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A time series perspective on income-based tax support for R&D and innovation

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Abstract

The use of tax incentives that provide preferential tax treatment to the incomes arising from research and development (R&D) and innovation activities, such as intellectual property regimes, has accelerated over the last two decades. The globalisation of R&D together with the greater mobility of intangible income may have contributed to the rise in such incentives to attract and retain R&D and innovation activity while preventing the transfer of taxable base to other countries. This paper documents the changes to the availability and design of income-based tax incentives from 2000 onwards for 48 countries, including all OECD countries and EU countries. Building on this, the paper analyses trends in the generosity of income-based tax support over time by building indicators of effective tax rates that can provide insights into the impact of Action 5 of the OECD/G20 Base Erosion and Profit Shifting project.

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Executive summary

The last two decades have seen an increasing use of the tax system to provide government support for R&D and innovation. The expansion of income-based tax incentives (IBTIs) raises a variety of policy questions. Governments may introduce IBTIs to support firms over the lifecycle of the innovation process, from conception commercialisation, and help address failures in the market for research and developments and potential underinvestment in R&D due to knowledge spillovers. However, IBTIs may also be introduced by governments out of competitive pressures to retain the intangible assets resulting from R&D and related efforts and the taxing rights over those profits. The issue is particularly more salient as intangible assets are highly mobile, and R&D performance and intellectual property (IP) ownership is concentrated among large firms which are typically MNEs, who can locate functions around the world. While IBTIs have attracted significant academic and policy attention for these reasons, a comprehensive comparison of the existing IBTIs around the world has so far been lacking.

This paper documents the expansion in the use of income-based tax incentives for R&D and innovation (IBTIs) and assesses changes in their design over the last two decades. The paper examines changes in the availability and design of IBTIs in 29 countries, including all OECD countries and EU countries with an IBTI over the period from 2000 to 2022. IBTIs mostly take the form of IP regimes that confer preferential taxation to the income arising from typically formally protected IP assets, such as patents. IBTIs target the output of the innovation process, as opposed to expenditure-based tax incentives, which target R&D expenditures. The implication is that tax benefits are only conferred to successful R&D investments. Across countries, IBTIs differ widely in how they are designed, which affects the calculation of tax benefits, and the types of income and assets to which they apply.

This paper builds a time series of forward-looking indicators to compare the evolution of implied tax from IBTIs over time and across countries. These indicators, which include the effective average tax rate, cost of capital and B-Index for R&D intangibles, cover 47 countries, including the 28 countries with IBTIs over time. A total of 51 regimes are examined in this study. These indicators compare tax burdens across intangibles generated through a firms' own R&D and those acquired from other firms. The indicators capture key design features of IBTIs.

The time series indicators allow for the analysis of policy changes including those derived from the implementation of Base Erosion and Profit Shifting (BEPS) Action 5 minimum standard. The minimum standard introduced a variety of restrictions on the design of IBTIs to address the profit-shifting risks that may stem from IBTIs. This paper captures the reforms implemented to IBTIs by countries to achieve compliance with the standard.

By building the evidence base on the use and generosity of IBTIs over time, this work promotes a better understanding of how IBTIs affect firms' decisions to invest in R&D intangibles and supports future analytical and policy work in this area. This paper draws the following insights:

- **The number of OECD countries offering IBTIs has increased fourfold in the last two decades from five in 2000 to 21 in 2022.** This increase has been even more

marked among EU countries with 16 out of 27 EU countries offering IBTIs in 2022 compared to three EU countries in 2000.

- **The steady increase in the number of IBTIs over time has led to a global decrease in the taxation of qualifying R&D intangibles.** Across OECD countries, the EATRs of internally generated R&D intangibles has fallen from 23.4% to 12.8% on average between 2000 and 2022. This drop has been even more pronounced for EU countries, where the EATR has on average decreased from 23.2% in 2000 to 8.6% in 2022. Indicators of the cost of capital and B-Index are less affected by IBTIs as these provisions are less targeted to lower the cost of marginal investments. The cost of capital for internally generated R&D intangibles equals 3.93% and 3.87% for OECD countries and EU countries respectively in 2022, compared to 4.18% and 4.17% in the absence of IBTIs. Between 2000 and 2022, the cost of capital and B-Index has remained rather stable, with a much less pronounced declining trend that reverts from 2016 onwards.
- **The BEPS Action 5 minimum standard has curtailed tax benefits from the use of IBTIs in situations where certain BEPS risks could arise**. In the aftermath of BEPS Action 5:
  - IBTIs tend to provide less support to acquired IP. Implicit tax subsidies for acquired IP, measured as the difference between the EATR with and without IBTIs, have on average decreased by 72% between 2015 and 2022 across all OECD countries.
  - Most of the reforms to comply with the BEPS Action 5 minimum standard have led to an increase in the taxation of qualifying R&D intangibles. Comparing the EATR for regimes with IBTIs before and after BEPS Action 5 implementation, the EATR for internally generated R&D intangibles increased between 2015 and 2022 by 0.7 percentage point to an average EATR of 5.9% for OECD countries.
  - IBTIs continue to expand post-2015. The minimum standard changed the terms and modalities of using IBTIs to prevent the tax motivated transfer of IP to benefit from IBTIs. After 2015, most of the countries with IBTIs replaced existing regimes with new and BEPS compliant regimes and other countries introduced for the first time.
- **While the generosity of IBTIs has been curtailed, some countries have expanded the scope of IBTIs to new types of IP assets and qualifying income.** The number of qualifying assets and income has increased in half of the countries covered between the time of introduction and 2022.
- **While the expansion of IBTIs has implied a decline in the tax burden on R&D intangibles, the relative tax reduction resulting from IBTIs has also become smaller.** IBTIs reduce EATRs by 69% in 2022, compared to 77% in 2015 comparing countries with IBTIs in both years. This decline in relative impact is due to two factors. First, the global decline in statutory corporate income tax rates has lowered the relative benefits available to investments qualifying for IBTIs compared to those that do not qualify. The EATR for internally generated R&D intangibles has fallen from 26.7% in 2000, to 20.9% in 2015 and to 19.5% in 2022 in OECD countries, abstracting from any IBTIs that may apply (26.3%, 18.8% and 17.2% respectively for EU countries). Second, the introduction of the BEPS Action 5 minimum standard introduced more stringent conditions to the taxpayers and qualifying investments for IBTIs. Given this decline in relative generosity, evaluations of the benefits and costs of IBTIs, including possible distortions, are important.

1. Introduction

Income-based tax incentives for R&D and innovation feature in the policy mix of many OECD and EU countries. In 2022, 21 out of 38 OECD countries offer income-based tax incentives to R&D and innovation (IBTIs). With the exception of Luxembourg, all of these countries offer IBTIs together with expenditure-based tax incentives such as R&D tax credits.[1] While expenditure-based tax incentives provide tax relief based on R&D expenditures, IBTIs seek to reduce the taxation of the income from intangibles resulting from R&D and related activities. They do so by offering a preferential tax rate to the income arising from certain types of R&D intangibles. Income-based tax support can be targeted solely to income from Intellectual Property (IP) assets or extend support to both IP income and other forms of non-IP income (dual category regimes).

The use of income-based tax support in the OECD area and beyond has accelerated over the last two decades. This work surveys IBTIs available in 48 countries including all OECD countries, EU countries and five partner economies (Argentina, Brazil, China, South Africa and Thailand). The number of OECD countries offering IBTIs has multiplied by four between 2000 and 2022, with an even more acute pattern among EU countries. The globalisation of R&D, the growth of intangibles and their increasing contribution to productivity and growth may have contributed to the rise in IBTIs to attract and retain R&D and innovation activity while preventing the transfer of taxable base to other countries.

This paper takes stock of the trends in the introduction and design of income-based tax incentives from 2000 onwards, accounting for the impact of Action 5 of the OECD/G20 Base Erosion and Profit Shifting (BEPS) project. [2] This paper contributes to an emerging literature that tracks the evolution of IBTIs (Evers, Miller and Spengel, 2013[1]; Lester and Warda, 2018[2]). It builds on previous work which has provided a systematic overview of the design features of IBTIs in 2021 (González Cabral et al., 2023[3]) and their use and uptake over time (Appelt, González Cabral and Hanappi, 2022[4]). This paper takes a time series perspective and takes stock of changes in use and design of IBTIs from 2000 until 2022 for 29 countries (52 regimes). In doing so, it examines the impact of BEPS Action 5, one of the four minimum standards from the OECD/G20 BEPS project. BEPS Action 5 was a key policy change that sought to introduce substantial activities requirements for taxpayers to access preferential tax treatment, including from IBTIs. A goal of BEPS Action 5 was to counteract tax practices that may erode countries' tax bases. While BEPS Action 5 introduced common development conditions that led to the alignment of certain design features of IBTIs across the sample of countries covered in this paper, some heterogeneity in the design of IBTIs remains.[3]

[1] In the European Union, 16 out of 27 member countries have in place at least one income-based tax incentives, two-thirds of them alongside expenditure-based tax support. Czech Republic provides expenditure-based tax-incentives but they are incompatible with the tax holiday for investments in R&D centres.

[2] This paper is produced as part of the KNOWINTAX project, co-funded by the European Commission Horizon 2020.

[3] The Forum on Harmful Tax Practices (FHTP) monitors compliance with the BEPS Action 5 minimum standard through their BEPS Action 5 peer review process. In order to be in scope of the FHTP peer review, regimes need to meet certain criteria (e.g., have a low effective tax rate, or artificial definition of the tax base) as outlined in OECD (2015[35]). Notably, for subnational regimes for which the combined effective tax rate at the subnational and national level would be sufficiently high, the regime would not

To facilitate cross-country comparability, this paper presents tax policy indicators that can help compare the level of tax benefits granted by IBTIs across countries from 2000 to 2022. Using the methodology outlined in González Cabral et al. (forthcoming[5]), the paper presents indicators of the Effective Average Tax Rate (EATR), the cost of capital and B-Index including IBTIs. A time series of these three indicators is produced for 48 countries, including all OECD countries and EU countries, starting in 2000 and continuing until 2022. Although this paper is descriptive in nature, the indicators produced can help inform future analytical work in this area.

The paper is organised as follows. Section 2 provides some background on the policy rationale for introducing IBTIs and role of BEPS Action 5. Section 3 discusses the expansion in the use of IBTIs over time. Section 4 describes changes in the design features of IBTIs over time. These changes include, changes affecting the scope in terms of qualifying assets and qualifying income, but also those relating to IP-specific development conditions, with a particular focus on the effect of the introduction of the BEPS Action 5 minimum standard. Section 5 discusses trends in the indicators of tax support, and how changes in IBTI design affect the generosity of tax support provided.

2. Policy rationale and role of BEPS Action 5

Intangible assets are recognised drivers of productivity and economic growth and their share of firms' investment has rapidly increased over time (Corrado, Hulten and Sichel, 2009[6]; Corrado et al., 2016[7]). As a result, many jurisdictions seek to put in place the most complete innovation policy package possible to encourage innovative activity in their jurisdiction, from support for the conception of new ideas to the commercialisation of IP stemming from R&D and innovation activity. Tax support-based measures represent a key part of these packages, with many jurisdictions offering IBTIs alongside expenditure-based tax incentives.4

The increasing globalisation of R&D among large corporations, typically MNEs, may pose challenges for governments in promoting R&D and the associated commercialisation of R&D intangible asset in their jurisdiction. R&D activity and IP ownership is heavily concentrated among MNE performers, with the top 2000 R&D performers owning 75% of patents in information and communications technology (Dernis et al., 2019[8]). Firms operating at a global scale have more flexibility to decouple the location of R&D investment from the location of the output of R&D activity, i.e., the resulting R&D intangible asset. Given that intangible assets are more mobile than other assets, there is ample evidence suggesting that firms have an incentive to locate the output of R&D activity in more tax favourable locations (Griffith, Miller and O'Connell, 2014[9]; Beer, Mooij and Liu, 2020[10]; Grubert, 2003[11]; Dischinger and Riedel, 2011[12]). Governments face the challenge of retaining

meet the criteria of offering a low tax rate. In addition, a sub-national regime would be considered out of scope of the FHTP process unless the national government is ultimately responsible for the general design of the relevant regime, with limited discretion on the part of the sub-national government on the regime's introduction or key features, and the tax rate at the sub-national level represents a significant proportion of the combined tax rate (OECD, 2015, pp. 61-62 par 145-146[18]). This implies that regimes that are in scope of the FHTP are only a subset of the regimes covered in this paper. The KNOWINTAX project is not part of any evaluation of regimes for FHTP purposes.

[4] Most governments use a combination of direct support such as grants or public procurement and tax support in their policy mix **Invalid source specified.**.

the right to tax the income associated with the innovations that they may have supported through preferential taxation or other forms of government support.

In this context, governments may introduce IBTIs to serve several objectives. First, IBTIs may provide a more complete innovation policy package to incentivise firms to locate and raise their R&D and innovative activities within the jurisdiction. In fact, most jurisdictions that offer IBTIs also offer support through expenditure-based tax incentives (Appelt, González Cabral and Hanappi, 2022[4]). Second, IBTIs may help secure the commercialisation of IP within the jurisdiction and discourage the tax motivated shifting of IP to other low-tax jurisdictions by offering low-tax rates for intangible related income at source (Bloom, Van Reenen and Williams, 2019[13]).

The strategic transfer of IP ownership to affiliates in jurisdictions with IBTIs has historically been a key concern prior to the introduction of BEPS Action 5, in particular in cases where access to the preferential tax treatment was not tied to the development of the asset. Prior to 2015, regimes varied in the extent to which they required the taxpayer to be involved in the development of the asset in order for it to qualify for relief. As discussed in Section 4.2 and reflected by Evers et al. (2013[1]), the stringency of development conditions to benefit from relief has varied significantly over time. This has led at times to the transfer of IP towards countries offering preferential tax rates to IP income where such development conditions were weak or not in place. Empirical evidence suggests that the transfer of IP was less pronounced where regimes had development conditions in place (Ciaramella, 2017[14]; Alstadsæter et al., 2018[15]; Gaessler, Hall and Harhoff, 2018[16]; Bradley, Dauchy and Robinson, 2015[17]).[5]

BEPS Action 5 introduced common development conditions to limit the access of transferred IP to preferential tax relief. BEPS Action 5 restricted the types of assets and income that could benefit from IBTIs and also restricted the conditions under which qualifying taxpayers could benefit from income-based tax relief (OECD, 2015[18]). Table 1 summarises key changes to the design of IBTIs introduced by the BEPS Action 5 minimum standard. Importantly, BEPS Action 5 introduced common development conditions through the 'nexus ratio', which established a link of proportionality between the expenditures incurred by the taxpayer in the development of the intangible and the share of income that could qualify for relief.[6] As a consequence of the introduction of the nexus ratio, intangible assets that are acquired can no longer benefit from IBTIs unless they are further developed by the taxpayer. Even when they are further developed, the relief can only be proportional to the taxpayers' contribution to the total development of the asset. Although the findings of the studies mentioned above pre-date BEPS Action 5, they suggest that development conditions act to limit the tax motivated transfer of IP to access tax benefits. Further research is required about the impact of BEPS Action 5 on firms' investment and location decisions.

[5] While BEPS Action 5 mandated the inclusion of development conditions, most of the existing empirical work refers to tax years pre-dating BEPS Action 5 implementation.

[6] The nexus ratio introducing a link of proportionality between the R&D expenditures incurred by the taxpayers or outsourced to unrelated parties in the total cost of acquiring the intangible and the income that could qualify for relief. See Box 1 in González Cabral et al. (2023[3]) and Box 1 in Section 4.2

Table 1. Design changes from the application of the BEPS Action 5 minimum standard

	Before BEPS Action 5	BEPS Action 5: Nexus compliant regimes
A. Qualifying assets	Trade intangibles, e.g. patents, utility models Marketing intangibles, e.g. trademarks	Trade intangibles in three categories: patents (broad sense), copyrighted software and Category III assets*. Marketing intangibles can never qualify for relief
B. Development conditions	Intangible assets generated through subcontracted R&D or acquired pre-existing IP with or without development conditions all potentially eligible for relief.	Development conditions apply through the application of the nexus ratio to benefit from relief.
C. Qualifying IP income	Income from marketing and trade intangibles (defined by national legislation)	Income from trade intangibles, excluding income from marketing intangibles: royalties, embedded IP income, capital gains and other income from the sale of IP
D. IP tax base: Ongoing expenses	Gross: IP income is gross of associated expenses incurred in the year Net: IP income is net of associated expenses incurred in the year	Net: IP income is net of associated expenses incurred in the year
D. IP tax base: Past R&D expenses	Countries have discretion over whether past expenses had to be accounted before applying relief to IP income	
D. IP tax base: Share of qualifying profit based on development conditions	Unrestricted or defined by national legislation if development conditions are in place	The share of qualifying profit is defined by the nexus ratio
D. IP tax base: IP losses	Symmetric treatment: IP losses and IP income are offset at the same tax rate Asymmetric treatment: IP losses could offset ordinary income at the statutory rate while IP income is taxed at the regime rate	The treatment of IP income and IP losses must be symmetric under the BEPS Action 5 minimum standard.

Note: This table contains a summary of the design features that were observed or possible before the application of Action 5.
* Category III assets are IP assets that share similar traits to patents that do not fall in the previous two categories but that are certified in a transparent process by a competent government agency. Only taxpayers with less than EUR 50 million (or nearest amount in domestic currency) in global group-wide turnover and with no more than EUR 7.5 million in gross revenue from all IP assets on average in the last five years are eligible to apply for relief under this third category (OECD, 2015[18]).

Despite the limitations placed by BEPS Action 5 on certain tax planning strategies, there remain significant competitive pressures that may induce the introduction of IBTIs. While BEPS Action 5 tackled the possibility of accessing IBTIs by acquiring pre-existing IP, firms may still derive a tax advantage from locating IP in tax favoured locations even without access to IBTIs.[7] Countries may thus have an incentive to introduce IBTIs as way to narrow the tax rate differential between their own and competitor jurisdictions, to lower firms' incentives to shift intangible assets outwards. Chen et al. (2019[19]) observe less tax motivated shifting out of a jurisdiction following the implementation of an IP regime. The rise of IBTIs over the last two decades, even beyond BEPS Action 5 implementation (see Section 5), points to that the continuing competitive pressures faced by jurisdictions to attract and retain the income arising from certain intangible assets.

In recent years, many countries have introduced a wide range of anti-avoidance provisions to deter the strategic location of IP in other jurisdictions. Although the discussion in this section refers to the role of IBTIs and BEPS Action 5, multiple tax avoidance measures have been introduced in recent years that may address BEPS practices linked to intangible assets. Examples include the introduction of controlled foreign corporation (CFC) rules and the introduction of more stringent transfer pricing rules on physical presence or the provision of transfer pricing guidance on hard-to-value intangibles (OECD, 2022[20]). Even more recently, the introduction of a Global Minimum Tax for large MNEs will help limit profit shifting incentives and strategies (OECD, 2021[21]). There may be tax policy implications of the introduction of the Global Minimum Tax on the use of IBTIs (OECD, 2022[22]).[8]

3. Proliferation of income-based tax incentives

The number of countries offering IBTIs has increased fivefold over the past two decades, in different waves. In 2000, only five out of the current 38 OECD countries offered IBTIs (Figure 1 Panel A).[9] Since then, this number has steadily increased until 2019, with only small interruptions in 2006 due to the repeal of the IBTI in Korea, and 2015 following the adoption of BEPS Action 5 which led to the temporary repeal of some IBTIs. From 2019 to 2021 the count of OECD countries offering IBTIs remained stable at 22 but dropped to 21 in 2022 when Italy repealed its IBTI (Figure 1 Panel A). The number of regimes available in the OECD area follows a similar trend but generally exceeds the country count as several countries offered multiple IBTIs over time (Figure 1 Panel B), targeted to different activities, sectors, investment locations, or types of taxpayers. In addition, some countries offer IBTIs at subnational level. Among the 48 countries covered in this study, overall 29 countries offered IBTIs at some point during the 2000-22 period, which raises the total count of regimes covered in this study to 52 regimes. Table A.1. contains a list of all IBTIs covered, including key dates and characteristics. Unique identifiers at the regime and country-level are assigned to each IBTIs. Country-level identifiers will be utilised to refer to IBTIs throughout this paper for brevity unless specified otherwise.

The first IBTIs date back to 1960s, with their use being concentrated in five OECD countries up until the early 2000s. Figure 2 represents graphically the availability of income-based tax support from the year 2000, with Figure 3 providing a breakdown by country. Between the 1960s and 1990s, France, Korea, Ireland and Spain (Navarra) introduced IP regimes. Israel

[7] The FHTP has also introduced substantial activities requirements for no or only nominal tax jurisdictions, including for income from IP **Invalid source specified.**.

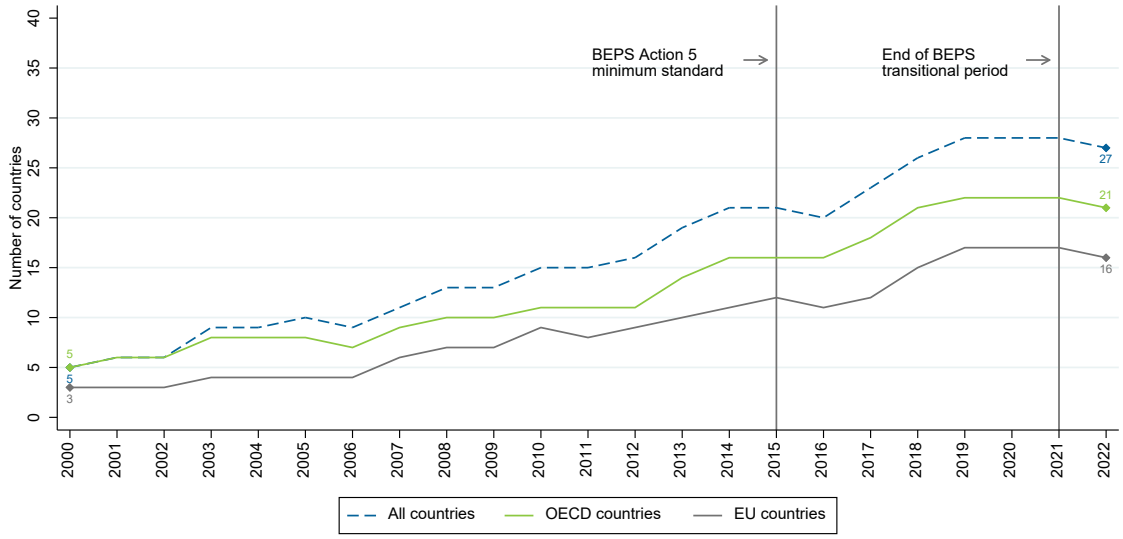
[8] This paper does not consider in detail the implications of the Global Minimum Tax for IBTIs.

