. Nonetheless, an *ex post* analysis has not been conducted, nor a verification of effective increase in R&D activities in Spain, which might be relevant according the following considerations.

¹⁶⁶ OECD, COUNTERING HARMFUL TAX PRACTICES MORE EFFECTIVELY, TAKING INTO ACCOUNT TRANSPARENCY AND SUBSTANCE (2015).

¹⁶⁷ The major exclusion in the objective scope of IP Boxes has been brands and other marketing intangibles in general. Brands have been a controversial topic because although they are quite relevant among the intangible assets that a firm can hold, they are generally not related to R&D activities. See *id.* at 26–27. Trademarks used to hold a central strategic value in some IP Boxes, such as the Italian Patent Box, to attract or bring back trademarks that were moved out of the country, as highlighted in Lucrezia Valentina Caramia, *The Taxation of ‘Intangible’ Innovation: The Patent Box in Europe and the Italian Case*, 50 REV. EUR. COMP. L. 3, 109–127, 122–125 (2022). Like the other countries that changed their legislation in accordance to Action 5, Italy removed brands from its IP Box in April 2017, as reported in Cesare Galli, *Trademarks Come Out of the Italian Patent Box*, WORLD TRADEMARK REV. (Aug. 01, 2017), <https://www.worldtrademarkreview.com/article/trademarks-come-out-of-the-italian-patent-box>.

¹⁶⁸ Concerning the way of calculating the tax benefit, the OECD considers the “modified nexus” as equivalent to the traditional one. The modified nexus is generally more generous with the deduction but requires more restrictive conditions. See OECD, *supra* note 99. Nonetheless, to the scope of the economic analysis, there is no need to differentiate between the two, because they are applied in the same way. For further information on the modified nexus, see Peter Merrill, *Innovation Boxes: BEPS and Beyond*, 69 NAT’L TAX J. 847 (2016).

is based on the recognition of the company that conducts the activities of R&D, which must be either the same that asks for the tax benefit or a company that does not belong to the group. The reason is that companies normally prefer not to externalize their most important processes of R&D, so they will tend to transfer R&D activities to the country that adopts the IP Box.¹⁶⁹

The OECD Action 5 only has the power of soft law, but it has been reinforced by the clarifications issued by the European Council, represented by the Code of Conduct Group on Business Taxation. Indeed, the Group underlined that the third principle of the code of conduct for business taxation, concerning the presence of the economic substance in every fiscal policy introduced by the Member States, in the case of IP Boxes coincides with the adoption of the nexus described by the OECD Action 5. Although the code of conduct is still an instrument of soft law, almost all Member States adopting an IP Box chose to comply with it, changing their legislation between the second half of 2016 and the first half of 2017.¹⁷⁰

Member States might have perceived the danger of infringing State aid rules in case they did not adopt such a modification, especially after the Directorate General for Competition of the European Commission started investigating the undertakings that had access to the Luxembourg IP Box.¹⁷¹ Therefore, the European Union obtained a sort of harmonization of the IP

¹⁶⁹ The nexus chosen by the OECD is a suboptimal solution because it still creates some distortions. An optimal nexus would have been the geographical nexus, which allows tax deductions only for R&D activities undertaken *in loco*, in the jurisdiction that adopts the measure. Nevertheless, a geographical nexus was not conceivable in the context of the European Union, because it would have violated the freedom of establishment and the freedom to provide services, respectively contained in articles 49 and 56 of the Treaty of Functioning of the European Union. In such a context, the solution adopted was considered the best solution, because it did not incentivise base erosion and profit shifting. For a deeper analysis, see Lilian V. Faulhaber, *The Luxembourg Effect: Patent Boxes and the Limits of International Cooperation*, 101 MINN. L. REV. 1641 (2017).

¹⁷⁰ During this period, all the Member States adopting an IP Box that was not compliant with the OECD Action 5 chose either to change it or to suppress it. The only exception was constituted by France, whose IP Box did not transpose any nexus. However, France defended itself in the Council discussions stating that its IP Box did not have a sufficiently low tax rate to attract foreign investments, but it only helped local undertakings. For a deep analysis on the situation before the changes, see Evers, Miller, & Spengel, *supra* note 98.