[9] OECD membership is held constant as of 2022 for comparability.

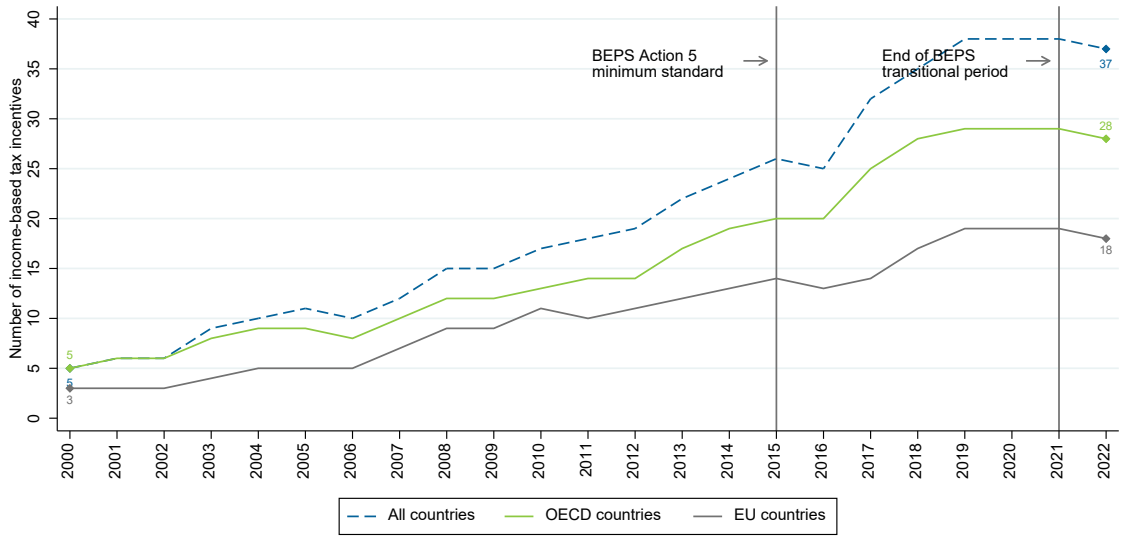
has offered IBTIs in the form of dual category regimes (available to R&D businesses among other eligible corporate taxpayers) from as early as 1958, with its first IP regime being introduced in 2017. From the early 2000s, a gradual increase in the number of countries offering IBTIs can be observed, with certain countries introducing IBTIs for the first time Türkiye (dual category) in 2001; Colombia (dual category), Hungary and Thailand (dual category) in 2003 and Argentina in 2005.

Figure 1. Availability of IBTIs by country groups, 2000-2022

Panel A: Number of countries



Panel B: Number of IBTIs



Note: Panel B uses the regime-level unique identifier in Table A.1.
Source: KNOWINTAX surveys, documentation from the Forum on Harmful Tax Practices peer reviews, public sources.

A second wave of introductions started in 2006, mainly led by EU countries. Between 2007 and 2008, the three countries in the Benelux region—Belgium, Luxembourg, and the Netherlands—introduced IBTIs for the first time. Southern European countries, such as Greece, Malta, and Cyprus[10], followed in 2010-12. In 2013, the Czech Republic introduced its first IBTI. Portugal and Italy introduced IBTIs in 2014 and 2015 respectively.[11] Outside the European Union, other jurisdictions also introduced IBTIs: the People's Republic of China (China hereafter) in 2008 for small and medium-sized enterprises, the Québec province in Canada in 2009, the Canton of Nidwalden in Switzerland in 2011, Japan in 2012 and the United Kingdom in 2013.

The last and third wave followed the implementation of the BEPS Action 5 minimum standard. After 2015, non-compliant regimes were either amended or replaced by compliant ones in several countries. Out of 21 countries with IBTIs in 2015, nine countries amended their schemes to be compliant with the BEPS provisions in 2016 or subsequent years,[12] four countries (Belgium, Cyprus, France, Greece) abolished pre-nexus regimes and replaced them with new compliant incentives in 2016 or subsequent years and two repealed their regimes in 2015 but reintroduced compliant ones at a later date (Luxembourg and Malta, in 2018). Income-based tax support continued to expand, especially in Eastern Europe. Between 2018 and 2019, Lithuania, Poland, Romania, the Slovak Republic and the United States introduced IBTIs.

Most countries have maintained the preferential tax treatment for IP from the first year of introduction until 2022. As shown in Figure 2, only Colombia and Italy have repealed their IBTIs indefinitely. Other OECD countries removed their incentives only temporarily: this is the case of Ireland between 2011 and 2015, Korea between 2006 and 2013, Luxembourg between 2016 and 2017, and Japan between 2015 and 2016. Among non-OECD European countries, Malta suspended its IP regime for three years between 2016 and 2018.

The stepwise and increasing introduction of IBTIs may reflect competitive pressures to attract or retain mobile activity within jurisdictions. The introduction of IBTI may have been driven by governments' adoption of neighbour's policies (yardstick competition) (Besley and Case, 1995[23]); competition to attract mobile resources (Brueckner, 2016[24]); or changes in intellectual trends (Slemrod, 2004[25]). Countries belonging to the same geographical or economic area often implemented income-based tax support at the same time as discussed in the next section. Evidence on such strategic interactions have been found for other forms of

[10] Note by Türkiye:

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Türkiye recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Türkiye shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union:

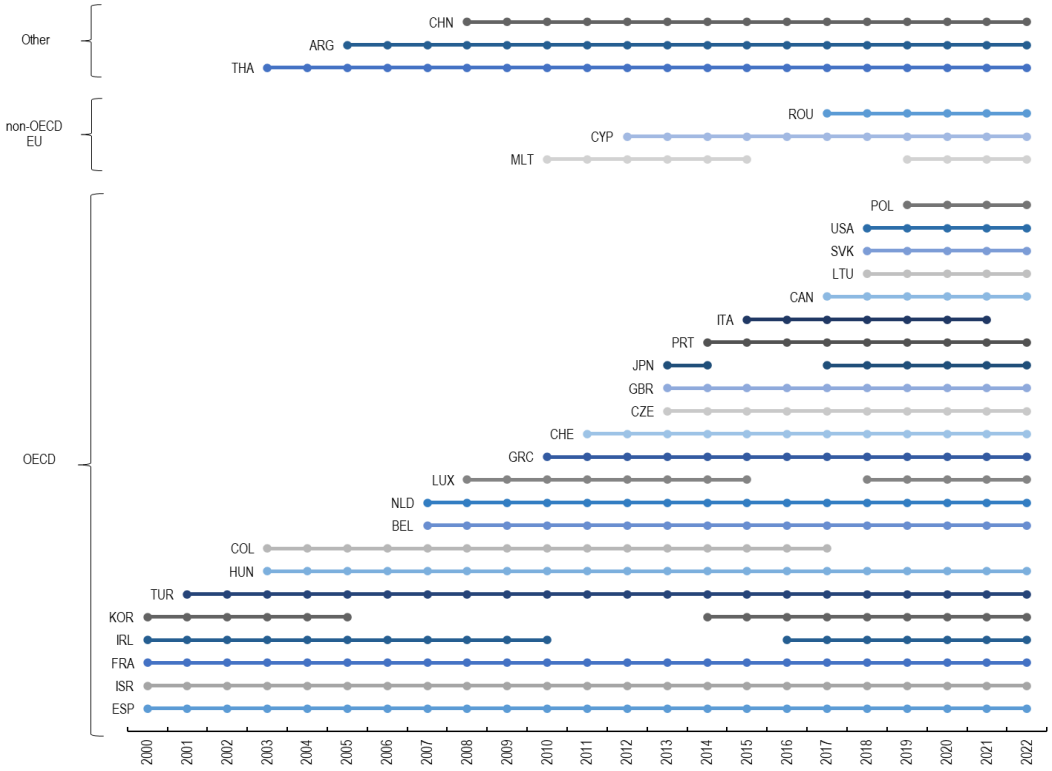
The Republic of Cyprus is recognised by all members of the United Nations with the exception of Türkiye. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

[11] Among EU members, this wave starts around the same time as two key events that some studies suggest are related to the sharp increase in the number of IP regimes: the favourable conclusion of the EU Commission of the review of the Spanish IP regime and Irish IP regime **Invalid source specified.** and the EU Commission ruling of the Cadbury-Schweppes case that restricted the use of CFC rules between EU members**Invalid source specified.**.

[12] These include Hungary, Italy, Korea, the Netherlands, Spain, Switzerland (the Canton of Nidwalden), Portugal, Türkiye (which amended regime TUR1) and the United Kingdom.

IBTIs such as tax holidays, that are targeted to attract foreign direct investment (Klemm and van Parys, 2011[26]).

Figure 2. Availability of IBTIs over time, 2000-22



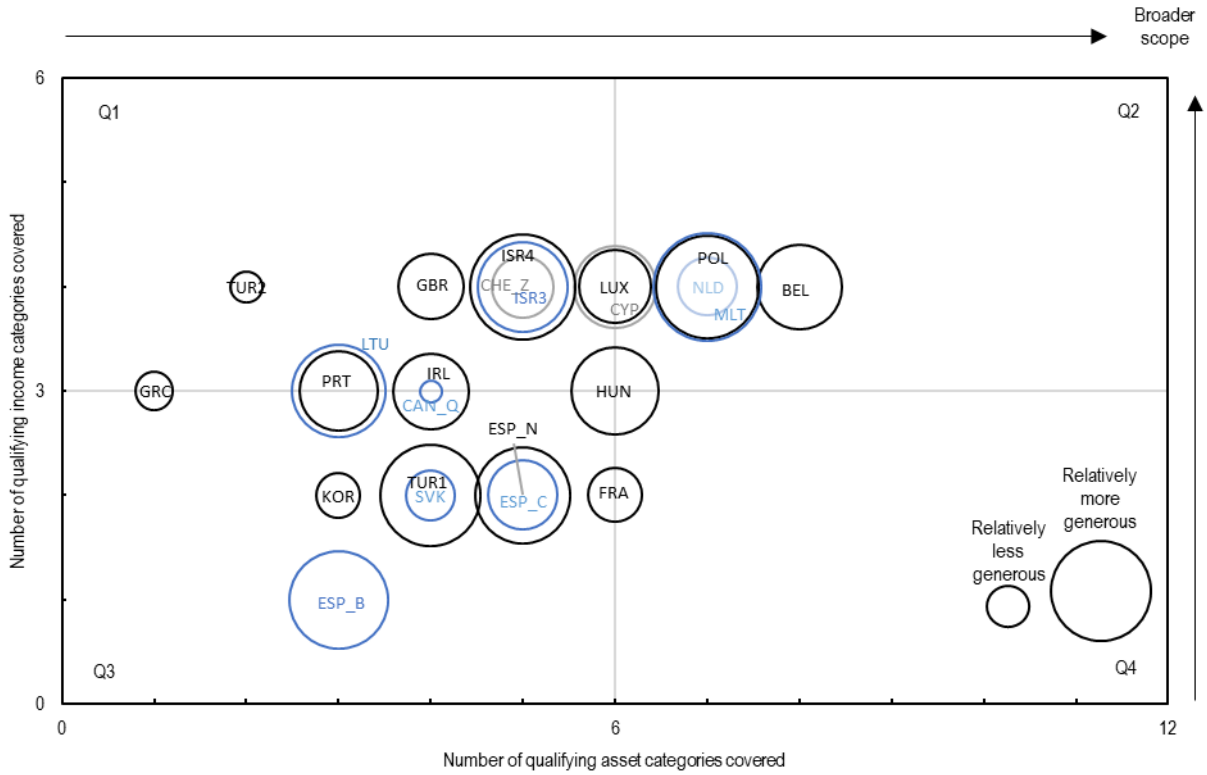
Note: The markers represent the availability of at least one IBTI in the country in the relevant year (Table A.1).
Source: KNOWINTAX surveys, documentation from the Forum on Harmful Tax Practices peer reviews, public sources.

4. Changes in the design of income-based tax incentives

IBTIs differ across several design dimensions that affect their generosity. Figure 3 reflects differences in the scope and the extent of tax benefits of the regimes covered for 2022. The x-axis and y-axis represent the number of eligible qualifying assets and types of qualifying income, respectively, providing an approximate indication of the breadth in the scope of different regimes. Countries in the upper right quadrant (Q2) are those that offer the widest scope in terms of assets and income, with those in the bottom left quadrant (Q3) representing those with the narrowest scope. The size of the bubbles represents the relative generosity of the regimes relative to other countries measured by the ranking of the EATRs for an internally generated R&D intangible asset (González Cabral et al. (forthcoming[5]) and Section 5). The bigger the bubbles, the lower the EATR for qualifying forms of assets and income, and therefore the more generous the tax treatment is in the jurisdiction compared to others. This figure illustrates that the scope and the extent of tax benefits go hand in hand. The broader the scope and the lower, in this case, the EATR, the more generous a regime is overall. IBTIs are identified using the country-level identifier in Table A.1. This applies to Figure 3 and the remainder of the section.

Figure 3. The generosity of IBTIs, IP regimes, 2022

Differences in qualifying income and assets and ranking based on the EATR internally generated R&D intangibles



Note: The chart represents 24 IP regimes in force in 21 countries in 2022. Country-level identifiers are used to identify regimes. Dual category regimes or IP regimes where both qualifying assets and income are not explicitly defined are not included as they do not restrict relief to IP income and may not restrict qualifying assets through a limited list (see Table A.1).

- **The horizontal axis** represents the number of categories of qualifying IP assets covered.
- **The vertical axis** represents the number of categories of qualifying income covered
- **Bubble size** represents the ranking of the country in the EATRs for internally generated R&D intangibles in 2022. The bigger the bubble, the lower the EATRs on internally generated R&D intangibles and the greater the relative generosity of a given regime compared to others.

Qualifying IP assets are grouped in twelve categories: Patents/Exclusive licenses, Supplementary Protection Certificates (SPCs), Utility models/ Short-term patents, Plant variety rights (PVR)/ plant breeders rights, Orphan drugs, Designs and models, Industrial processes, Secret formulae or processes or other trade secrets, Information concerning know-how, Products benefitting from data or marketing exclusivity (medicinal products), Copyrighted Software, and Trademarks. Qualifying income are grouped in six categories: income from royalties/exclusive license fees, income from the sale and transfer of IP rights, capital gains or income from in-kind contributions for IP rights, embedded IP income, income from the insurance, damages or compensation in relation to the qualifying IP asset (income derived from IP protection, hereafter) and income from marketing intangibles.

This section maps key changes in the design of IBTIs from 2000 till 2022. In total, 29 countries and 52 IBTIs are covered in this paper.[13] Table 1 classifies the types of design changes implemented by countries from 2000 (or earlier if available) till 2022 in nine categories that affect the scope and the calculation of tax benefits. The remainder of the section will discuss the nature of those changes and their direction in terms of generosity of tax relief. Table A.2 and Table A.3 in Annex A outline the design of IBTIs at the time of their introduction and Table A.4 and Table A.5 in Annex A summarise all the changes reported by countries as part of the 2022 KNOWINTAX survey[14] for each incentive up until 2022.

Table 1. A summary of changes in the design of IBTIs, 2000-2022

Number of country-year design changes since IBTI introduction

	Design feature	Definition	More generous	Less generous
Scope	Eligible taxpayer	Types of taxpayers that qualifies for relief (e.g., domestic firms, permanent establishments of foreign firms) and additional qualifying criteria (e.g. the ownership of the IP, role in developing the IP, role on managing the IP)	4	1
	Qualifying assets	Types of eligible IP assets (e.g., patents, licenses, certificates, etc.)	15	15
	Qualifying income	Types of eligible IP income (e.g., royalties, license fees, capital gains, etc.)	13	9
Calculation of tax benefit	Development conditions	Specific IP-related conditions on the development of the intangibles	3	15
	Tax relief	Preferential tax rate (exemption or reduced rate)	7	6
	Treatment of ongoing expenses	Whether expenses associated to the IP asset need to be deducted from IP income only (net income approach) or they can be deducted against ordinary income (gross income approach)	0	6
	Treatment of past expenses	Whether R&D and related expenses associated with the IP incurred in the past need to be accounted for when calculating qualifying income, or not	0	3
	Treatment of losses	IP losses can be used to offset ordinary income or there are provisions to ensure that IP losses can only offset IP income	0	2
	Limitation to tax benefits	Ceilings on the amount of tax relief that can be granted that limit the tax benefits, domestic minimum taxes	3	4

Note: Colour intensity represents the total number of changes observed for each design feature over time. The darker the colour, the higher the number of changes reported by countries. The data covers 29 countries and 52 regimes. A description of each design feature is contained in González Cabral et al. (2023[3]). Source: OECD.

[13] Between 2000 and 2022, 16 OECD countries and 11 EU countries do not offer IBTIs. From this point onwards, in the case of Israel, the analysis concentrates in the Preferred Enterprises regime (ISR3 and ISR4 using the regime-level identifiers in Table A.1.) and the Preferred Technology Enterprises regime (ISR5 and ISR6 using the regime-level identifiers in Table A.1.).

[14] Delegates from the KNOWINTAX network formed by delegates of Working Party No. 2 of Tax Policy and Statistics, the Working Party for National Experts on Science and Technology Indicators and delegates from the Forum on Harmful Tax Practices have contributed to validate the design information presented in this paper.

4.1. Most IBTIs have become broader in scope

During the period of study, several IBTIs have experienced changes in the scope of qualifying income and assets. Over time, 16 of the 29 countries with IBTIs over time have revisited the list of qualifying IP assets and IP income since the first introduction of their IBTI (15 out of 29 countries have revised the list of qualifying assets and 14 out of 29 have revised the definition of qualifying income). For those countries revising the scope of their IBTIs over time, Figure 4 illustrates changes to qualifying assets and Figure 5 changes to qualifying income over time.[15] Even though some compulsory removals of certain asset classes occurred, in part related to the introduction of BEPS Action 5 minimum standard, most amendments produced an enlargement in the scope of regimes. Table A.3 captures the design features at the time of introduction and Table A.4 changes since.

Some revisions in the scope of IBTIs can be attributed to the implementation of the BEPS Action 5 minimum standard which restricted the types of qualifying assets and income. The minimum standard restricted support to three categories of IP assets, specifically excluding marketing intangibles and their associated income from being eligible for relief (Table 1). This led to two types of changes. First, some countries amended their IBTIs to exclude marketing intangibles such as trademarks, and other intangibles such as know-how from the list of qualifying assets.[16] Second, some countries introduced and enforced a positive list of qualifying assets. This is the case for countries that did not have an explicit list of qualifying assets or only had a negative list which implied that other types of assets not explicitly captured could in principle qualify for relief. In these cases, there were no clear boundaries regarding the type of intangible assets that were eligible for relief. Others waived the requirement to have a qualifying asset subject to meeting other requirements.[17]

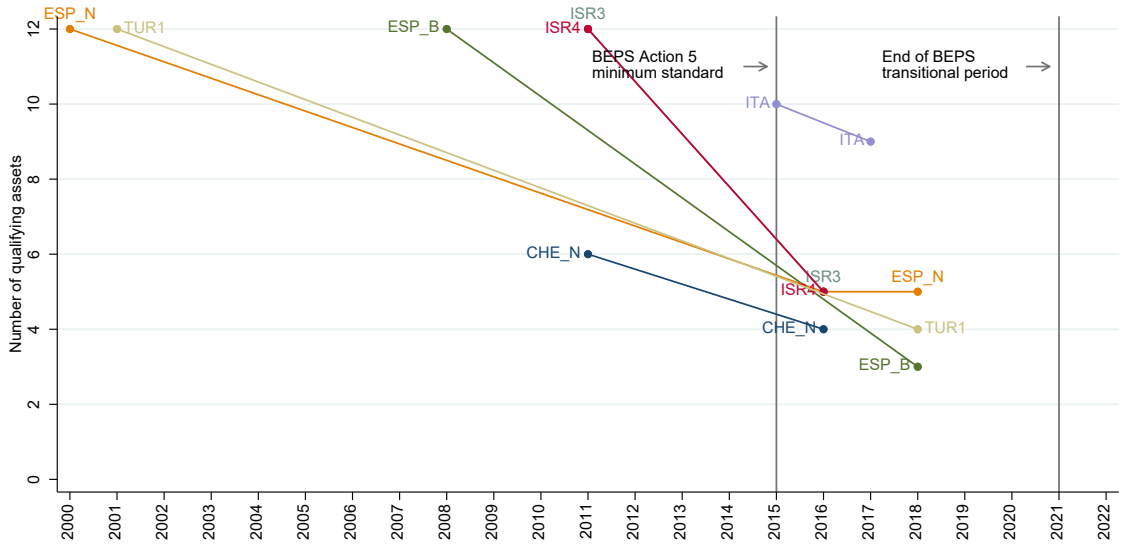
[15] These figures capture the overall direction of changes but certain qualitative considerations may not be well represented. This is the case where certain qualitative criteria may waive the requirement to have certain qualifying assets or where the list of qualifying assets may lead to some uncertainty about the types of qualifying assets (e.g., by not defining a positive list). In addition, the BEPS Action 5 minimum standard required income from IP to be isolated from other non-qualifying types of income. Depending on the requirements prior to the introduction of the minimum standard, income from certain marketing intangibles may have qualified. This is not accounted for in this chart for countries with a positive list of assets (Table A.3 in Annex A).

[16] Six countries revised their IBTI to exclude trademarks from the positive list of qualifying assets (Cyprus, Hungary, Italy, Luxembourg, Malta and Switzerland (Canton of Nidwalden)) and five countries excluded know-how (Cyprus, Hungary, Ireland, Spain (ESP_C and ESP_N) and Switzerland (Canton of Nidwalden) (CHE_N).

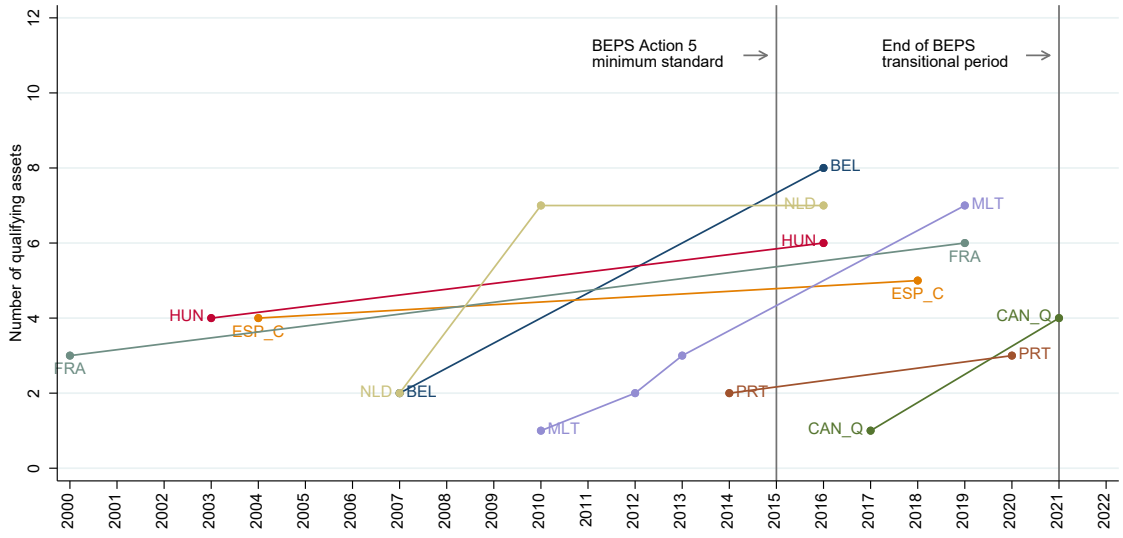
[17] The IBTI in Türkiye (TUR1) and Israel (ISR3 and ISR4) did not contain an explicit list of assets prior to their amendments in 2017. Spain for its subnational regimes only contained a negative list of assets prior to 2016 (ESP_B) and 2018 (ESP_N). In the Netherlands, from 2008, taxpayers could access the IBTI without a qualifying IP asset provided they had valid R&D certificate. Since 2017, this option is restricted. Large taxpayers, in addition to the R&D certificate, need also have a form of qualifying asset. Smaller taxpayers can still access IBTIs using the R&D certificate.

Figure 4. Changes in the number of qualifying assets over time

Panel A: IBTIs with net decreases in the number of qualifying assets



Panel B: IBTIs with net increases in the number of qualifying assets



Note: This chart uses the country-level identifiers in Table A.1 that treat IBTIs as a continuum to analyse changes in the design of IBTIs independent of the nature of legal changes over time. The first dot refers to the number of qualifying assets at the date of first introduction of IBTIs. The remaining points show the evolution of the number of qualifying assets in a given year. Qualifying assets are grouped as in Table 1. Countries are split between those that observed a net increase in the number of qualifying assets since introduction (Panel A) and those that observed a net decrease (Panel B). Countries with no changes are not represented. Within a given year, countries may extend IBTIs to some new assets and limit access for others (Table A.4). This chart provides a net result incorporating those changes. Certain qualitative changes may escape representation, e.g., the restriction of access to IBTIs solely with the R&D certificate in the Netherlands post-2016 coincided with an increase in the list of qualifying assets, the effect of the former is not captured in this chart. Countries where a positive list of qualifying assets was not available at the time of introduction but introduced at a later point in time are shown as having all types of qualifying assets potentially eligible to illustrate the reduction in scope (ESP_N, ESP_B, ISR3, ISR4 and TUR1).

Overall, most countries have expanded, in net terms, the number of qualifying assets and income over time. While the restrictions imposed by BEPS Action 5 have led to a net decrease on the types of qualifying assets in certain countries (Figure 4 Panel A), most countries have expanded the scope of IBTIs over time (Figure 4 Panel B). Most expansions have included supplementary protection certificates (SPCs), copyrighted software, utility models, plant variety rights (PVRs), orphan drugs.[18] Likewise, most countries have enlarged the list of qualifying IP income over time (Figure 5 Panel A compared to Panel B), despite the aforementioned revisions to exclude income from certain intangibles Most regimes expansions sought to include capital gains, embedded income from the sales of final products and services, and income derived from IP protection.[19]

In some cases, the enlargement in the scope of IBTIs coincided in time with the amendment or replacement of the old schemes to align with the BEPS Action 5 minimum standard. For example, this is the case of Belgium and the Netherlands. In Belgium, the regime was replaced in 2016 by a new IP regime in line with BEPS Action 5 minimum standard, which extended relief to other asset such as utility models, PVRs or copyrighted software and other types of income such as those derived from the sale and transfer of IP and from the protection of IP.[20] In the Netherlands, as the Innovation Box was amended to align with the minimum standard in 2016, the scope of the regime was extended to include other assets such as copyrighted software, orphan drugs and category III assets as defined in BEPS Action 5. This is the second expansion in scope of the Dutch regime since its introduction in 2007.[21]

Similarly, countries that reintroduced IBTIs in the post-BEPS Action 5 period also provided a more generous scope compared to the IBTI previously offered. This is the case, for example, in Ireland, Luxembourg, and Malta. In Ireland, the first IP regime, approved in 1973 and abolished in 2010, provided preferential tax treatment only for income from royalties or exclusive license fees. When another IP regime was introduced in 2016, Ireland extended the preferential tax treatment to embedded income and IP infringement income. The regime in Malta introduced in 2010 was originally restricted to patents. In 2013, this regime was extended

[18]Since introduction nine countries have expanded the scope to include SPCs, eight countries to include copyrighted software, seven countries to include utility models and plant variety rights and six to include orphan drugs.

[19] Six countries increased the scope of their IBTI over time to include income from the sale or transfer or IP (France, Hungary, Spain (ESP_C in 2013; and ESP_N in 2016), Belgium, Malta and Greece). Six countries included income derived from IP protection as qualifying income (Ireland, Belgium, Luxembourg, Malta and Canada (Québec)).

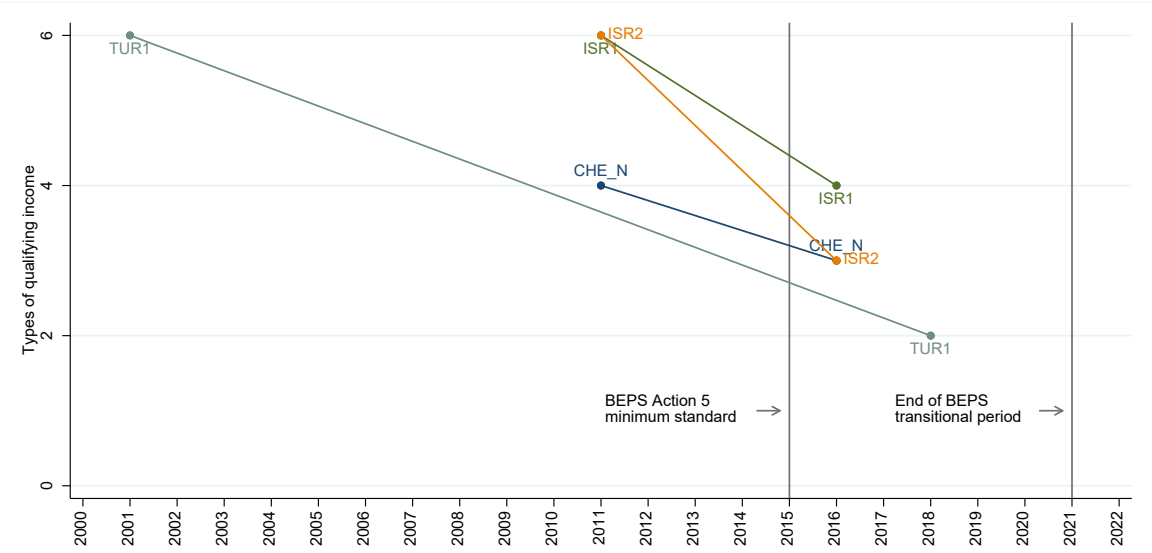
[20] In Belgium, the IP regime introduced in 2007, provided relief to royalties and embedded IP income arising from patents and SPCs. The list was enlarged to include income arising from utility models, PVRs, industrial processes, products benefitting from data or marketing exclusivity, and copyrighted software. It also extends relief to capital gains, income from in-kind contributions of IP rights and income derived from IP protection.

[21] In 2007, the Netherlands granted preferential tax treatment only to income derived from the use of patents and plant variety rights. The regime was renamed as an Innovation Box in 2010 and the list of qualifying assets was enlarged to include SPCs, exclusive licenses, utility models, designs and models, industrial processes, and copyrighted software. In 2016, the regime was further expanded to include orphan drugs, secret formulas or processes, information concerning know-how, products benefitting from marketing exclusivity and category III assets as defined in BEPS Action 5; and to income from the in-kind contributions. BEPS Action 5 also restricted the possibility of large taxpayers to access preferential tax treatment by only having the R&D declaration and required having a qualified intangible asset, restricting the scope of the regime.

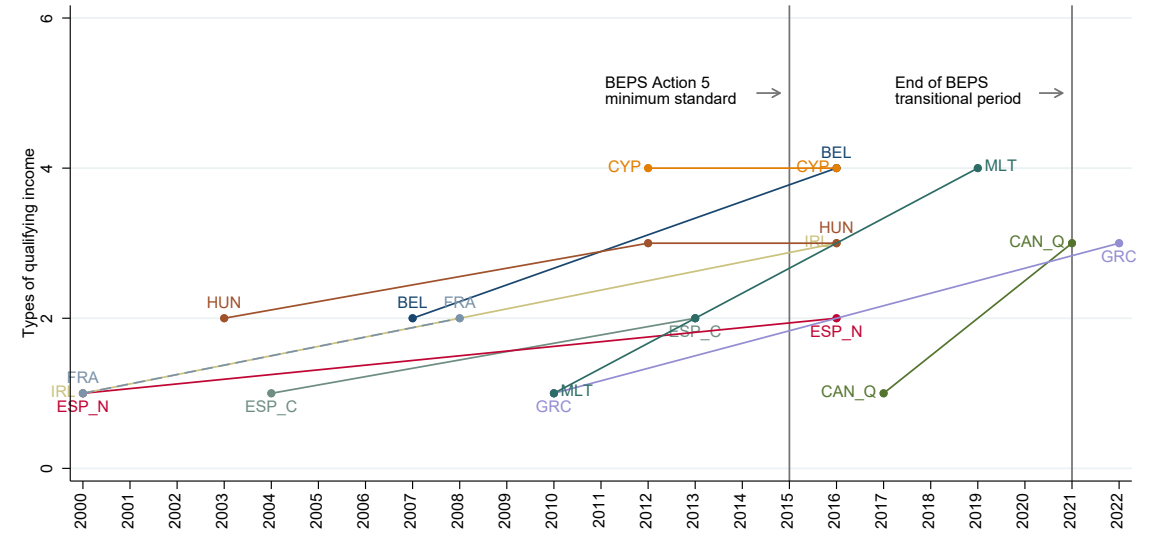
to copyrighted software and trademarks prior to its discontinuation in 2015. When Malta reintroduced income-based tax support in 2019, the new regime had a further expanded the scope relative to the old IP regime both in terms of the set of qualifying assets and qualifying income.[22] The IP regime in Luxembourg, reintroduced in 2018, while removing income from marketing intangibles, included income from income derived from IP protection.

Figure 5. Changes in the types of qualifying income over time

Panel A: IBTIs with net decreases in the types of qualifying income



Panel B: IBTIs with net increases in the types of qualifying income



[22] The qualifying assets for the new regime included SPCs, utility models, PVRs, orphan drugs, and design and models as qualifying assets. Trademarks were removed from scope. The income categories included income from exclusive licenses, capital gains, in-kind contributions, embedded income and income related to the violation of IP rights (e.g., insurance, compensation).

Note: This chart uses the country-level identifiers in Table A.1 that treat IBTIs as a continuum to analyse changes in the design of IBTIs independent of the nature of legal changes over time. The first dot refers to the types of qualifying income at the date of first introduction of IBTIs. The remaining points show the evolution of the types of qualifying income in a given year. Qualifying income types are grouped as in Table 1. Countries are split between those that observed a net increase in the types of qualifying income since introduction (Panel A) and those that observed a net decrease (Panel B). Countries with no changes are not represented. Within a given year, countries may extend IBTIs to some new types of income and limit access for others (Table A.4). This chart provides a net result incorporating those changes. Certain qualitative changes may escape representation, e.g., some IBTIs may not have required the elimination of income from marketing intangibles even if not included in the list of qualifying assets, a feature that is not represented in this chart. Countries where qualifying income was not defined at the time of introduction but introduced at a later point in time are shown as having all types of qualifying income potentially eligible to illustrate the reduction in scope (ISR3, ISR4 and TUR1).

4.2. Most IBTIs require more stringent development conditions as a response to the BEPS Action 5 minimum standard

Before the implementation of the BEPS Action 5 minimum standard, there was no uniform definition of the development conditions required for an asset to be eligible for relief under IBTIs. Development conditions restrict the possibility to receive tax benefits if the taxpayer was not involved in the R&D activities that led to the creation of the asset. In the absence of such conditions, regimes could create incentives to transfer IP towards entities that could benefit from preferential tax treatment. Where development conditions existed, the strictness of development conditions varied widely across regimes. Among the 22 countries that offered IBTIs before 2015, in six out of the 22 (27%) there was an IBTI that required some development conditions linked to the expenditures incurred in the development of the IP, in four countries (18%) IBTIs required some other development conditions or activity testing and in 13 countries (59%) IBTIs had no IP-specific development conditions. Table A.2 in Annex A summarises the type of development conditions that were in place at the time of introduction of regimes and Table A.4. captures changes to development conditions up until 2022.23

Some countries required minimum participation percentages in the cost of the development of the intangible asset. These requirements put in place mechanisms to ensure that there is some substance linked to the preferential tax support. At the time of introduction, Spain for its central regime, for instance, required a 100% participation in the IP cost to be able to apply for the regime. This provision was relaxed in 2013 by lowering the minimum contribution to 25%. The Netherlands also required that at least 50% of the R&D phase had to be performed in the country and the Dutch entity had to play a key coordination role in the development of the asset.

In other countries development criteria were established by means of a taxpayer activity-based test or other development requirements. These tests did not always establish a strong link between the R&D expenditures and eligibility for the IBTI. In the United Kingdom, for instance, a “qualifying development” condition and an “active ownership condition” applied. To meet the qualifying development condition the IP had to be developed by the taxpayer itself or, if developed by another member of the group, the firm had to actively manage the IP, i.e. be involved in significant activities such as planning and decision making about the development

[23] Prior to their amendment to comply with the BEPS Action 5 minimum standard, contributing to the development of the IP asset was not explicitly required to access IBTIs in certain countries such as Cyprus, Hungary, Luxembourg or Switzerland (Canton of Nidwalden) or was only required to access greater tax benefits (e.g., Spain for the subnational regimes (ESP_N and ESP_B) to benefit from a higher exemption rate). This was also the case for the remainder eight dual category regimes. See Table A.2.

and exploitation of the IP.[24] In Malta, the income exemption would only apply if the individual carried out, either solely or together with another person (or persons), research, planning, processing, experimenting, testing, devising, designing, developing or another similar activity leading to the invention that led to the qualifying patent. Other countries indicated a minimum period of possession of the IP for acquired IP to benefit from the incentive. For instance, France required a holding period of at least two years for acquired IP assets before the IBTI would apply.

From 2015, the BEPS Action 5 minimum standard introduced a "nexus approach" that linked income-based tax benefits to the proportion of expenditure incurred by the taxpayer in the development of the associated asset. For regimes following the BEPS Action 5 minimum standard, development conditions are introduced through the nexus ratio (Box 1). The nexus ratio defines the proportion of qualifying IP income eligible for relief based on the R&D expenditures incurred by the taxpayer (or subcontracted to unrelated parties).

Box 1. BEPS Action 5: Development conditions

Qualifying expenditures as a link to substance: The nexus ratio

BEPS Action 5 proxies development conditions through the use of the nexus ratio. The nexus ratio sets a proxy for the substantial activities undertaken by the taxpayer. The numerator equals qualifying expenditure (QE) which includes (*a*) expenditure directly incurred by the taxpayer that currently qualifies for relief under expenditure-based R&D tax incentives plus (*b*) the cost of outsourcing to unrelated parties. Interest payments, acquisition costs, building costs and any other costs not directly linked to a specific asset, do not enter the definition of qualifying expenditure. The denominator equals overall expenditures (OE), which is the numerator plus (*c*) acquisition costs and (*d*) costs of outsourcing to related parties. To allow some flexibility in the development mix of the asset, jurisdictions may allow taxpayers to apply a 30% uplift to qualifying expenditures, increasing qualifying expenditure but never to the extent that qualifying expenditure would be greater than the total amount of overall expenditure. The nexus ratio as a function of QE, OE and terms *a*, *b*, *c*, and *d* can be expressed as follows:

$$\textbf{Nexus ratio} = \frac{\textbf{Qualifying expenditure to develop the IP (QE)}}{\textbf{Overall expenditures to develop the IP (OE)}} = \frac{\textbf{Min}((a+b)*1.3, OE)}{a+b+c+d}$$

The nexus approach is additive in that both qualifying and overall expenditures represent expenditure incurred over the life of the IP asset. Expenditures for the purpose of the nexus ratio enter the calculation when they are incurred (independent of the accounting or tax treatment).For example, if the firm acquires an IP asset for EUR 75 and further developed it incurring EUR 25 of in-house R&D. The nexus ratio for this asset would be equal to 25*1.3/(75+25)=32.5%. Only 32.5% of IP income can benefit from relief, and the rest is taxed at the full rate. If the firm instead incurs EUR 25 in acquiring the IP and developed EUR 75 in-house, the nexus ratio for this asset would be equal to 97.5%. Hence almost all IP income can benefit from preferential tax treatment. In exceptional circumstances, the nexus ratio can

[24] If the company that performed the R&D was acquired by another group and in the following 12 months from the acquisition had performed the same type of activities as those that constituted the qualifying development activities. The condition was considered to be met even if the further qualifying development was carried out by a different company within the group.

be rebutted if the taxpayer demonstrates that the level of eligible income as calculated by the nexus ratio does not accurately reflect their contribution to R&D activity. To enable this calculation, taxpayers should establish a track and trace system that links expenditure, assets and IP income. As a transitional measure, countries could introduce rules that allowed taxpayers already benefiting from an existing regime to keep such entitlements until no later than 30 June 2021 (see Table A.1).

Source: Based on González Cabral et al. (2023[3]).

Development conditions are now common to all regimes compliant with the BEPS Action 5 minimum standard. This implies the adoption of more stringent requirements than those that were in place in most countries previously.[25] To date, most regimes that were deemed in scope of BEPS Action 5 have been amended or replaced by new regimes compliant with the BEPS Action 5 minimum standard.[26] Out of the 27 countries with IBTIs in force in 2022, 21 (78%) had IBTIs with development conditions in the spirit of the nexus approach, noting that not all IBTIs in this paper fall under the scope of the BEPS Action 5 peer review process.

4.3. Several IBTIs have revised the calculation of tax benefits

The overall level of tax benefits granted by IBTIs depends on both the level of the preferential tax rate offered and on the definition of the tax base. This section will discuss changes to the preferential tax rates and the calculation of the tax base around three key elements: the treatment of ongoing IP expenses, the treatment of past expenses and the treatment of IP losses. Table A.2 in Annex A summarises the initial design features and Table A.5 in Annex A the changes in the calculation of tax benefits.

Countries tend to offer lower preferential tax rates to IP income over time. Figure 6 focuses on countries with IBTIs in 2010 and 2022 and shows changes to the preferential tax rates, standard tax rates and tax relief (the difference between preferential and standard tax rates) between these years. Comparing the dots to the diamonds, in 5 out of the 13 countries with IBTIs in both years, IBTIs offer a lower preferential tax rate in 2022 compared to 2010. Preferential tax rates may change as a response to changes in the STR (in the case of partial or full tax exemptions), to an increase in the exemption rate or a reduction in the reduced tax rates.[27] To disentangle changes in preferential tax rates, the bars below capture changes to the

[25] Although not covered in this report, another source of concern in the pre-BEPS context was that in some cases regimes did not require IP income to be linked to specific IP assets, leading to concerns on abuse of the policy (Evers, Miller and Spengel, 2015[31]).

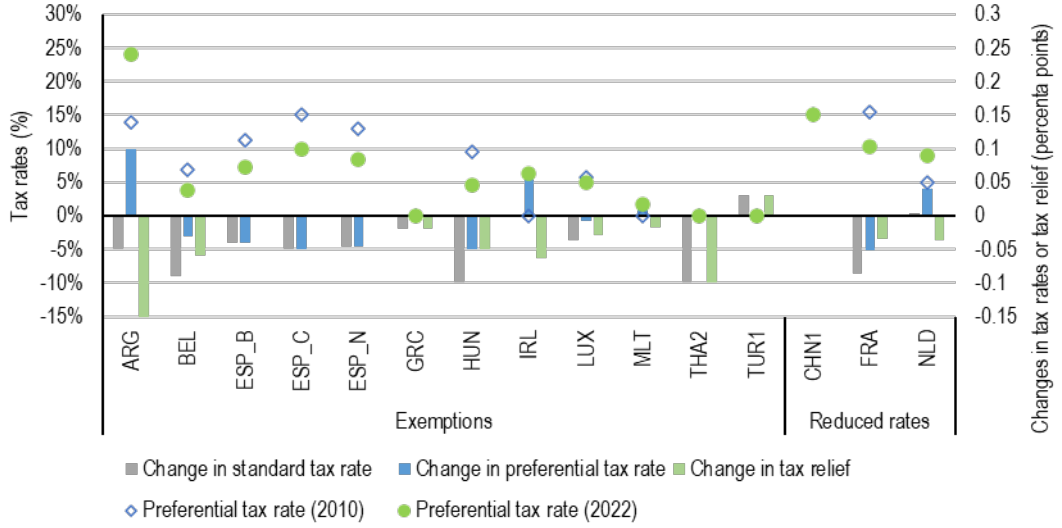
[26] As referred to in footnote 3, not all regimes in this paper fall under the scope of the FHTP peer review process. This is because only regimes that meet certain criteria (e.g. have a low effective tax rate or artificial definition of the tax base) are considered to be in scope of the FHTP. Similarly, subnational regimes are considered out of scope unless the national government is ultimately responsible for the general design of the relevant regime, with limited discretion on the part of the sub-national government on the regime's introduction or key features, and the tax rate at the sub-national level represents a significant proportion of the combined tax rate (OECD, 2015, pp. pp. 61-62 par 145-146[18]). This implies that regimes that are in scope of the FHTP are only a subset of the regimes covered in this paper.

[27] Unlike for reduced tax rates, for regimes offering an exemption from the full rate, the preferential tax rate adjusts automatically to changes in the STR.

STR, changes to the preferential tax rate and changes to the difference between the two between 2022 and 2010 in percentage points (pp).[28]

Figure 6. Changes in preferential and standard tax rates between 2010 and 2022

Only countries having IBTIs in place in both years



Note: Tax relief is defined as the difference between the preferential tax rate and the standard tax rate. In countries providing tax exemptions, the preferential tax rate is the product between the STR and one minus the exemption rate. If a reduced rate applies, the preferential tax rate is equal to the reduced rate. The figure captures changes in preferential tax rates, standard tax rate and tax relief between 2010 and 2022.
Source: 2022 KNOWINTAX Survey.