¹⁷¹ On the 24th of March 2014, the Commission formally requested information on the Luxembourg IP Box to verify its compatibility with State aid legislation. Specifically, it demanded details on the largest 100 undertakings benefiting from it. *EU Orders Luxembourg to Hand Over Corporate Tax Practices Information*, REUTERS (Mar. 24, 2014) <https://www.reuters.com/article/eu-luxembourg-taxavoidance/eu-orders-luxembourg-to-hand-over-corporate-tax-practices-information-idINL5N0ML23320140324>. However, Luxembourg refused to disclose such information. For procedural reasons, the legal proceeding was won by Luxembourg, as explained in Case T-259/14, *Luxembourg v. Commission* (Apr. 24, 2014), <https://op.europa.eu/en/publication-detail/-/publication/c1336eca-0b2b-11e4-a7d0-01aa75ed71a1>. By the end of the same year, Luxembourg decided to disclose the information anyway, despite the decision of the Court, but no further formal analyses were undertaken by the Commission.

Box regimes, in an effort to reduce the problems related to its internal tax competition.

3. E.U. Outward Competition

Due to the specific characteristics of its internal market, the European Union tends to act as a coalition towards third countries.¹⁷² This is due to the harmonization process, that comes both from the directives on taxation of the European Union (so-called positive harmonization), and the modifications required by the Court of Justice of the European Union in cases concerning the infringement of the fundamental freedoms and other E.U. rules (negative harmonization).¹⁷³

In its outward competition, the European Union tends to act on two levels. First, the European Union attracts investments as a bloc, meaning that once a company is established in a Member State, thanks to the internal market, it can operate in all the other E.U. countries as if it were a resident of those other Member States. Second, each Member State has its own policies, which can be more or less attractive to third-country investments.

At the same time, in order to protect the internal market of the European Union from distortions created by subsidies provided by third countries, the bloc has adopted a new regulation called the E.U. Foreign Subsidies Regulation (FSR),¹⁷⁴ which entered into force on January 12, 2023. The FSR covers any form of contributions, direct or indirect, offered by non-E.U. governments to companies that operate in the E.U. market, including tax exemptions and reductions, state-funded R&D, and other forms of intellectual property subsidization. This means that innovation-oriented incentives granted by third countries might fall within the scope of this E.U. regulation and be scrutinized by the European Commission, which oversees infringements in such cases. This measure might constitute a paramount change in the E.U. approach to competition, which will be shaped according to how the Commission is going to use it, on a case-by-case basis, as there is probably going to be a delicate equilibrium with trade legislation and possible countervailing measures.

¹⁷² See, e.g., EUROPEAN COMMISSION, https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/eu-position-world-trade_en (last visited Aug. 25, 2023).

¹⁷³ Paolo Piantavigna, *Tax Competition and Tax Coordination in Aggressive Tax Planning: A False Dichotomy*, 9 *WORLD TAX J.* 4, 477, 498 (2017); Anzhela Cédelle, *Enhanced Cooperation: A Way Forward for Tax Harmonisation in the EU?*, WP 15/33, OXFORD UNIVERSITY - CENTRE FOR BUSINESS TAXATION, 35 (2015).

¹⁷⁴ Council Regulation 2022/2560 2022.

V. CONCLUSION

This paper analyzed the tax incentives related to innovation and their interaction with the intellectual property rights system. It provided a comparative analysis between the approaches taken by the United States and the European Union in this domain.

The first part of the paper presented the most common features of IP rights, questioning their relationship with innovation. Indeed, patents and copyrights do not necessarily imply innovation or positive externalities, whereas some forms of innovation might not be necessarily patentable. At the same time, trademarks need further analysis of their effects on innovation-oriented investments and R&D.

When the tax system intervenes in innovation with tax incentives, some policy recommendations are necessary, especially when it comes to targeting the right underlying factors. In this context, unpacking the elements that are generally associated with innovation can be a good approach. The analysis of tax incentives, based on an expenses- vs. revenue-centered categorization of the most common innovation-related policies, seems to suggest that expenses-centered tax incentives, such as R&D tax credits, might be a better complement to IP rights. However, further analyses of the economic consequences of both R&D tax incentives and IP Boxes could help formulate a more precise policy examination, which might lead to more precise considerations on what to do in terms of policy design.

In the context of the U.S. and the E.U. approaches to innovation-oriented tax incentives, the paper presented some of the structural differences between the two legal systems. The adoption of GILTI and FDII by the United States has acted as a sort of defensive measure to the IP Boxes adopted by the European Union, which were, by the way, softened by the coordinated transposition of Action 5, possibly triggered by the E.U. state aid investigations. However, several competition-oriented trade and tax measures are still in place between the two legal systems, while new agreements get signed, such as the global minimum tax. In this context, a strong transatlantic tension between tax cooperation and competition can be highlighted in the measures adopted by both the European Union and the United States.

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