Overall, tax relief through IBTIs relative to standard tax treatment has largely decreased. Tax relief from IBTIs has decreased in 11 out of the 13 countries covered in Figure 6. The changes in STRs in grey are larger than those in preferential tax rates in green resulting in a negative total change in tax relief (green bar). In some countries, the decrease is solely due to a decrease in the share of income that is exempted (Ireland, Malta) or an increase in the reduced tax rate (the Netherlands).[29] In others, the rate of exemption has increased (Belgium, Luxembourg) or reduced tax rates have decreased (France) but not enough to offset the decrease in STRs. The extent of tax relief may also increase or decrease solely based on STR movements (Greece and Türkiye). Some countries have changed exemption rates alongside movements in STRs and maintain a constant level of tax relief despite STR movements (Spain, all regimes).

Most changes to the calculation of the tax base have led to a less generous definition of qualifying profits, in part due to BEPS Action 5 requirements. Most changes reported by countries sought to achieve an alignment between the tax rates at which income is taxed and

[28] Note that comparing preferential tax treatment to the standard tax rate establishes a within country comparison. Even if preferential tax treatment compared to the baseline in the country does not increase, the reduction in the preferential tax rate might make the regime more generous compared to those of other jurisdictions (Section 5).

[29] In the case of the Netherlands, both the STR and the preferential tax rate have increased. Tax relief has gone down as a result of these changes.

the rates at which losses and expenses are deducted from the tax base. Before the introduction of BEPS Action 5, there was no alignment across countries in the way expenses and losses had to be treated. As such, in some cases losses and expenses associated with the IP could be deducted at the STR, while income was taxed at the preferential tax rate. Several regimes prior to their amendment to follow the minimum standard allowed expenses to be deducted at the STR, also known as the 'gross approach'[30] Under some regimes, IP losses could offset both IP and ordinary income.[31] These features have been amended so that all such regimes now ensure that IP income is now calculated net of ongoing expenses also known as the 'net approach' and IP losses cannot offset ordinary income.[32]

Some countries have introduced mechanisms to reduce qualifying profits by the expenses incurred in the development of the asset. Such provisions establish requirements to adjust the tax base for past expenses associated with the development of the IP assets.[33] Some countries required accounting for past expenses in the tax base calculation since the early introduction of their regimes[34] Others introduced the requirements for recapturing for the first time at the time of amending their regimes in line with the BEPS Action 5 minimum standard (Belgium in 2016 and France in 2019); or changed from capitalisation to requiring the recapturing of past expenses (Netherlands, 2017).

In some countries, changes to the calculation of tax benefits and to the scope of IBTIs occurred at the same time as the introduction of BEPS Action 5 development requirements, highlighting the need for a combined picture of the evolution of income-based tax support. For example, in 2016 Belgium replaced the old regime with a new BEPS Action 5 compliant IP regime which offered an 85% exemption (compared to the 80% exemption under the old scheme), enlarged the number of qualifying assets and income and introduced substance requirements through the nexus ratio. At the same time, Belgium introduced a requirement to recapture past expenses. By contrast, the Netherlands enlarged the scope of qualifying assets and income in 2018 but increased the preferential tax rate from 5% to 7%, and to 9% in 2021. While the reductions in preferential tax rates and increases in scope increase the generosity of the regimes, the more stringent development conditions and the requirements to account for past expenses likely have the opposite impact. In France, the introduction of BEPS Action 5 minimum standards in 2019 coincided with an increase of number of assets and a decrease in the preferential tax rate from 15% to 10%. Overall, this implies that indicators that ensure the cross-country comparability of design changes and their effect on the level of

[30] This included Belgium, Hungary, Israel (Preferred and Special Preferred Enterprise regimes) and Portugal. Spain amended both central and regional regimes in 2013 to introduce the net approach, even before the introduction of the minimum standard.

[31] This was the case in Belgium, Cyprus, Greece, Hungary and Spain.

[32] Countries use different methods to ensure that losses are only used to offset ordinary income (González Cabral et al., 2023[3]).

[33] These provisions ensure that, to a certain extent, expenses incurred in the past are also deducted at the same rate as income is taxed. This has the effect of making the tax incentives less generous compared to situations where such provisions do not apply. See González Cabral et al. (2023[3])for a discussion of these methods.

[34] This occurred either by means of the capitalisation of past expenses (e.g., Cyprus, the Slovak Republic, Türkiye) or the recapturing in calculating tax support for the first time (e.g., France or Luxembourg). Requirements to recapture past expenses rather than capitalise R&D costs in the balance sheet provides a more advantageous position for the taxpayer.

income-based tax benefits are important to assess the net effect of multiple design changes. The next section develops and presents such indicators.

5. Trends in income-based tax benefits

This section presents estimates of the tax benefits and implicit tax subsidies from IBTIs over time. Section 5.1. discusses the modelling framework and calibration. Section 5.2 presents the trend in the taxation of internally generated R&D intangibles, those that are the result of a firm's own R&D and compares it to those of acquiring pre-existing R&D intangibles from other firms. Section 5.3 discusses the drivers of these trends and Section 5.4 presents country-specific results.

5.1. Modelling and calibration

This paper presents synthetic tax policy indicators that help compare the extent of tax benefits offered by IBTIs across countries and over time. To do so, it relies on the forward-looking effective tax rates framework that facilitate a comparison of the effect of different provisions of tax systems by holding constant a hypothetical investment across countries (Devereux and Griffith, 2003[27]; Klemm, 2008[28]), and in the case of IBTIs, the case of investments in R&D intangibles (González Cabral, Appelt and Hanappi, forthcoming[5]). The methodology and calibration in this section follows González Cabral et al. (forthcoming[5]).[35]

Given that IBTIs only apply to profitable investments, the key indicator considered in this paper is the EATR that summarises the average impact of taxation on a profitable R&D investment. Estimates of the EATRs for R&D intangibles are produced for 47 countries, 28 countries of which offered IBTIs over the 2000-22 period, resulting in a total of 51 regimes that are considered for modelling purposes.[36] The main time-series estimates presented consider the case of an internally generated R&D intangible asset, one that is generated through the firms' own R&D and that is licensed out or kept for own use domestically and that may benefit from IBTIs. This implies that this model does not currently consider cross-border flows and their taxation. These estimates are compared to those derived for the alternative case of acquiring pre-existing R&D intangibles from other firms. Although the body of the paper concentrates on the impact of IBTIs on the inframarginal investment, i.e., one that yields a profit, using indicators of the EATR, similar indicators that capture the impact of IBTIs on marginal investments, i.e., one that just breaks even after tax, such as the B-Index and cost of capital are presented in Annex B.

[35] This model distinguishes between the acquisition and a commercialisation phase of the R&D intangible and introduces a time lag between the R&D investment and income generation, also known as a gestation lag in the literature **Invalid source specified.**. The model is apt to account for different ways in which firms can acquire the R&D intangible, i.e., by internally generating the R&D asset, outsourcing R&D costs or acquiring pre-existing R&D intangibles from other firms. It models the tax treatment of each acquisition strategy under standard taxation and in the presence of IBTIs.

[36] The United States also offered IBTIs during the period covered but the IBTI is not modelled as it only applies to foreign-derived income and the current model is purely domestic (i.e., the firm performs the R&D and commercialises the R&D in the same jurisdiction). The number of 51 regimes is obtained using the unique regime identifier in Table A.1.

The indicators capture the impact of key design features of IBTIs, including both IP regimes and dual category regimes.

- the **preferential tax rate**[37]: equivalent to the reduced tax rate or in the case of income tax exemptions, the exemption rate multiplied by the STR;
- the **treatment of ongoing expenses**: ongoing expenses may have been deducted at the reduced rate ('net approach') or full rate ('gross approach');
- the **treatment of past expenses**: different recapturing or capitalisation mechanisms may have been in place to account for past expenses in the development of the R&D intangible asset;
- **the presence of development conditions**: the nexus ratio and development conditions, wherein place, limit the types of acquisition strategies that give rise to income-based tax relief.

It is worth noting that other design features may also affect the effective tax benefit resulting from an IBTI. For instance, the treatment of IP losses or presence of provisions that limit the calculation of tax benefits (e.g., ceilings on taxable income, domestic minimum taxes, etc.) may have a role in the determination of tax benefits. These design features are not captured in the model. Insofar that changes over time refer to dimensions a-d above, the indicators produced within this section will be able to capture their effect on the levels of EATRs and implicit tax subsidies from IBTIs. Table 1 in the previous section provides a summary of the type of changes that have occurred over time in these and other design features. Table A.2 and A.3 summarise design features at the time of introduction and Table A.4 and Table A.5 summarise changes over time.

To ensure cross-country comparability, the empirical calibration is held constant across countries. In particular, all indicators presented in this paper refer to a profitable investment in an R&D intangible asset that might benefit from preferential tax treatment, with a pre-tax rate of return of 30% that is funded by retained earnings.[38] The gestation lag between the investment decision and the asset's creation is assumed to be two years, with 50% of the investment taking place at the start of the R&D phase and the remainder in the commercialisation phase. Once generated, the asset depreciates at a rate of 15% annually. The modelled macroeconomic scenario assumes a 3% real interest rate and a 1% inflation. This calibration follows González Cabral et al. (forthcoming[5]).

[37] Preferential taxation may only be available for a fixed period of time after which standard taxation applies. This is also accounted for in the modelling.

[38] The model is domestic and abstracts from cross-border considerations as well as the impact of financing decisions. Where allowance for corporate equity provisions are available these lower the EATR shown.

5.2. Trends in EATRs for internally generated R&D intangibles

The average taxation of internally generated R&D assets has continuously declined over the past two decades. As shown in Figure 7, the average EATR on internally generated R&D intangibles has fallen in the OECD area from 23.4% in 2000 to 12.8% in 2022. The decline stabilises after 2019 and has only been temporarily reversed in 2016 due to introduction of the BEPS Action 5 minimum standard and in 2022 with the repeal of an IBTI in Italy. The fall in EATRs is even more pronounced for EU countries (Figure 8 and Figure B.1 in Annex B for all countries covered). These trends have to be interpreted in the context of the global fall in STRs, that has led to a reduced taxation of profitable intangible investments even in the absence of IBTIs (Devereux et al., 2002[29]; OECD, 2020[30]). For R&D intangibles that do not benefit from IBTIs, the EATR for OECD countries has fallen from 26.7% in 2000 to 19.5% in 2022, driven by the drop in STRs.[39] In principle, lower levels of standard taxation could reduce incentives for governments to introduce IBTIs, as the difference between standard and preferential taxation becomes smaller.

Despite falling EATRs under standard taxation, the extent of tax benefits provided to internally generated R&D intangibles has on average increased over time. The green bars in Figure 7 display the average implicit tax subsidy granted through IBTIs as measured by the difference between the average EATR for internally generated R&D intangibles under standard taxation and in the presence of IBTIs. The size of the green bar continues to grow over time even following the introduction of the BEPS Action 5 minimum standard in 2015, but at a slower pace, plateauing after 2019. This appears to suggest that BEPS Action 5 modified the way in which IBTIs are designed rather than reducing the use of such instruments. Section 5.3 discusses the drivers of this trend.

Contrary to internally generated R&D intangibles, the extent of tax benefits provided through IBTIs for acquiring pre-existing R&D intangibles has declined over time. Panel B in Figure 7 provides the EATR for acquired R&D intangibles for OECD countries (Panel B in Figure 8 for EU countries). As opposed to internally generated R&D intangibles whose costs can be typically immediately deducted, the costs of acquiring R&D intangibles are typically deducted in instalments over the lifetime of the asset. For acquired R&D intangibles, under standard and preferential taxation, average EATRs appear to have decline over time to a more modest extent than for internally generated R&D intangibles. This can be explained by the fact that most countries had *some* development conditions in place, although their strictness varied.[40] Contrary to internally generated R&D intangibles, implicit tax subsidies decreased on

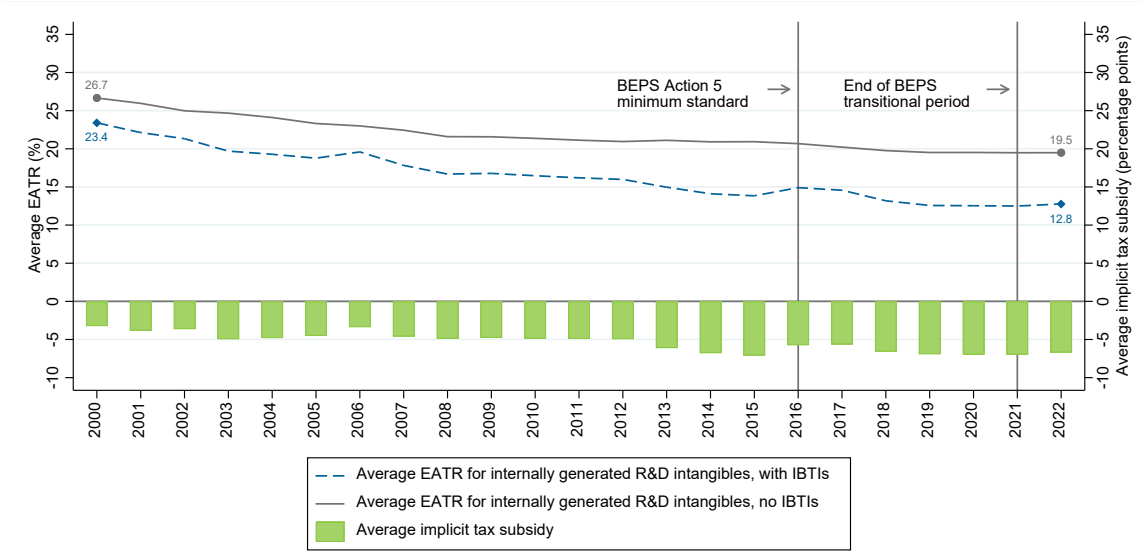
[39] Most IBTIs covered, with few exceptions typically for smaller taxpayers, apply to formally protected assets such as patents. The baseline EATR would be the rate applicable to intangible assets that do not benefit from preferential tax treatment (e.g., because they were not formally protected). This implies that the taxation of internally generated intangibles even in the absence of preferential tax treatment has declined over time.

[40] The modelling considers acquired R&D intangibles only eligible for regimes with no development conditions. This modelling is conservative and acquired R&D intangibles may have been able to benefit at least partially from regimes with some development conditions (Section 4.2). If acquired R&D intangibles was modelled as eligible for those regimes with other development conditions, the average EATR with IBTIs would decrease. Since most of these regimes have been amended to be in compliance with the BEPS Action 5 minimum standard, relaxing this assumption would increase the difference between EATRs with and without IBTIs in the period leading up to 2015, but the decreasing preferential tax treatment over time would be sustained.

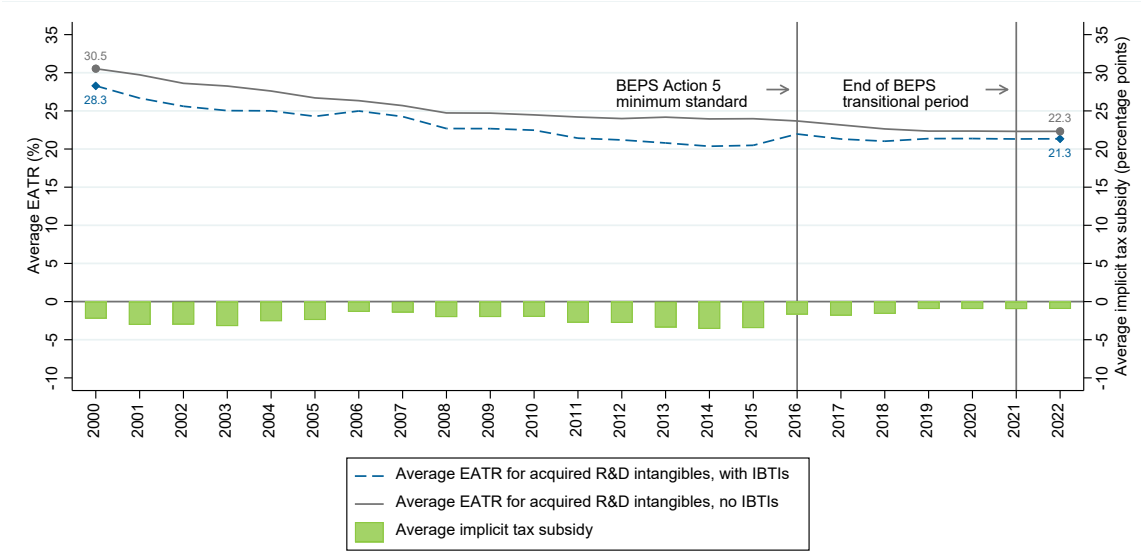
average after 2016 as regimes were amended to comply with the development conditions introduced by the BEPS Action 5 minimum standard through the nexus ratio (Box 1).[41]

Figure 7. EATR and implied tax subsidies for R&D intangibles, OECD countries, 2000-22

Panel A: Internally generated R&D intangibles



Panel B: Acquired pre-existing R&D intangibles



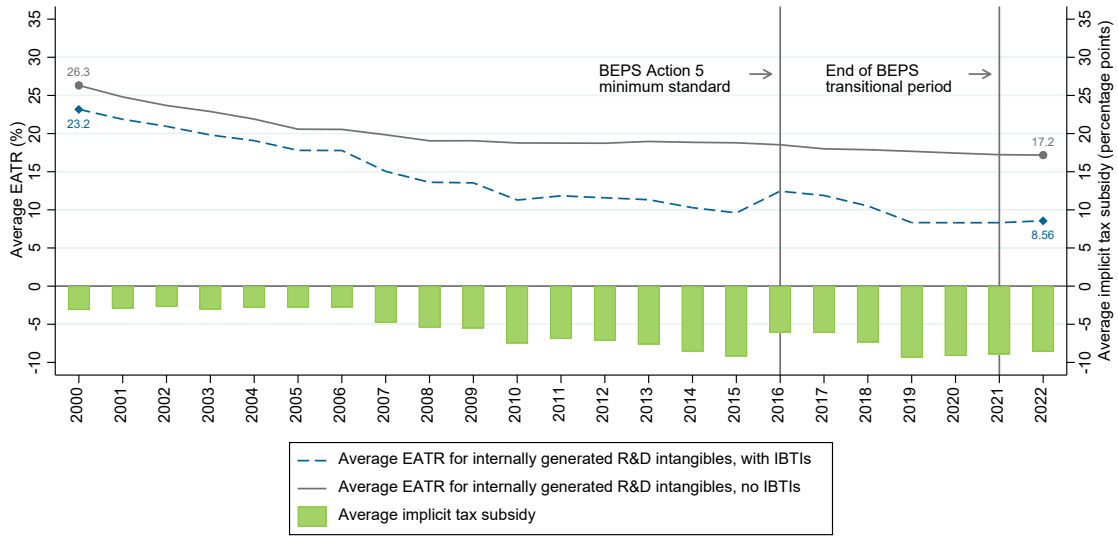
Note: The chart reports the unweighted average EATR across all 38 OECD countries over time, including those that do not offer IBTIs. It accounts for both IP regimes and dual-category regimes. Where IBTIs are available at the central and subnational government level in a given year, the central level IBTI enters the OECD average (Table A.1). If several IBTIs are available in the same year, the most generous one is used in the computation of the OECD average.

[41] BEPS Action 5 required IBTIs to stop offering tax benefits to new IP assets or taxpayers and established a transitional period for non-compliant regimes that could not extend beyond 30th June 2021 (Box 1).

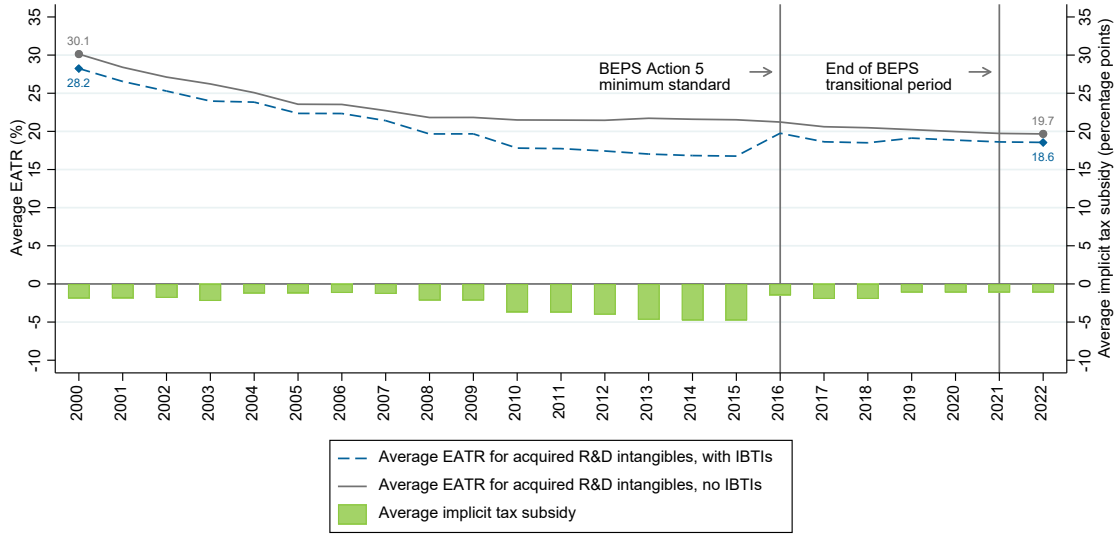
In Canada, IBTIs are only available at the subnational level in the provinces of Québec and Saskatchewan. The regime in the province of Québec is modelled in this average as Québec represents a larger share of Canada's gross domestic product (about twenty percent) relative to Saskatchewan (approximately four percent) (Table A.1). As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries.
Source: OECD

Figure 8. EATR and preferential tax treatment for R&D intangibles, EU countries, 2000-22

Panel A: Internally generated R&D intangibles



Panel B: Acquired pre-existing R&D intangibles



Note: The chart computes an unweighted average across all 27 EU countries, including those that do not have IBTIs over time. It accounts for both IP regimes and dual-category regimes. Where IBTIs are offered at the central and subnational level in the same year, the central level IBTI is used in the average (Table A.1). If several IBTIs are available in the same year, the most generous one is used in the average. In Canada, IBTIs are only available at the subnational level in the provinces of Québec and Saskatchewan. The regime in the province of Québec is modelled in this average as Québec represents a larger share of Canada's gross domestic product (about twenty percent) relative to Saskatchewan (approximately four percent). As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries.
Source: OECD.

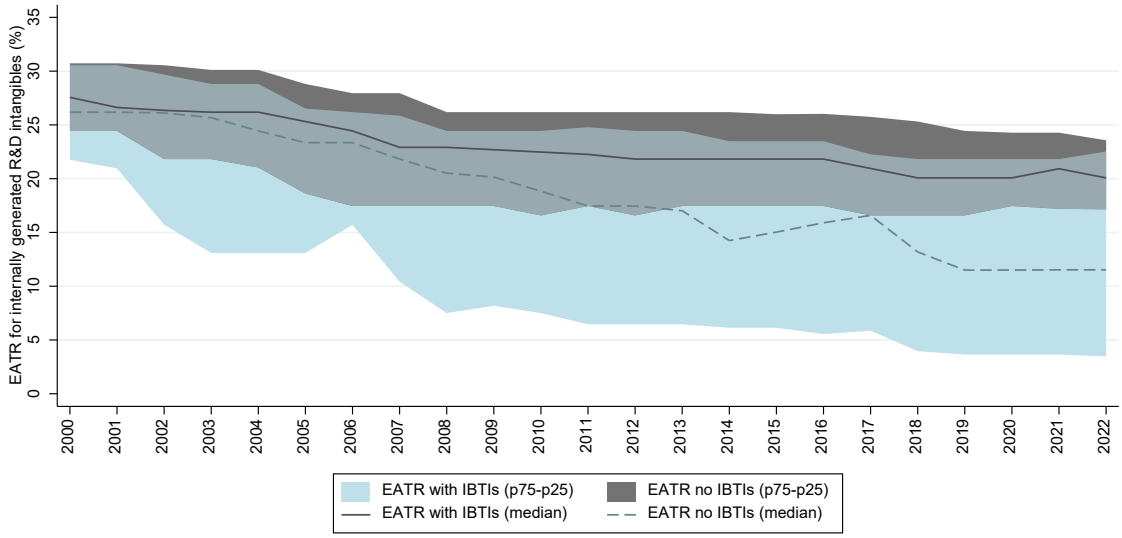
Over the last two decades, the variation in the taxation of R&D intangibles across countries has increased due to IBTIs. Figure 9 provides insights into the distribution of EATRs for R&D intangibles for OECD countries (Panel A) and EU countries (Panel B). In the absence of IBTIs, the distribution of EATRs has converged for both groups of countries. IBTIs push the distribution of EATRs for OECD and EU countries downward as observed in both panels. Accounting for IBTIs, the tax treatment of R&D intangibles has become more disperse across OECD countries over time compared to EU countries. This is in part driven by the more widespread use of IBTIs among EU countries but also greater differences in the implicit tax subsidies offered by IBTIs in OECD countries (Section 5.4). Between 2012 and 2022, the interquartile range that measures the difference between the 25th and 75th percentile increased by 1.08 percentage points (pp) in OECD countries, while it decreased by 3.7 pp among EU countries. The dispersion of EATRs for acquired R&D intangibles has however tended to narrow as less IBTIs provide benefits to acquired IP compared to the pre-BEPS period (Figure 9).

Growing differences in the taxation of qualifying internally generated R&D intangibles may affect firms' decisions regarding the location of IP and R&D activity, as well as IP commercialization and protection strategies. Differences in the taxation of *qualifying* internally generated intangibles across countries may create an incentive for firms to locate the economic ownership of the IP in countries with IBTIs to benefit from preferential tax treatment, provided that development conditions, where applicable, are met.[42] Meeting development conditions may imply in certain cases that firms need to consider jointly the decision of how and where to perform the R&D and where to locate the generated IP asset in order to ensure access to future IBTIs benefits. This implies that IBTIs indirectly condition the decision to locate R&D activity. Growing differences between qualifying and non-qualifying forms of R&D intangibles may also affect firms' decisions on how the R&D intangible is acquired (i.e., through own R&D, outsourcing R&D costs or acquiring pre-existing IP), protected and commercialized (i.e., own use, licensing or sale and transfer).

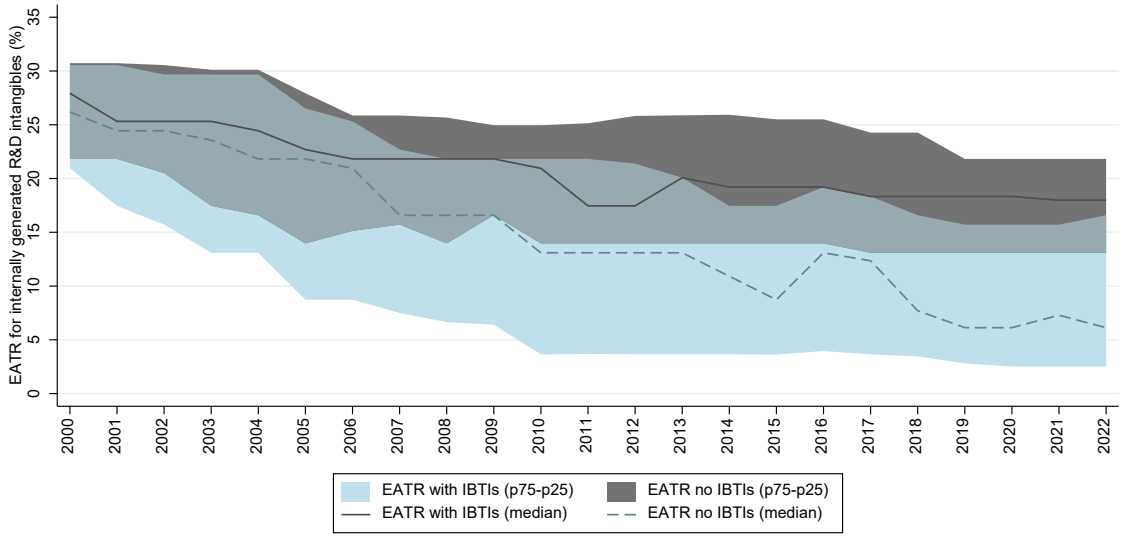
[42] This may also create incentives for firms to locate R&D in the jurisdiction, but not necessarily. For instance, the application of the BEPS Action 5 in the European Union recognises that R&D can occur in other member states as the nexus between the performance of R&D and the income qualifying for relief is the entity rather than the location of R&D.

Figure 9. Dispersion of EATR for internally generated R&D intangibles, percentiles of the EATR

Panel A: OECD countries



Panel B: EU countries

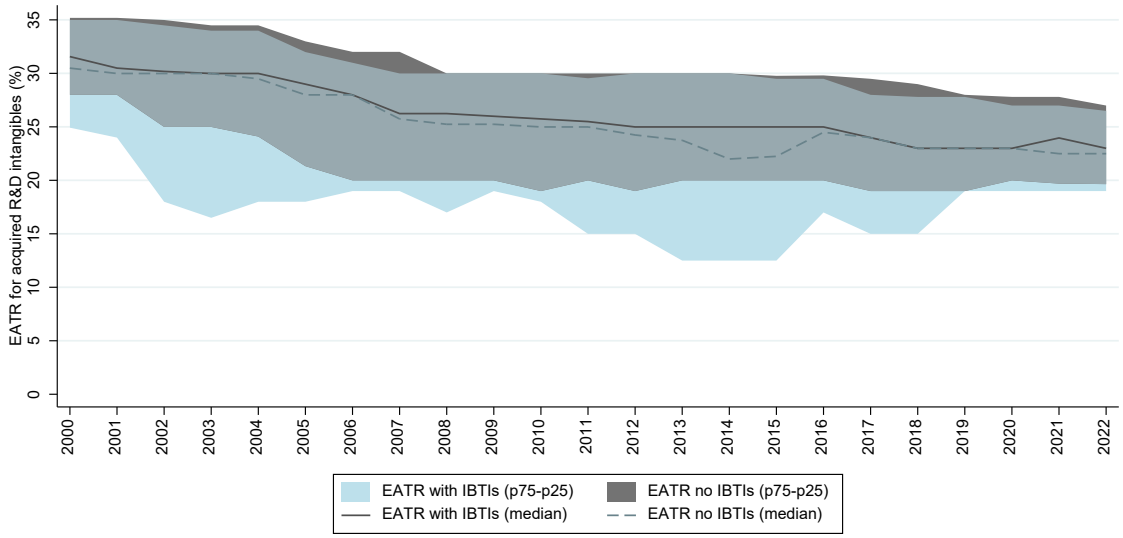


Note: The area in this chart represents the difference between the 25th and the 75th percentile of the EATRs presented in Figure 8 and 9 Panel A. The median represents the centre the distribution. This difference is referred to as the interquartile range and is interpreted as a measure of dispersion. The chart refers to all 38 OECD countries (Panel A) and EU countries (Panel B), including those that do not have IBTIs over time. OECD and EU membership are held constant over time for comparability. Where IBTIs are offered at the central and subnational level in the same year, the central level IBTI is used in the chart (Table A.1). If several IBTIs are available in the same year, the most generous one is used in the average.

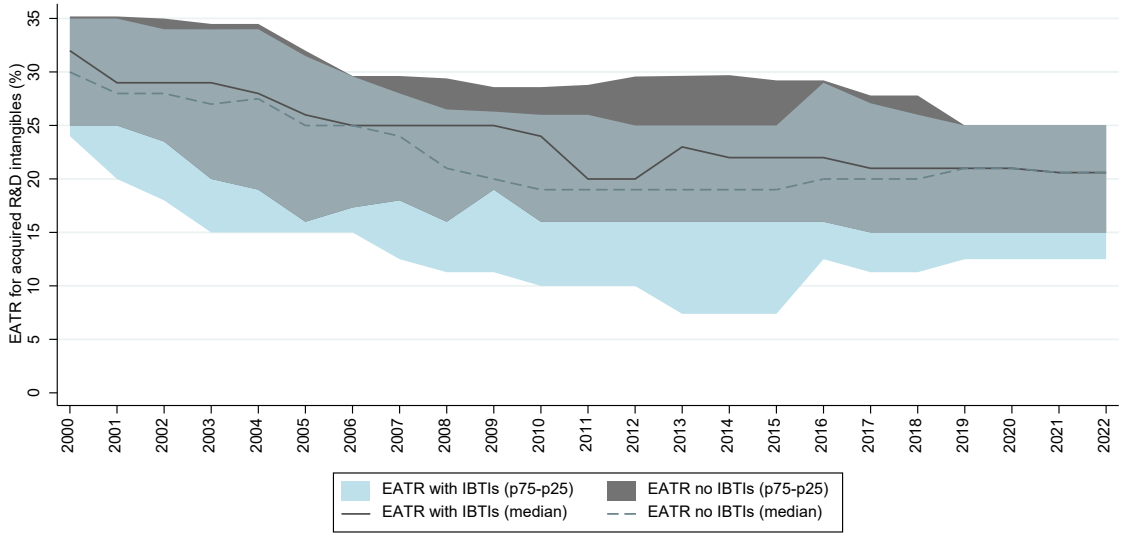
In Canada, IBTIs are only available at the subnational level in the provinces of Québec and Saskatchewan. The regime in the province of Québec is modelled in this graph as Québec represents a larger share of Canada's gross domestic product (about twenty percent) relative to Saskatchewan (approximately four percent). As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries.
Source: OECD.

Figure 10. Dispersion of EATR for acquired R&D intangibles, percentiles of the EATR

Panel A: OECD countries



Panel B: EU countries



Note: The area in this chart represents the difference between the 25th and the 75th percentile of the EATRs presented in Figure 8 and 9 Panel B. The median represents the centre the distribution. The chart refers to all 38 OECD countries (Panel A) and EU countries (Panel B), including those that do not have IBTIs over time. OECD and EU membership are held constant over time for comparability. Where IBTIs are offered at the central and subnational level in the same year, the central level IBTI is used in the chart. If several IBTIs are available in the same year, the most generous one is used in the average (Table A.1). In Canada, IBTIs are only available at the subnational level in the provinces of Québec and Saskatchewan. The regime in the province of Québec is modelled in this graph as Québec represents a larger share of Canada's gross domestic product (about twenty percent) relative to Saskatchewan (approximately four percent). As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries. The chart includes both IP regimes and dual-category regimes.
Source: OECD.

5.3. Drivers of implicit tax subsidies for internally generated R&D intangibles

Implicit tax subsidies measure the difference between the tax treatment of an investment with IBTIs and the tax treatment under standard taxation, providing insights into the generosity of IBTIs. Implicit tax subsidies measure the deviation from a country's benchmark tax system provided under IBTIs. In this case, the deviation is measured as the difference between the EATR with IBTIs and with no IBTIs. As such the implicit tax subsidy indicators enable a within country comparison of the extent of tax benefits provided by IBTIs. Looking into the trends of implicit tax subsidies for a particular country yields insights into whether IBTIs are providing increasingly more or less tax benefits to firms over time in that country relative to the treatment under the standard tax system. In the aggregate, the previous section has shown an increase in average implicit tax subsidies for internally generated R&D intangibles (Figure 7). This section looks further into the nature of this increase and tries to examine what has been the impact of IBTIs on the tax treatment of qualifying income given the fact that EATRs under standard taxation tend to have declined.

Changes in implicit tax subsidies can be linked to changes in the standard tax system or to changes to the availability and design of IBTIs.[43] Figure 11 decomposes the average year-on-year change in implicit tax subsidies for internally generated R&D intangibles. The blue diamond in Figure 11 represents the year-on-year absolute change in the EATR with IBTIs, the grey circle the change in the EATR with no IBTIs and the green cross the change in the extent of implicit tax subsidy. All these three series take yearly differences from those in Figure 7 Panel A. While changes to IBTIs are not completely separate from the effect of change in the general tax system, a comparison of the relative size of both changes (with and with no IBTIs) shows that on average implicit tax subsidies to qualifying R&D investments have mostly grown over time. Among OECD countries, implicit tax subsidies increased, showing in the negative domain of Figure 7, in 14 out of the 22 years covered in the analysis, with changes in implicit tax subsidies plateauing from 2019 onwards. In other words, despite the continuous decline in STRs, the expansion of IBTIs has declined the EATR at a faster pace.

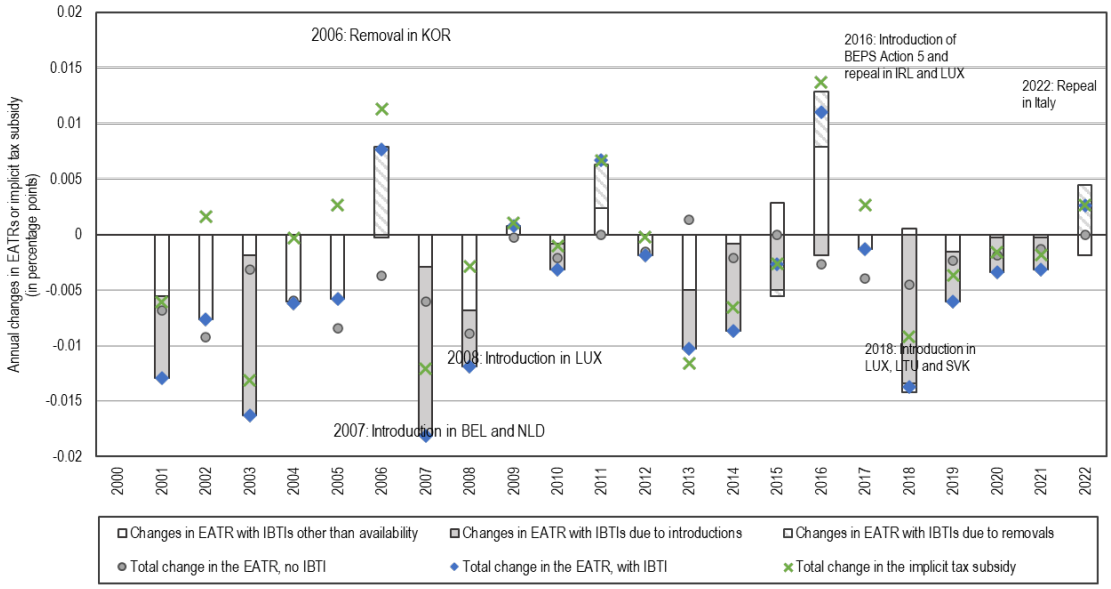
The main source of the increase in implicit tax subsidies can be attributed to the increasing use of IBTIs over time. This increase has more than compensated for the reduction in implicit tax subsidies resulting from the continuous decline in STRs. In this calibration, changes in the EATR with no IBTIs only occur through changes in the STR, which tend to have

[43]This can be written as: $\Delta Implicit\ tax\ subsidies = \Delta EATR_{with\ IBTIs} - \Delta EATR_{with\ no\ IBTIs}$. Note that the EATR with no IBTIs is equal to the EATR under standard taxation.

declined over time and decrease implicit tax subsidies (Figure 7), all else equal. Changes to the EATRs with IBTIs (shown in the blue diamonds) can be attributed to three key drivers: changes to the availability of IBTIs, changes in the design of IBTIs (i.e. the preferential tax rate or the calculation of the tax base) and changes in the STRs that affect the initial value of the deduction of R&D expenses and the preferential tax rate in the case of exemptions.[44] The figure decomposes changes to the EATRs with IBTIs linked to changes to the availability of IBTIs (introduction and removals) from other design changes. The largest changes to implicit tax subsidies in Figure 9 can be attributed to introductions of new regimes (e.g., introduction of regimes in Belgium, the Netherlands, Spain (Basque Country), and Luxembourg brought down the average of 1.2 pps in 2007); or repeals (Korea, 2006; Italy 2022). Changes to the design of IBTIs or to STRs indirectly affecting the EATR with IBTIs result in smaller changes that do not appear to significantly affect average implicit tax subsidies in the OECD area.

Figure 11. Decomposing the annual change in average implicit tax subsidies

Average EATR for internally generated R&D intangibles. OECD countries.



Note: This figure decomposes the year-on-year change in average implicit tax subsidies between average changes in the EATR with no IBTIs and with IBTIs in Figure 7 Panel A. The chart refers to all 38 OECD countries, including those that do not have IBTIs over time. Changes in the EATR with no IBTIs show changes in the general tax system. In this calibration, these changes are only changes in the STR. Changes in the EATR with IBTIs captures changes in the availability and design of IBTIs. They also capture indirectly changes in the general tax system (e.g., through the change in preferential tax rates in the case of partial CIT exemptions). The figure decomposes changes in the EATR with IBTIs between changes stemming from the availability of IBTIs (introductions and removals) and other changes which capture changes in the design of IBTIs and indirect effects of changes to the STR. A negative change in implicit tax subsidy indicates an increase in the extent of tax subsidies provided compared to the earlier year.

[44] IBTIs typically provide tax relief through either an exemption or a reduced tax rate on qualifying income. Out of the 52 regimes considered in this study, 32 take the form of a partial or total exemption and 20 take the form of a reduced tax rate on qualifying IP income. In countries providing an exemption, the applicable reduced tax rate is usually a function of the STR, i.e., the effective level of taxation applied to the relevant income is given by the interaction between the percentage of exemption and the statutory tax rate. Changes in the STR (or full applicable rate) will cause an automatic change to the reduced tax rate. In setting reduced tax rates, the reduced rate and the STR are independent.

Source: OECD.

The majority of changes in EATRs with IBTIs observed over time have contributed to reduce implicit tax subsidies. Changes in STRs reduce implied tax benefits in 80% of cases as STRs have tended to decline. Similarly, changes to the design of IBTIs, particularly after the introduction of BEPS Action 5, contribute to lower implicit tax subsidies (74% of cases). This is due to the adoption of more stringent conditions in the calculation of tax benefits, as will be discussed in the next section. Given the restrictions to the calculation of tax benefits, most increases to the generosity of IBTIs for regimes following the BEPS Action 5 have occurred through increases in the scope of regimes (Section 4.1), although some countries have done so by decreasing the preferential tax rate (e.g., Portugal, 2022).

5.4. EATRs for R&D intangibles: Country-specific results

Across all countries covered, there is substantial variation in the EATRs for internally generated R&D intangibles over time. Figure 12 Panel A shows the EATR for internally generated R&D intangibles in OECD countries at three moments in time, 2010, 2016 and 2022 for the 47 countries for which ETRs are calculated. Where multiple regimes are available, these are displayed according to Table A.1. Panel A separates countries between those that have no IBTIs between 2000 and 2022 (15 countries); those with at least one IBTI in the period covered by this study (22 countries).[45] Panel B shows the implicit tax subsidy over time as measured by the difference in EATRs with IBTIs and without IBTIs (the EATR with no IBTIs is omitted from the chart in Panel A). The absence of a bar in Panel B implies that no IBTI was offered in a given year. This provides an indication of the availability of IBTIs. Figure B.2. in Annex B shows equivalent figures for the cost of capital and B-Index exhibiting similar trends.

EATRs for internally generated R&D intangibles tend to have declined in most countries over time but are significantly lower among countries offering IBTIs compared to those that do not offer such incentives. Compared to 2010, EATRs in 2022 are lower in 21 out of 37 OECD countries for which estimates are provided and remained constant in 11 OECD countries.[46] In countries without IBTIs over the 2000-22 period, EATRs declined between 2010 and 2022 in 6 out of 15 OECD countries and remained constant in another 6 countries. However, IBTIs allow countries to offer significantly lower EATRs than countries without IBTIs. In 2022, the median EATR in countries with IBTIs was 6% while the median EATR among OECD countries without IBTIs was 19%. Substantial heterogeneity is observed in the design of IBTIs across countries that lead to differences in EATRs. In 2022, among countries offering IBTIs, the EATR ranges from 31% in Colombia to -1.4% in Israel.[47]

Despite the downward trend in EATRs, some design changes to achieve compliance with the BEPS Action 5 minimum standard led to an increase in EATRs. Between 2010 and 2016, EATRs increase for instance in Hungary, Belgium, Ireland, Luxembourg (repeal of the incentive) linked to changes in the design of IBTIs at the time of the implementation of the BEPS

[45] For years for which a particular regime is not available, standard taxation is modelled. There is no assumption that the firm would use an alternative tax incentive if the modelled incentive is not available. The modelling excludes the regime in the United States, see footnote 37.

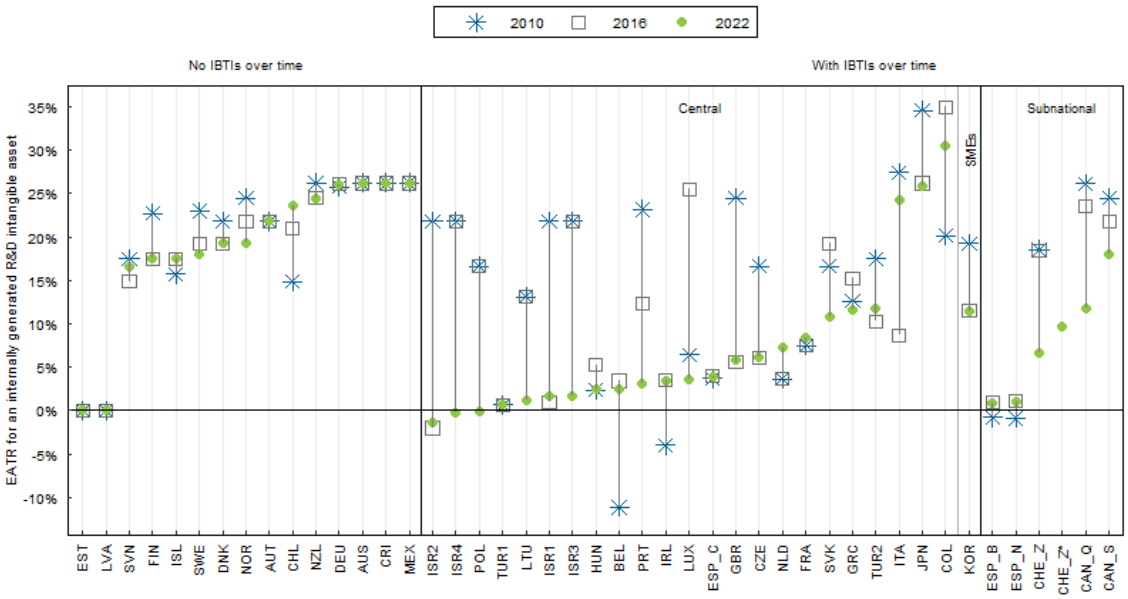
[46] EATR counts refer to countries with at least one regime offering a decreasing EATR.

[47] González Cabral et al. (forthcoming[34]) estimate the relative impact of the different design features on the EATR of internally generated IP in 2021. The lower the EATR, the greater the incentive to locate IP and meet the necessary development conditions in a given jurisdiction. A negative EATR implies a net subsidy is granted to a profitable investment.

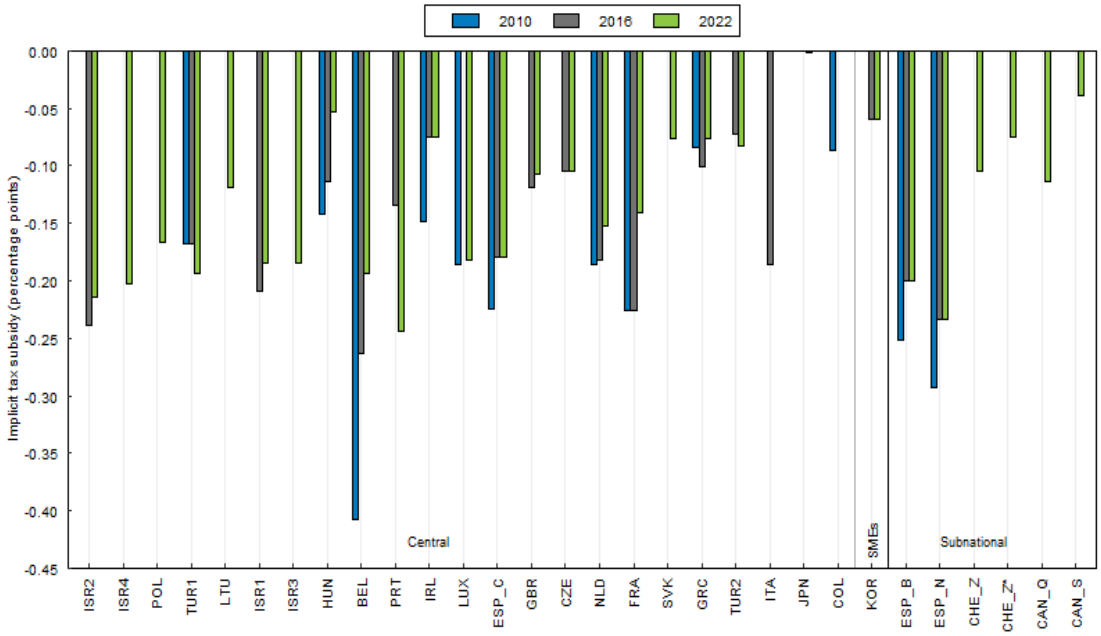
Action 5 minimum standard. Some of these regimes ceased to offer negative EATRs, which implied a net subsidy on profitable R&D investments.

Figure 12. EATRs and implicit tax subsidies for internally generated intangibles, OECD countries, selected years

Panel A: All OECD countries, with IBTIs indicates the presence of IBTIs at some point in the period covered



Panel B: Countries with IBTIs, implicit tax subsidies, for selected years



Note: Panel A: The chart includes all OECD countries and separates countries based on whether they have had IBTIs at some point during the three years selected. In the EATR modelling, the intangible asset is the result of R&D and a gestation lag of two periods is assumed for the investment to become productive capital and start generating profits. To model IBTIs, the investment is assumed to be a formal asset eligible for protection, e.g., a patent. The intangible asset is assumed to decay at an economic depreciation rate of 15% in line with the average decay found in the literature. The chart includes both IP regimes and dual-category regimes.
The investment is assumed to be financed by retained earnings but provisions such as allowances for corporate equity that are available in a number of countries are not accounted for. Estonia and Latvia have distribution-based tax systems that tax profits upon distribution, retained earnings are untaxed. Panel B: The chart captures differences between the EATR for R&D intangibles under IBTIs in a given year and the baseline EATR in the respective year (in the absence of IBTIs). Certain countries offer multiple regimes over time. These are represented independently in this figure as reported in Table A.1. For years for which a particular regime is not available, standard taxation is modelled. As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries. IP income in Switzerland can benefit from a 90% exemption of qualifying IP income from cantonal taxation. However, this exemption is subject to a cap: only 70% of a firm's total profits (IP or non-IP) can be exempt. The canton of Zurich is chosen as the representative canton. The 8.11% in 2022 applies to qualifying IP income and assumes that the firm has sufficient other income (non-qualifying IP or non-IP income) that is taxed at higher rates so that it is not subject to the 70% maximum relief limitation (CHE_Z). If the firm had enough qualifying IP income that the 70% maximum relief limitation did apply, the rate applied to IP income in the city of Zurich would increase steadily from 8.11% to 11.38% in 2022 (100% IP Income) (CHE_Z*).

For countries that have offered IBTIs over time, the implicit subsidy offered by IBTIs has seemingly declined with a marked step reduction after 2015. Comparing implicit tax subsidies in 2010 to 2016 for the ten countries with IBTIs in both years, implicit tax subsidies have declined in six out of these ten countries (Belgium, Colombia, Hungary, Ireland, the Netherlands and Spain)[48] The main factors that explain this result are the drop in the STR and the introduction of the BEPS Action 5 minimum standard. Implicit tax subsidies stabilise after 2016 in most cases.

Observing the time series of EATRs over time for a given country helps illustrate changes to the level of tax benefits granted through IBTIs over time. Table A.4 and A.5 report changes from the initial design of IBTIs at introduction (which are summarised in Table A.2 and A.3). Figure 13 displays the EATR for an internally generated intangible including IBTIs for a selected set of countries over time (Panel A) and the change in implicit tax subsidies (Panel B). Matching figures for the cost of capital are presented in Figure B.3 in Annex B. Several features which drive changes in the time series are of note.

- **New introductions or repeals:** EATRs fall with new introductions of regimes (Belgium in 2007) and increase with repeals (Luxembourg 2017 and Ireland in 2010). The change in EATRs is progressive when policies are phased-in (United Kingdom, phased in the IBTI from 2013 to 2017).
- **Changes to the design of IBTIs:**
  - **Changes to the preferential tax rate:** In the Netherlands, the increase in the EATR between 2017-2021 can be explained by the increases in the rate of the IBTI from 5% to 9% over the period.
  - **Changes to the treatment of past expenses:** The introduction of recapturing or capitalisation provisions increases EATRs all else equal. The Netherlands introduced IBTIs in 2007 which explains the decline in EATRs from that year

[48] The same pattern is observed between 2016 and 2022. Out of the 14 countries that offered in both years, 50% of them see lower implicit tax subsidies in 2022 compared to 2016.

onwards. In 2009 a requirement to capitalise past costs under the regime was changed to a requirement to recapture past expenses to benefit from preferential tax relief. Recapturing offers a more generous tax treatment as firms do not need to forgo the immediate expensing of R&D costs, which explains the further decline in the EATR for the Netherlands after 2009.

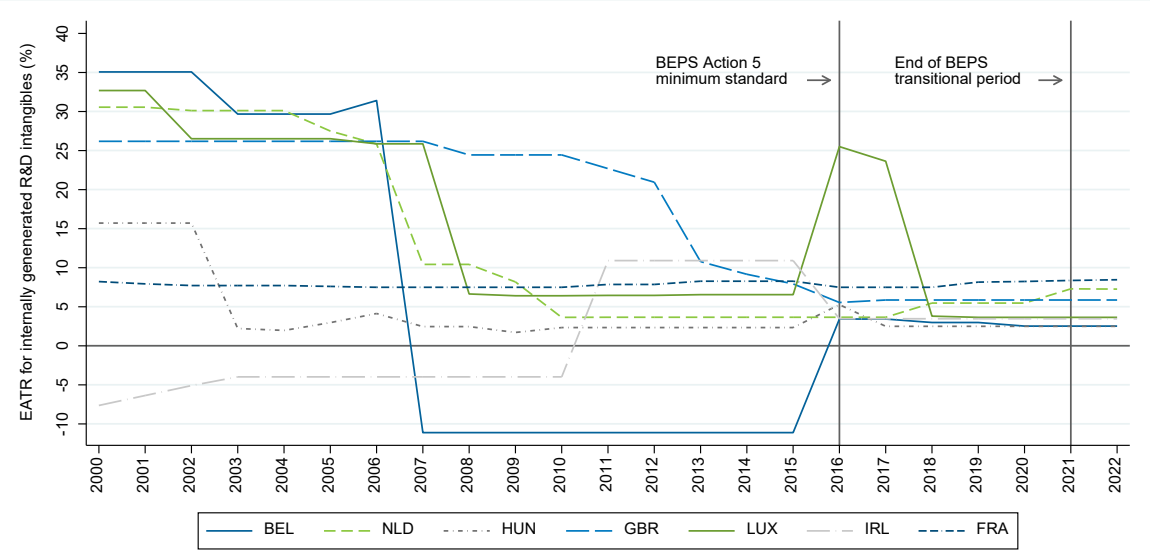
- **Changes to the treatment of ongoing expenses:** The change from a 'gross approach' to a 'net approach' increases the EATR for R&D intangibles for the regimes in Hungary in 2016 after the 2016 reform and Belgium for the IP regime that replaced the old regime in 2017.
- **Changes to the STR:**
  - Declining STRs will lead to lower preferential tax treatment in most cases as the baseline EATR drops and the EATR with IBTIs decreases by a lower amount or remains constant. This is the case in the United Kingdom where the STR slowly dropped over time from 23% in 2013 to 19% in 2017, while the rate under the IBTI remained at 10%. This led to a decrease in the EATR in the baseline and an increase in the EATR with IBTIs due to a lower value of R&D deductions. Together, these two factors led to a decrease in preferential tax treatment of 5 pp in between 2013 and 2017 (Panel B).
  - Changes to the STR affect the preferential tax rate where this is granted in the form of an exemption. The EATR in Hungary decreased in 2017 as the STR dropped from 19% to 9% that year, which made the preferential tax rate fall from 9.5% to 4.5%, as the regime takes the form of an exemption.

The effect of multiple design changes in the calculation of tax benefits can be disentangled to show how they determine the net change in EATR. For example, Belgium, and France implemented several changes affecting the calculation of EATR at the same time. In France the new IP box introduced in 2019 introduced the recapturing of past expenses and a reduction of the preferential rate from 15% to 10%. In both countries, EATRs increased as a result of such changes (Figure 12).[49] EATR indicators can provide a succinct way of summarising whether the changes observed led to an increase or decrease of tax benefits over time. Box 2 discusses the changes in Belgium as one case in point.

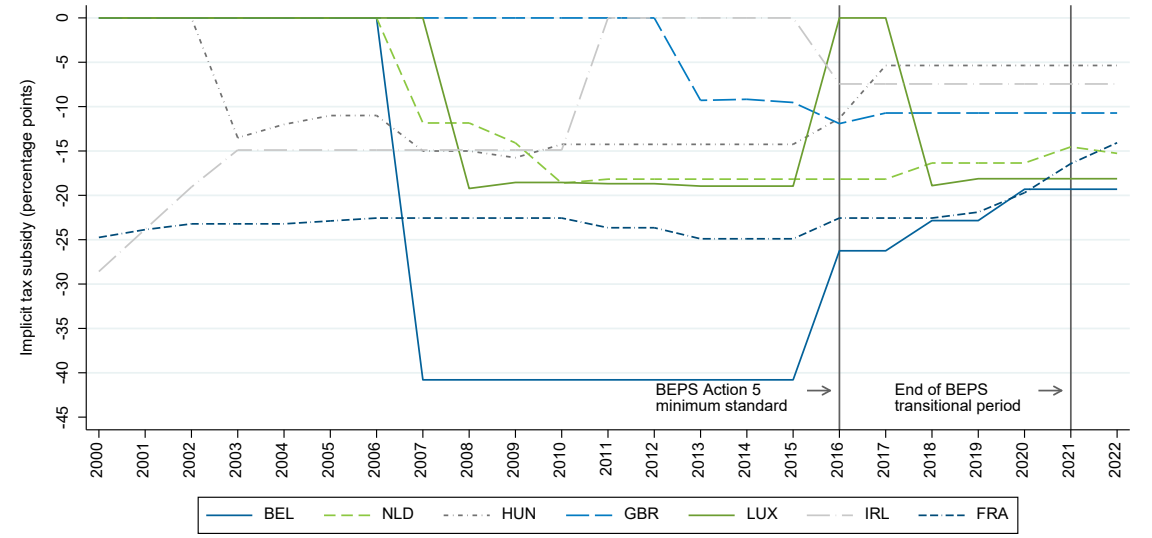
[49] This is also the case for Spain. In 2013, Spain revised its federal regime to require the application of the net approach, but at the same time the exemption rate was increased from 50% to 60%. Both changes led to an increase in the EATR.

Figure 13. Evolution of EATRs and implicit tax subsidies for internally developed R&D intangibles, selected countries

Panel A: EATRs for internally developed R&D intangibles



Panel B: Implicit tax subsidy (percentage points)



Note: In achieving compliance with the BEPS Action 5 minimum standard, certain regimes introduced a transitional period that allowed existing taxpayers to still benefit from the old regime until 30th June 2021. The regimes were closed-off to new entrants (both new taxpayers and new IP and activities) since their date of compliance with the standard. From the close-off date, the EATR shows the design of the new regimes, since during the transitional period, no new IP could benefit from relief. Table A.1 lists the close-off date and the regimes with transitional periods in place.
Source: OECD.

Other changes in the design of IBTIs, not captured by this indicator, may impact implicit tax subsidies. Ceilings that cap the amount of tax benefits would lower implicit tax subsidies

for firms for which they are binding. These ceilings can be set as a function of total tax benefits, R&D expenses, or taxable income. For example, Ireland capped tax support at €5 million per taxpayer until the IP regime was repealed in 2010. The central regime in Spain limited tax relief to six times R&D costs. The cap was subsequently repealed in 2013. Ceilings based on taxable income are available in eight other regimes over the period studied. Similarly, certain regimes allowed the deduction of IP losses at the STR rather than the preferential tax rate (Belgium for its pre-BEPS regime between 2007-15, Hungary or Spain) rather than requiring IP losses to be offset at the same rate at which IP profits would be taxed. Where this was the case, those regimes offered a comparatively more generous tax treatment compared to other regimes, which is not captured in this model which assumes a profitable investment. Following BEPS Action 5 requirements, compliant regimes should ensure that both profits and losses would be taxed at the same rate. Several methods can be applied to achieve this outcome (see González Cabral et al. (2023[3]) for a discussion and Section 3.5).

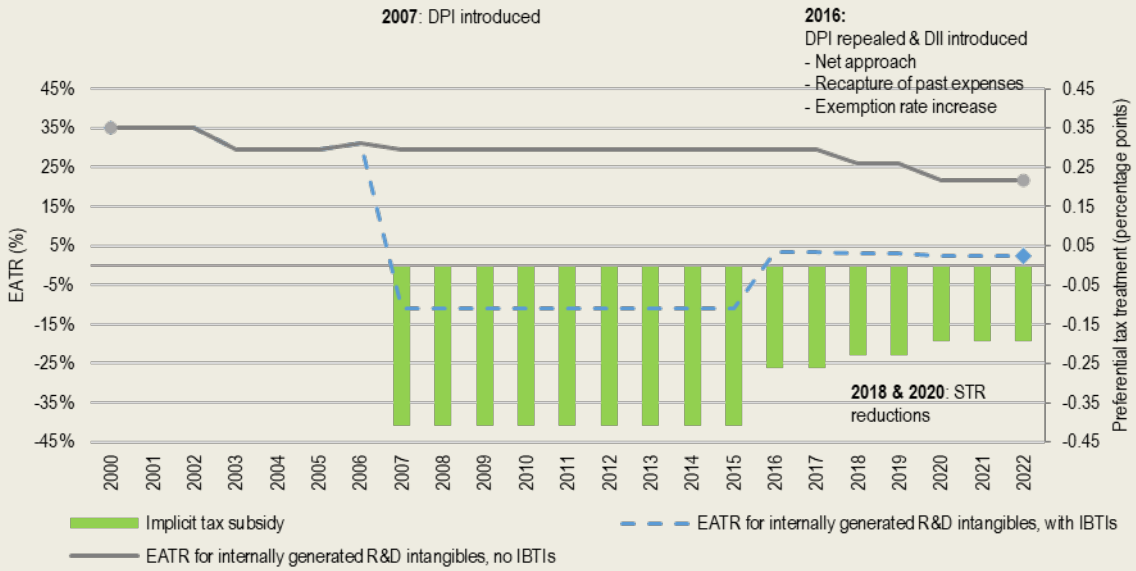
Box 2 The evolution of preferential tax treatment in Belgium

Figure 13 (Panel A) shows the EATR time series for internally generated IP assets in Belgium. Belgium introduced the Deduction for Patent Income (DPI) in 2007. In 2016, this incentive was repealed and replaced by the Deduction for Innovation Income (DII). The new IP regime required ongoing expenses to be deducted from associated income (a 'net approach'), introduced the nexus ratio and requirements to recapture past expenses. At the same time, the exemption rate was increased from 80% to 85%. The EATR on internally generated IP declined in 2007 with the introduction of the Deduction for Patent Income, stayed constant up until 2016 where the new Deduction for Innovation Income was introduced and declined in recent years due to the decline in STRs. The EATR for internally generated IP increased from -11% to 3.4% with the introduction of the new regime, an increase of 14 pp.

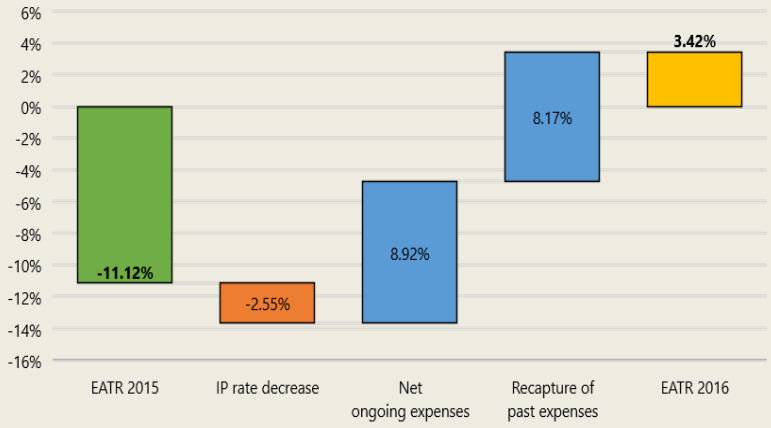
Panel B decomposes the change in the EATR between 2015 and 2016 into the different design changes. The increase in the exemption rate decreased the preferential tax rate from 6.8% to 5.1% and pushed the EATR downwards. Under the old regime, the gross approach to calculate qualifying profits allowed R&D expenses to be deducted at 34% while income was taxed at 6.8%. The change to the net approach and the requirement to recapture of past expenses more than compensated the effect of the increase in the exemption rate causing the EATR to increase.

Figure 14. EATR for internally generated IP: 2000-22, Belgium

Panel A: Evolution of EATRs and implicit tax subsidy



Panel B: Decomposition of design changes: Changes in EATR between 2015 and 2016



Note: The size of each component is dependent on the order with which each design feature is introduced. This is due to the fact that the treatments of ongoing and past expenses interact with changes in the regime rate. However, the relative size of each component is not affected by the order of changes.
Source: OECD.

6. Concluding remarks

This paper documents changes in the availability, design and implicit tax subsidies from IBTIs over the last two decades. It highlights the increasing use of IBTIs across jurisdictions and maps out changes in the design of IBTIs that affect the scope and calculation of tax benefits. To track the evolution of preferential tax treatment over time, the paper presents indicators of the EATR, cost of capital and B-Index for internally generated R&D intangibles and acquired R&D intangibles for 47 countries, 28 of which have had IBTIs over the period 2000-22. In doing so, it captures the effect of key policy changes to IBTIs following the introduction of the BEPS Action 5 minimum standard.

The paper finds that effective tax rates on R&D intangibles have declined globally due to the lower general levels of corporate income taxation and the expansion of IBTIs. First, the decline in STRs has driven down the EATRs on profitable investments. Even without accounting for IBTIs, the EATR for R&D internally generated intangibles has dropped from 26.9% to 19.4% between 2000 and 2022 in all 47 countries covered. Second, in the last two decades, IBTIs have proliferated. From five OECD countries in 2000, 21 have IBTIs in 2022. As a result, EATRs on qualifying intangible investments have fallen from 24.2% in 2000 to 12.3% in 2022 across all 47 countries covered. This decline has been even more pronounced among EU countries where the EATR has fallen from 23.2% in 2000 to 8.6% in 2022.

In spite of this reduction globally, the relative tax benefits provided by IBTIs when compared to standard tax systems have declined over time. This is due to two factors. The first is that the global decline in STRs has narrowed the extent of implicit tax subsidies granted through IBTIs. The second is that changes in the design of IBTIs to comply with the BEPS Action 5 minimum standard have decreased the generosity of IBTIs on average. For OECD countries providing IBTIs in both 2010 and 2022, the average EATR when IBTIs are not considered has declined from 22.5% in 2010 to 19.7% in 2022; while the EATR with IBTIs has increased from 5.7% to 7%. The overall decline in standard taxation and the increase in EATRs from the introduction of BEPS Action 5 have contributed to narrow the extent of implicit tax subsidies granted through IBTIs. For the ten OECD countries offering IBTIs in both 2010 and 2022, the implicit tax subsidy declines in six of them, by an average of 6.3 pp, 33% lower than in 2010.

The BEPS Action 5 minimum standard has established common rules in the design of IBTIs that have limited tax benefits, particularly where IBTIs could give rise to BEPS risks. Establishing a common pattern of qualifying assets and income; a standard definition of qualifying profits and the introduction of the nexus ratio, the BEPS Action 5 minimum standard has led to an alignment in the design of IBTIs. More specifically, the minimum standard has limited situations where taxpayers could offset expenses and losses associated with the IP against ordinary income benefiting from a double tax advantage.[50] By setting up common development conditions through the nexus ratio, it has restricted the extent to which R&D intangibles that had not been developed by the taxpayer (i.e., acquired from another firm or from a related party) could benefit from IBTIs without further the development by the taxpayer. While development conditions already existed for some regimes, the degree of strictness varied. As more and more countries are implementing IBTIs, the minimum standard has limited

[50] Expenses and losses are deducted at a higher rate (statutory tax rate) at which income is taxed (preferential rate).

certain kinds of activities related to IBTIs but does not appear to have limited their implementation.

At the same time, most countries have expanded the scope of their IBTIs to capture new qualifying assets and income which may suggest an increase in overall impact of these regimes. Some expansions in scope have coincided with the time of the amendments to comply with the BEPS Action 5 minimum standard. While the expansions to new categories of assets and income have resulted in a broadening of the scope of IBTIs, it is not clear whether they have resulted in a real increase in the generosity of regimes. Some expansions in the scope of IBTIs have been with respect to assets such as orphan drugs, SPCs or PVRs which may be more concentrated in certain industries, e.g., pharmaceutical industry.

The indicators and analysis presented in this paper are intended to support future analytical work and can be extended in several ways. The indicators in this paper provide a basis to analyse the impact of IBTIs on firms' decisions to invest in qualifying R&D intangible assets. Future work could extend these indicators to consider the effect of expenditure-based tax incentives that are available in most of the countries surveyed similar to Evers et al. (2015[31]) and the implications of cross-border investments. The continuous monitoring of changes in the design and calculation of tax benefits may offer new insights into the direction of policy changes including those derived from the introduction of the Global Minimum Tax (OECD, 2022[22]).

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Annex A. Additional tables

Table A.1. List of IBTIs covered, 2000-22

ISO3	Country-level ID[1]	Regime-level ID[2]	Regime name	In force	IPR	Central	Introduction date	Nexus compliance date[3]	Close-off date[4]	End of Transitional Period[5]	Forum on Harmful Tax Practices (FHTP) decision[6]
ARG	ARG	ARG1	Software Promotional Regime			x	07/09/04		31/12/19		Not harmful
ARG	ARG	ARG2	Regime to promote the knowledge-based economy	x		x	01/01/20		31/12/29		
BEL	BEL	BEL1	Deduction for patent income		x	x	18/05/07		30/06/16	30/06/21	
BEL	BEL	BEL2	Deduction for innovation income	x	x	x	01/07/16				Not harmful (amended)
CAN	CAN_Q	CAN1	Déduction pour sociétés manufacturières innovantes (DSI) (Quebec)		x		01/01/17		31/12/20		
CAN	CAN_Q	CAN2	Déduction incitative pour la commercialisation des innovations (DICI) (Quebec)	x	x		01/01/21				
CAN	CAN_S	CAN3	Saskatchewan Commercial Innovation Incentive (SCII)	x	x		01/01/17		30/06/24		
CHE	CHE_N	CHE1	License box (Canton of Nidwalden)		x		01/01/11	01/01/16	31/12/19	31/12/19	Not harmful (amended)
CHE	CHE_Z	CHE2	IP box	x	x		01/01/20	01/01/20			Not harmful
CHN	CHN1	CHN1	Reduced rate for high & new tech enterprises (HNTE)	x		x	01/01/08				Not harmful
CHN	CHN2	CHN2	Tech-based SMEs (TSMEs)	x		x	10/05/17				
COL	COL	COL1	Tax exemption on new software with high scientific content		x	x	01/01/03		31/12/17		Abolished
CYP	CYP	CYP1	IP Box regime (first regime)		x	x	01/01/12		30/06/16	30/06/21	

ISO3	Country-level ID[1]	Regime-level ID[2]	Regime name	In force	IPR	Central	Introduction date	Nexus compliance date[3]	Close-off date[4]	End of Transitional Period[5]	Forum on Harmful Tax Practices (FHTP) decision[6]
CYP	CYP	CYP2	IP Box regime (second regime)	x	x	x	01/07/16		30/06/16		
CZE	CZE	CZE1	Investment incentives for R&D centres	x		x	07/12/12				
ESP	ESP_C	ESP1	Partial exemption for income from certain intangible assets (Federal regime)	x	x	x	05/03/04	01/07/16	30/06/16	30/06/21	Not harmful (amended)
ESP	ESP_B	ESP2	Partial exemption for income from certain intangible assets (Basque country)	x	x		01/01/08		30/06/16	30/06/21	Not harmful (amended)
ESP	ESP_N	ESP3	Partial exemption for income from certain intangible assets (Navarra)	x	x		01/01/97		30/06/16	30/06/21	Not harmful (amended)
FRA	FRA	FRA1	Reduced rate for long term capital gains and profits from the licensing of IP rights		x	x	01/07/65		30/12/18		
FRA	FRA	FRA2	Reduced corporation tax rate on IP income	x	x	x	01/01/19				Not harmful (amended)
GBR	GBR	GBR1	Patent Box	x	x	x	01/04/13	01/07/16	30/06/16	30/06/21	Not harmful (amended)
GRC	GRC	GRC1	Tax patent incentives (first regime)		x	x	01/01/10	01/01/22			
HUN	HUN	HUN1	IP regime for royalties and capital gains	x	x	x	01/01/03	16/07/16	16/07/16	30/06/21	Not harmful (amended)
IRL	IRL	IRL1	Knowledge development box (first regime)		x	x	06/04/73		24/11/10		
IRL	IRL	IRL2	Knowledge development box (second regime)	x	x	x	01/01/16				Not harmful
ISR	ISR1	ISR1	Approved enterprise regime			x	01/01/58		31/03/05		
ISR	ISR2	ISR2	Priority enterprise regime			x	01/04/05		01/01/11		Not harmful (amended)
ISR	ISR3	ISR3	Preferred enterprise regime	x		x	01/01/11	01/01/17	30/06/16	30/06/21	Not harmful (amended)
ISR	ISR4	ISR4	Special Preferred enterprise regime	x		x	01/01/11		30/06/16	30/06/21	Not harmful (amended)
ISR	ISR5	ISR5	Preferred technology enterprise regime	x	x	x	01/01/17	01/01/17			Not harmful

ISO3	Country-level ID[1]	Regime-level ID[2]	Regime name	In force	IPR	Central	Introduction date	Nexus compliance date[3]	Close-off date[4]	End of Transitional Period[5]	Forum on Harmful Tax Practices (FHTP) decision[6]
ISR	ISR6	ISR6	Special preferred technology enterprise regime	x	x	x	01/01/17	01/01/17			Not harmful
ITA	ITA	ITA1	Taxation of income from intangible assets		x	x	01/01/15	24/04/17	21/10/21	30/06/21	Abolished
JPN	JPN	JPN1	Tax deduction for MNEs conducting R&D			x	01/11/12		31/03/15		
JPN	JPN	JPN2	Tax incentive for specified business in the National Strategic Zones	x		x	01/09/16				
KOR	KOR	KOR1	Tax reduction for transfer or leases of technology (first regime)		x	x	01/01/83		31/12/05		
KOR	KOR	KOR2	Tax reduction for transfer or leases of technology (second regime)	x	x	x	01/01/14		31/12/17		Not harmful (amended)
LTU	LTU	LTU1	IP regime	x	x	x	01/01/18				Not harmful
LUX	LUX	LUX1	Partial exemption for income/gains derived from certain IP rights		x	x	01/01/08		30/06/16	30/06/21	Abolished
LUX	LUX	LUX2	IP regime	x	x	x	01/01/18				Not harmful
MLT	MLT	MLT1	Exemption on royalties derived form patent rules		x	x	01/01/10		31/12/15	30/06/21	Abolished
MLT	MLT	MLT2	Patent Box regime	x	x	x	01/01/19				Not harmful
NLD	NLD	NLD1	Innovation box	x	x	x	01/01/07		30/06/16	30/06/21	
POL	POL	POL1	IP box	x	x	x	01/01/19				Not harmful
PRT	PRT	PRT1	Partial exemption for income from certain intangible property	x	x	x	01/01/14	01/07/16	30/06/16	30/06/21	Not harmful (amended)
ROU	ROU	ROU1	Exemption for taxpayers engaged in R&D and innovation	x		x	01/01/17				
SVK	SVK	SVK1	Patent Box	x	x	x	01/01/18				Not harmful
THA	THA1	THA1	International business centre	x		x	02/05/19				Not harmful
THA	THA2	THA2	Activity-based tax incentive	x		x	01/12/02				
THA	THA3	THA3	Merit-based tax incentive	x		x	01/01/15				
TUR	TUR1	TUR1	Technology development zones	x	x	x	06/07/01	19/10/17	19/10/17	30/06/21	Not harmful (amended)

ISO3	Country-level ID[1]	Regime-level ID[2]	Regime name	In force	IPR	Central	Introduction date	Nexus compliance date[3]	Close-off date[4]	End of Transitional Period[5]	Forum on Harmful Tax Practices (FHTP) decision[6]
			regime								
TUR	TUR2	TUR2	5/B regime	x	x	x	01/01/15	01/01/15			Not harmful
USA	USA	USA1	Foreign derived intangible income (FDII)	x		x	01/01/18				In the process of being eliminated/amended

Note: This table contains key dates and unique identifiers for the regimes covered as well as key characteristics: whether the regime is an intellectual property regime ('x' indicates yes) or a dual category regime (blank), whether the regime is in force ('x' indicates yes) and whether it is offered at the central level ('x' indicates yes) as opposed to the subnational level.
1) Country-level identifiers are used to group different IBTIs offered by a given country over time. Country-level identifiers enable the analysis of changes in IBTIs in each country as a continuum independent of the nature of legislative changes that have taken place. Changes in design or availability resulting from regimes that have been amended, repealed and substituted by a new regime or temporary repealed would be treated in the same manner for analytical purposes. Where countries offer multiple tax incentives, these are assigned different country-level identifiers.
2) Regime-level identifiers identify alternative IBTIs offered over time. **ARG2:** The regime was suspended as of 15th January 2020 by Resolution 30/2020. On October 26, 2020, Argentina enacted Law 27,570, which amends the promotional regime for the knowledge-based economy by imposing new requirements. Companies benefiting from the previous Software Promotional Regime can benefit from relief under the new promotional regime for the knowledge-based economy since 01/01/2020. **ITA1:** The regime in Italy has been repealed as of tax year 2021 and from the same tax year, relief will be provided instead through an expenditure-based tax incentive in the form of an R&D tax allowance. In 2021 (and up to tax year 2024 at the latest) the repealed regime continues to apply transitorily to taxpayers who already applied for it in the previous years and did not opt for the new expenditure-based tax allowance.
3) Where applicable, this contains the date in which the regime was deemed compliant with the BEPS Action 5 minimum standard. Note that not all regimes covered in this paper may fall within the scope of the Forum on Harmful Tax Practices (FHTP).
4) Close-off date refers to the date from which new taxpayers are not allowed into the regime.
5) This column indicates the end date after which the BEPS Action 5 transitional measures cease to apply.
6) Where applicable, this column contains the decision of the FHTP where regimes are in scope of the FHTP work and have been subject to review. Decisions refer to January 2023 (OECD, 2023[32]).
Source: KNOWINTAX Surveys 2020-22.

Table A.2. Table of initial design features: Calculation of tax benefits at time of introduction (1/2)

Country-level ID	Year	Income	Lowest preferential tax rate[1]	Full rate	Ongoing expenses[2]	Past expenses	IP losses	Development conditions apply[3]
ARG	2005		14%	35%	Net	None	None	
BEL	2007		6.80%	33.99%	Gross	None	None	Y
CAN_Q	2017		19%	26.80%	Net	None	Separate loss method	Y
CAN_S	2017		21%	25%	Net	None	NA	
CHE_N	2011		8.80%	12.66%	Net	None	Recapture Method	
CHE_Z	2020		8.15% (11.83%)	21.15%	Net	Recapture	Recapture Method	Y
CHN1	2008		15%	25%	Net	None	None	
CHN2	2017		15%	25%	Net	None	None	
COL	2003		0% (10 years)	36.75%	Gross	None	None	Y
CYP	2012		2%	10%	Net	Capitalisation	NA	
CZE	2013		0% (10 years)	19%	Net	None	Separate loss method	
ESP_B	2008		11.20%	28%	Gross	None	None	
ESP_C	2004		17.50%	35%	Gross	None	None	Y
ESP_N	1997		14%	35%	Gross	None	None	Y
FRA	1965		16.99%	37.77%	Net	None	Separate loss method	Y
GBR	2013		10%	23%	Net	None	Separate loss method	Y
GRC	2010		0% (3 years)	24%	Net	None	None	Y
HUN	2003		9%	18%	Gross	None	None	
IRL	1973		0%	24%	Net	None	None	Y
ISR1	2011		10%	24%		None	None	
ISR2	2011		5%	24%		None	None	
ISR3	2017	Capital gains	12%	24%	Net	None	Separate loss method	Y
ISR3	2017	Royalties and other income	7.50%	24%	Net	None	Separate loss method	Y
ISR4	2017	Capital gains	12%	24%	Net	None	Separate loss method	Y
ISR4	2017	Royalties and other income	6%	24%	Net	None	Separate loss method	Y
ITA	2015	Capital gains	0%	31.29%	Net	None	Recapture method	Y
ITA	2015	Royalties and other income	15.65%	31.29%	Net	None	Recapture method	Y
JPN	2013		29.60%	37%	Net	None	None	
KOR	1983		0%	28%	Net	None	None	Y

Country-level ID	Year	Income	Lowest preferential tax rate[1]	Full rate	Ongoing expenses[2]	Past expenses	IP losses	Development conditions apply[3]
LTU	2018		5%	15%	Net	None	Separate loss method	Y
LUX	2008		5.93%	29.63%	Net	Capitalisation	Recapture method	
MLT	2010		0%	35%	Net	None	None	
NLD	2007		10%	25.50%	Net	Capitalisation	Recapture method	Y
POL	2019		5%	19%	Net	None	Separate loss method	Y
PRT	2014		15.75%	31.50%	Gross	None	None	Y
ROU	2017		0%	16%	Net	None	None	
SVK	2018		10.50%	21%	Net	Capitalisation	Reduced value method	Y
THA1	2019		3%	20%	Net	None	Separate loss method	Y
THA2	2003		0% (8 years)	30%	Net	None	None	
THA3	2015		0% (up to 13 years)	20%	Net	None	None	
TUR1	2001		0%	33%	Net	Capitalisation	Full exemption	
TUR2	2015		10%	20%	Net	Capitalisation	Separate loss method	Y
USA	2018		18.45%	25.84%	Net	None	No deduction	

Note: 1) Preferential tax rate. If an exemption for IP income applies, the product between the exemption rate and statutory tax rate is reported. The full tax rate reflects the combined statutory tax rate as reported in the OECD Tax Database (OECD, 2023[33]), which incorporates the central and subnational statutory CIT rates and includes certain CIT surcharges. The preferential tax rate is adjusted to match the full rate.

GBR: The policy was phased in from 2013 to 2017; 60% of the benefit available from 1 April 2013 and increasing by 10% annually until 1 April 2017 when 100% of the benefit has been available to claimant companies. **CHE_Z:** IP income in Switzerland can benefit from a 90% exemption of qualifying IP income from cantonal taxation. However, this exemption is subject to a cap: only 70% of a firm's total profits (IP or non-IP) can be exempt. The canton of Zurich is chosen as the representative canton. The 8.15% rate in 2020 (8.11% in 2021 and 2022) applies to qualifying IP income and assumes that the firm has sufficient other income (non-qualifying IP or non-IP income) that is taxed at higher rates so that it is not subject to the 70% maximum relief limitation. If the firm had enough qualifying IP income that the 70% maximum relief limitation did apply, the rate applied to IP income in the city of Zurich would increase steadily from 8.15% to 11.83% in 2020 (from 8.11% to 11.39% and 11.38% in 2021 and 2022 respectively) (100% IP Income).

2) 'Y' marks regimes with some form of IP-specific development conditions in force at the introduction.

ARG1: Software must be developed in Argentina.

BEL: Qualifying assets must be developed totally or partially by the company in research centres forming a branch of activity.

CAN-Q: To be eligible, the patent must be held by a corporation established in Québec, be derived in whole or in part from R&D conducted in Québec and be issued under the Patent Act or an equivalent Act from another jurisdiction.

CAN-S: An innovation must meet two tests to qualify for the benefit of the statute – a scientific eligibility test (exceptional innovation) and an economic eligibility test (contribution to the provincial economy). Upon meeting the R&D criteria, relief refers to the whole activity of the taxpayer and is not necessarily tied to a given IP asset.

CHE-Z: The BEPS Action 5 nexus approach applies.

CHN1: If the IP is internally developed, at least 60% of R&D expenditures need to take place in China. Acquired IP cannot simply benefit from the regime unless further R&D activities are continuously conducted by the firm to develop the IP into a new patent, and the enterprise should also meet all the other related criteria for new/high tech enterprise in order to enjoy the regime. R&D outsourcing to unrelated or related parties can represent at most 40% of total expenditures. Development conditions are not tied to a specific IP asset.

CHN2: Conducting R&D activities is one of the factors that score to obtain the TSME status. Development conditions are not tied to a specific IP asset.
ESP_C: The beneficiary must bear all the risks and costs of creating the IP asset (100% development). The development of the asset could also occur outside Spain as long as the firm in Spain bore all risks and benefits from outsourcing.
ESP_N, ESP_B: Assets that have been acquired from a third party can benefit from a lower exemption rate of 30%.
FRA: IP rights had to be recorded in the balance sheets. Any acquired IPs had to be held for at least two years. IP assets had to be part of the fixed assets.
GBR: A "qualifying development" condition and an "active ownership condition" apply. To meet the qualifying development condition the IP must have been developed by the taxpayer itself or if developed by another member of the group, the firm has to actively manage the IP, i.e. be involved in significant activities such as planning and decision making about the development and exploitation of the IP.
GRC: Patents must be developed by the beneficiary. The exemption shall be also granted when the products are manufactured in third parties' facilities.
IRL: The company or individual who held the qualifying patent must have undertaken the R&D work leading to the patented invention.
ISR3-4: The BEPS Action 5 nexus approach applies.
ITA: R&D activities must be conducted in order to develop or enhance IP assets' value.
LTU: The BEPS Action 5 nexus approach applies.
MLT: The income could not be exempted unless the individual carried out, either solely or together with another person or persons, research, planning, processing, experimenting, testing, devising, designing, developing or other similar activity leading to the invention which is the subject of the qualifying patent.
NLD: The patent or IP must be developed through R&D which is paid for and is conducted at the risk of the Dutch taxpayer. For patents, the R&D activities can be carried out either in the Netherlands or abroad. However, for IP which has an R&D declaration from the Dutch government, generally at least 50% of the R&D must be performed in the Netherlands and the Dutch entity must play a key coordinating role in the development. Acquired IP may qualify in some cases, but only if it is further developed for the risk and account of the Dutch taxpayer.
POL: The BEPS Action 5 nexus approach applies.
PRT: The sold (or assigned) IP rights should be linked to assets emerging from R&D activities carried out, or contracted, by the taxpayer. Contracted activities do develop IP could involve related parties. The buyer (or the temporary user) of IP rights should use them in industrial, agricultural, or commercial operations. Additionally, the buyer (or temporary user) should not be a located in a tax heaven.
SVK: The nexus approach applies.
THA1: R&D activities must be conducted in Thailand.
Source: OECD based on 2022 KNOWINTAX survey.

Table A.3. Table of initial design features: Scope at the time of introduction (2/2)

	Qualifying asset														Qualifying income						
Country-level ID	Patent	Supplementary Protection Certificates	Utility models/ Short-term patents	Plant variety rights	Orphan drugs	Industrial designs and models	Industrial processes	Secret formulae, processes or trade secrets	Information concerning know-how	Products benefitting from data or market exclusivity	Copyrighted software	Other patentable inventions (small taxpayers)	Trademarks	IP assets not defined or unrestricted	Income from royalties and license fees	Income from the sale and transfer of IP	Income from in-kind contributions of IP	Embedded IP income	Income from IP protection	Income from marketing intangibles	IP income not defined
ARG											x				(x)	(x)	(x)	(x)	(x)	(x)	x
BEL	x	x													x			x			
CAN_Q	x																	x			
CAN_S	x			x				x			x										
CHE_N	x					x		x	x		x		x		x	x	x		x	x	
CHE_Z	x	x		x	x					x					x	x		x	x		
CHN1	x	(x)	x	x	(x)	x	(x)	(x)	(x)	(x)	x	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
CHN2	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
COL										x	x										
CYP	x					x		x	x		x		x		x	x			x	x	
CZE	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
ESP_C	x					x		x	x						x						
ESP_B	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	x						
ESP_N	x		x			x			x		x				x	x					
FRA	x			x			x								x						
GBR	x	x		x	x										x	x	x	x	x		
GRC	x																	x			
HUN	x							x	x				x		x					x	
IRL	x						x		x		x				x	x					
ISR1	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
ISR2	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
ISR3	x		x	x	x						x	x			x	x		x	x		
ISR4	x		x	x	x						x	x			x	x		x	x		
ITA	x	x	x	x	x	x	x	x			x		x		x	x	x	x	x	x	
JPN	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
KOR	x		x					x							x	x					
LTU	x	x									x				x	x			x		
LUX	x	x	x			x					x		x		x	x	x	x		x	

	Qualifying asset														Qualifying income						
Country-level ID	Patent	Supplementary Protection Certificates	Utility models/ Short-term patents	Plant variety rights	Orphan drugs	Industrial designs and models	Industrial processes	Secret formulae, processes or trade secrets	Information concerning know-how	Products benefitting from data or market exclusivity	Copyrighted software	Other patentable inventions (small taxpayers)	Trademarks	IP assets not defined or unrestricted	Income from royalties and license fees	Income from the sale and transfer of IP	Income from in-kind contributions of IP	Embedded IP income	Income from IP protection	Income from marketing intangibles	IP income not defined
MLT	x														x						
NLD	x			x											x	x	x	x	x		
POL	x	x	x	x		x				x	x				x	x		x	x		
PRT	x					x									x	x	x		x		
ROU	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
SVK	x	x	x								x				x			x			
THA 1	x										x										
THA 2																					
THA 3																					
TUR 1	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)		(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
TUR 2	x		x												x	x		x	x		
USA	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x

Note: For regimes existing pre-BEPS Action 5, it is possible that eligible IP income did not completely exclude income from other sources, e.g. trademarks. For regimes compliant with BEPS Action 5, isolating IP income is a requirement (OECD, 2015[18]; González Cabral et al., 2023[3]). For Hungary, the IP regime prior to 2016 provided tax benefits for the license to use trademarks, trade names and trade secrets.
Source: OECD based on 2022 KNOWINTAX survey.

Table A.4. Summary of design changes of IBTIs over time: Calculation of tax benefits

	Design feature	Direction of change	Before BEPS Action 5 implementation	After BEPS Action 5 implementation
Calculation of tax benefits	**Tax rate**	Increase[1] (increase in reduced tax rates or decrease in exemption rates)	2010: NLD 2013: ESP_C, ISR3	2016: IRL, ISR2 2018: NLD 2019: MLT 2020: ARG 2021: NLD
		Decrease (decrease in the reduced tax rate or increase in exemption rates)		2016: BEL, ESP_B, ESP_N, ISR1 2018: FRA 2019: FRA 2021: CAN_Q 2022: PRT
	Tax base			
	Treatment of ongoing expenses	Increase (from net to gross income approach)		
		Decrease (from gross to net income approach)	2013: ESP_C	2016: BEL, ESP_B, ESP_N, HUN, PRT
	Treatment of past expenses	Increase (from recapture/capitalisation to no recapture)		
		Decrease (from no recapture to recapture/capitalisation)		2016: BEL, PRT 2019: FRA
	Treatment of losses	Increase (from offsetting IP only to all income)		
		Decrease (from offsetting all income to IP income only)		2016: BEL 2022: GRC
	Limitations to tax benefits	Increase	2007: IRL; 2013-17: GBR	
		Decrease	2010: NLD 2013: ESP_C	

Note: This table contains changes within the regime and across regimes over time, e.g., in the case that a regime was repealed and a new regime introduced. 1) The direction of the change in preferential tax rates captures only the movement of preferential tax rates, without accounting for the variation in the standard tax rate. Section 4.3 discusses that changes in exemption rates may be made to keep the same level of implicit tax subsidy following a change in the standard tax rate.
Source: OECD based on 2022 KNOWINTAX survey.

Table A.5. Summary of design changes of IBTIs over time: Scope

	Design feature	Direction of change	Before BEPS Action 5 implementation	After BEPS Action 5 implementation
Scope	**Qualifying Taxpayer**	**Increase** (less stringent requirements)		
		Decrease (more stringent requirements)	2011: ARG	
	Development conditions	Increase (more stringent conditions apply)		2016: BEL, CHE_N, CYP, ESP_B, ESP_C, ESP_N, GBR, HUN, IRL, ISR1, ISR2, NLD, PRT 2017: ITA 2018: KOR, LUX, TUR1 2019: FRA, MLT 2021: CAN_Q 2022: GRC
		Decrease (less stringent conditions apply)	2008: NLD 2013: BEL, ESP_C	
	Qualifying assets	Increase (number of eligible assets)	2010: NLD 2012: MLT 2013: MLT	2016: BEL, CYP, HUN, IRL, NLD 2018: ESP_C, ESP_N, LUX 2019: FRA, MLT 2020: PRT 2021: CAN_Q
		Decrease (number of eligible assets)		2016: CHE_N, CYP, *ESP_N*, HUN, IRL, *ISR3*, *ISR4*, NLD 2017: ITA 2018: *ESP*_B, ESP_C, ESP_N, LUX, *TUR1* 2019: MLT
	Qualifying income	Increase (number of qualifying income)	2008: FRA 2012: HUN 2013: ESP_C	2016: BEL, CYP, *ESP*_N, HUN, IRL, 2018: LUX 2019: MLT 2021: CAN_Q 2022: GRC
		Decrease (number of qualifying income)		2016: *ISR3*, *ISR4* 2016: CHE_N 2018: LUX, *TUR1*

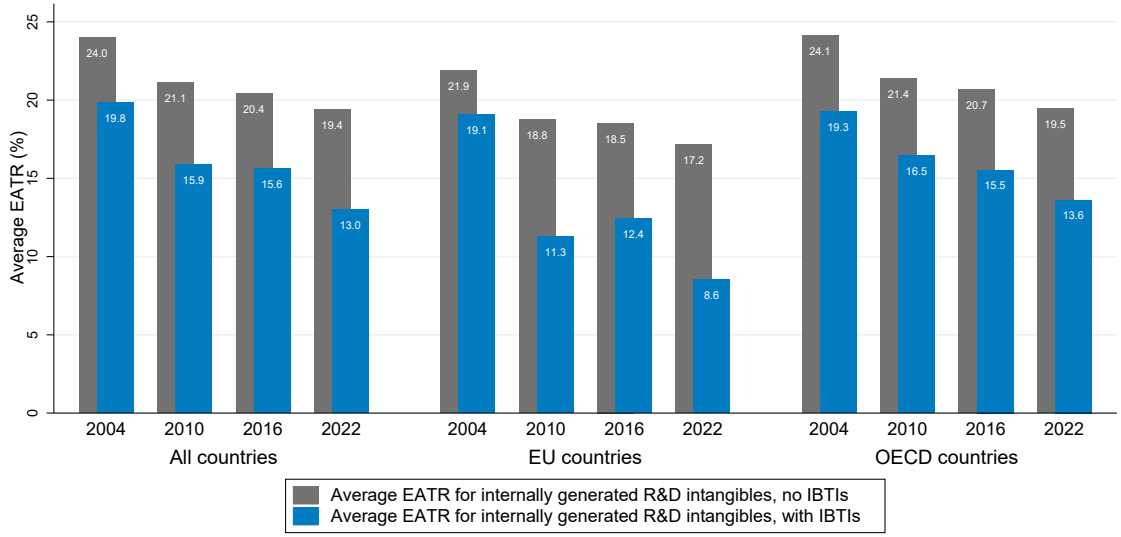
Note: This table contains changes within the regime and across regimes over time, e.g., in the case that a regime was repealed and a new regime introduced. They underlie represented in Table 1. The unit of analysis is based on the country-level identifiers (Table A.1 in Annex A) and only reflects the frequency of changes by year, rather than the number of total changes within each category. For example, it shows that a certain country modified its regime to increase its scope but does not reflect the extent to which assets or income were added. Country identifiers in italics show countries with no exhaustive list of qualifying assets or income. Changes reflect the introduction of a positive list, which in principle narrows the scope of the regime, hence shown as a decrease.
Source: OECD based on 2022 KNOWINTAX survey.

Annex B. Additional figures

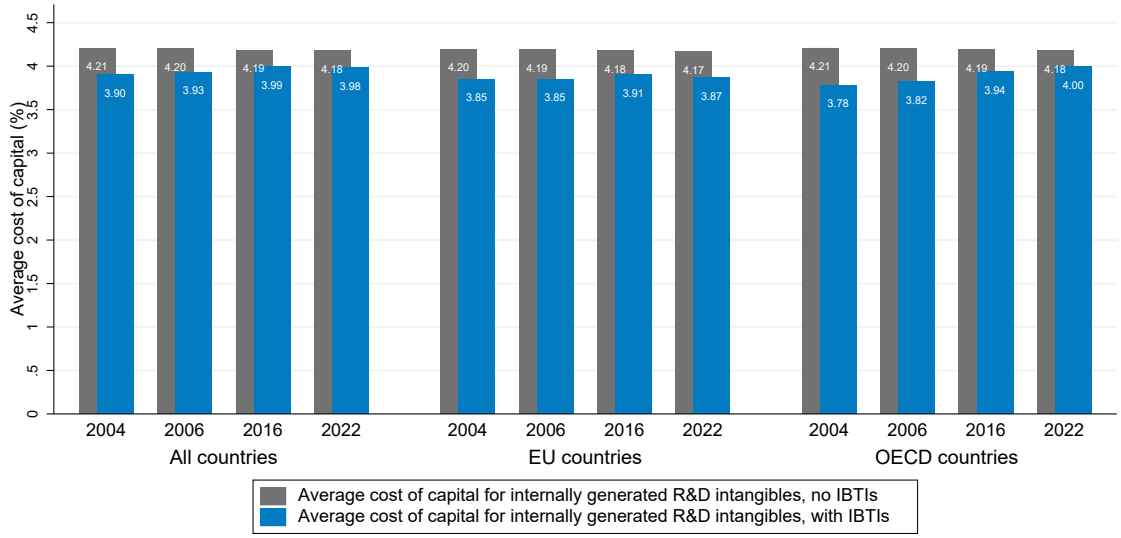
This annex provides additional supporting figures. It reproduces some of the charts provided in the main text for EU countries or for all countries covered. It contains estimates of the cost of capital and B-Index which are not discussed within the body of the paper. When observing the effect of IBTIs on the cost of capital and B-Index, a subcomponent of the cost of capital, similar trends are observed as discussed in the main text for the EATR. However, the effect of IBTIs is more apparent in the EATR, i.e., they affect more strongly the taxation of the inframarginal investment as IBTIs lower the taxation of profitable investments, hence the use of the EATR. Indirectly, IBTIs also affect the cost of capital, and hence the B-Index, lowering the pre-tax rate of return for an investor to break even after tax.

Figure B.1.Average EATR and cost of capital for internally generated R&D intangibles, by country groups

Panel A: EATR for internally generated R&D intangibles



Panel B: Cost of capital for internally generated R&D intangibles

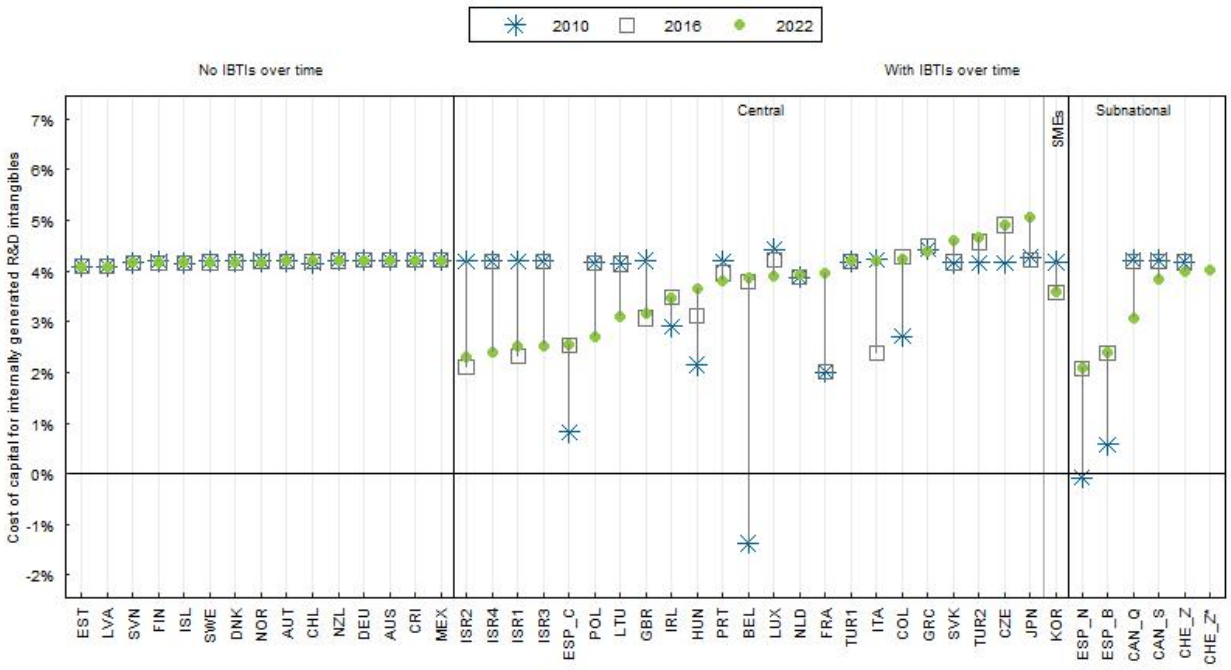


Note: This chart represents unweighted averages of the EATR (Panel A) and cost of capital (Panel B) for internally generated R&D intangibles for all 47 countries in the study, 37 OECD countries and 27 EU countries. Where IBTIs are offered at the central and subnational level in the same year, the central level IBTI is used in the average. If several IBTIs are available in the same year, the most generous one is used in the average (Table A.1). In Canada, IBTIs are only available at the subnational level in the provinces of Québec and Saskatchewan. The regime in the province of Québec is modelled in this average as Québec represents a larger share of Canada's gross domestic product (about twenty percent) relative to Saskatchewan (approximately four percent). As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries. The chart includes both IP regimes and dual-category regimes.

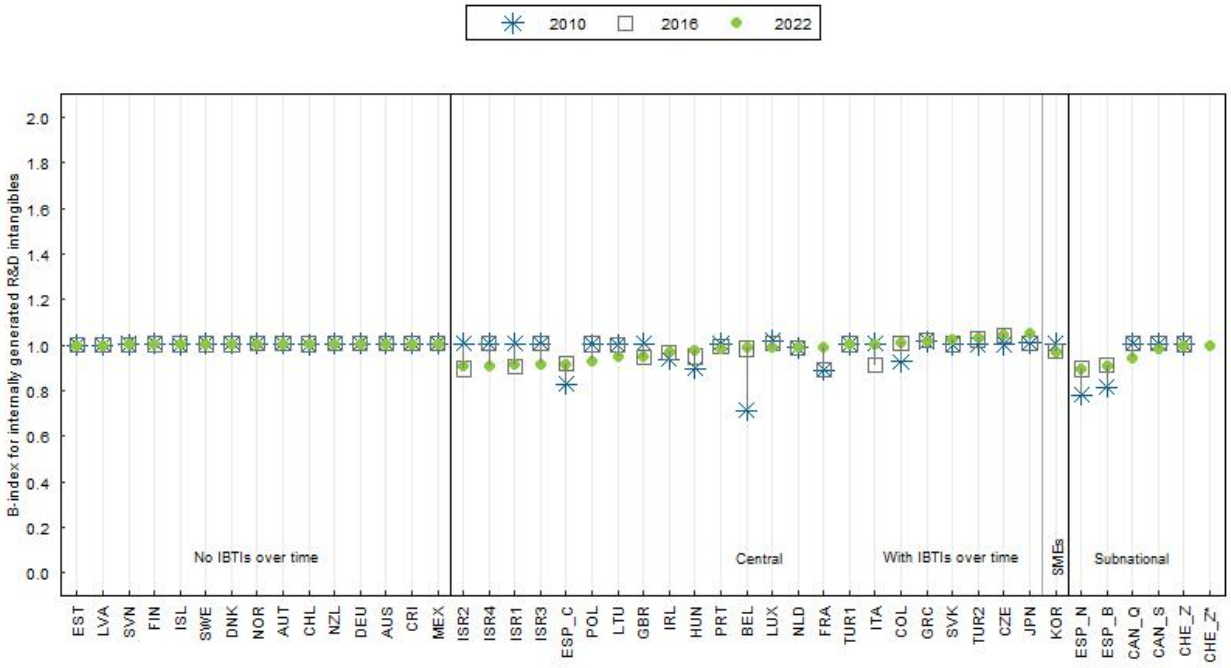
The averages exclude the regimes in Argentina (ARG1, ARG2) as the combination of sunset clauses that lead to a reduced tax benefits period for investors as the sunset clause date approaches and the relatively high statutory tax rates that apply to forgone initial tax deductions lead to high EATRs and cost of capital that distort the averages.
Source: OECD.

Figure B.2. Cost of capital and B-Index for internally generated R&D intangibles, OECD countries

Panel A: Cost of capital for R&D intangibles



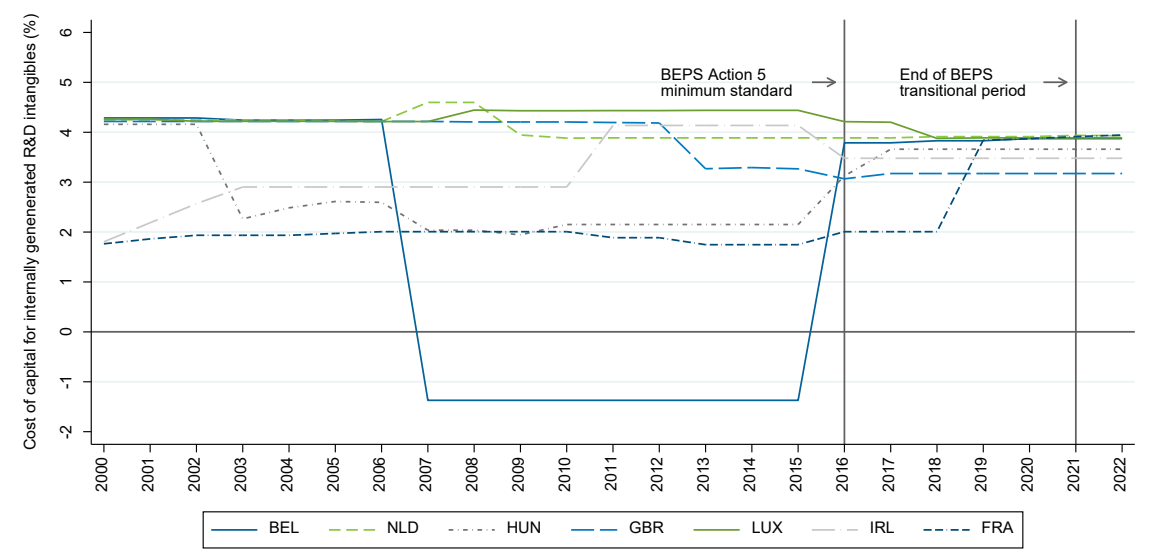
Panel B: B-Index for R&D intangibles



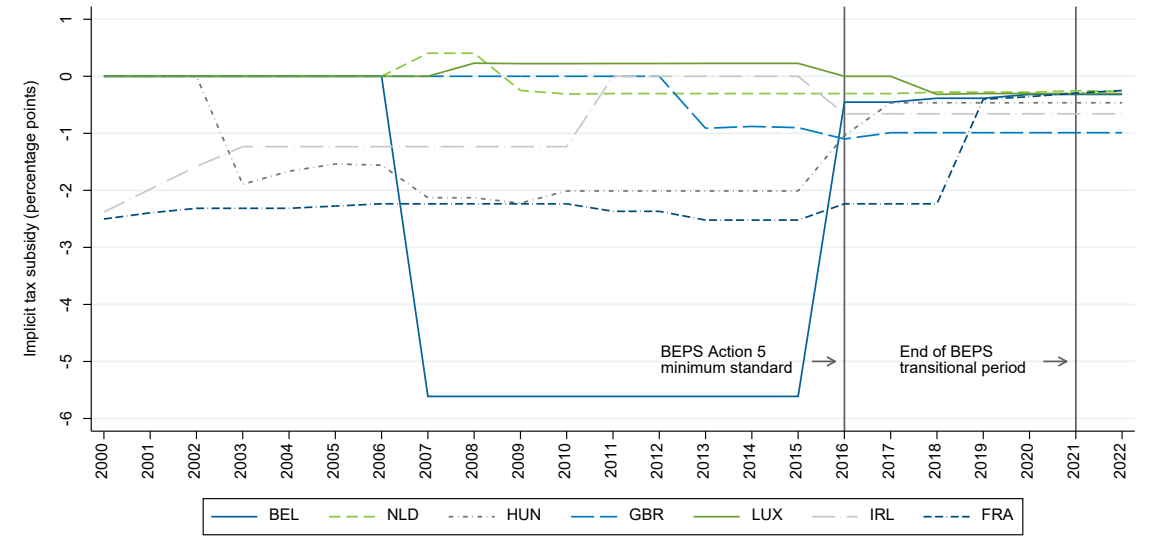
Note: Panel A presents the cost of capital for R&D intangibles and Panel B presents the B-Index. Both indicators are related as referred to in Annex A in González Cabral et al. (forthcoming[5]) and refer to a marginal investment, i.e. one that allows the firm to break-even after tax. Where multiple regimes are available, these are represented using the unique identifier in Column A Table A.1. The chart includes all OECD countries and separates countries based on whether they have had IBTIs at some point during the three years selected. The intangible asset is the result of R&D and a gestation lag of two periods is assumed for the investment to become productive capital and start generating profits. To model income-based tax support, the investment is assumed to be protected by a formal asset eligible for protection, e.g., a patent. The intangible asset is assumed to decay at an economic depreciation rate of 15% and takes two years to yield profits after the R&D investment takes place (gestation lag) (Section 5.1). The investment is assumed to be financed by retained earnings. Provisions such as allowances for corporate equity that are available in a number of countries are not accounted for. Estonia and Latvia have distribution-based tax systems that tax profits upon distribution, retained earnings are untaxed. IP income in Switzerland can benefit from a 90% exemption of qualifying IP income from cantonal taxation. However, this exemption is subject to a cap: only 70% of a firm's total profits (IP or non-IP) can be exempt. The canton of Zurich is chosen as the representative canton. The 8.11% in 2022 applies to qualifying IP income and assumes that the firm has sufficient other income (non-qualifying IP or non-IP income) that is taxed at higher rates so that it is not subject to the 70% maximum relief limitation (CHE_Z). If the firm had enough qualifying IP income that the 70% maximum relief limitation did apply, the rate applied to IP income in the city of Zurich would increase steadily from 8.11% to 11.38% in 2022 (100% IP Income) (CHE_Z*). As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Estimates for the regime in the Canton of Nidwalden are not included in this paper due to unavailable data to enable the modelling of the regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the estimate chosen refers to an investment in the city of Zurich. Acquired IP is only considered to be eligible when no explicit development condition was imposed by countries. The chart includes both IP regimes and dual-category regimes.
Source: OECD.

Figure B.3. Evolution of the cost of capital and implicit tax subsidies for internally developed R&D intangibles, selected countries

Panel A: Cost of capital for internally developed R&D intangibles



Panel B: Implicit tax subsidy (percentage points)



Note: In achieving compliance with the BEPS Action 5 minimum standard, certain regimes introduced a transitional period that allowed existing taxpayers to still benefit from the old regime until 30th June 2021. The regimes were closed-off to new entrants (both new taxpayers and new IP and activities) since their date of compliance with the standard. From the close-off date, the EATR shows the design of the new regimes, since during the transitional period, no new taxpayers (new IP of existing taxpayers or new taxpayers) could benefit from relief. Table A.1 lists the close-off date and the regimes with transitional periods in place.
Source: OECD.