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INCOME-BASED TAX RELIEF FOR R&D AND INNOVATION

AN INTEGRATED VIEW

OECD SCIENCE, TECHNOLOGY AND INDUSTRY
POLICY PAPERS
November 2023 **No. 161**

OECD
BETTER POLICIES FOR BETTER LIVES

OECD Science, Technology and Industry Policy Papers

This paper was approved and declassified by written procedure by the Committee for Scientific and Technological Policy (CSTP) on 9 October 2023 and prepared for publication by the OECD Secretariat.

Note to Delegations:

This document is also available on O.N.E under the reference code:

DSTI/STP/NESTI(2023)5/FINAL

Income-based tax relief for R&D and innovation – an integrated view

This document - the final output of the OECD KNOWINTAX project – provides an integrated view on income-based tax incentives for R&D and innovation and advances the existing OECD evidence in this area in three ways. It brings together the latest evidence on the adoption, design, generosity, cost and take-up of income-based tax incentives, and gives new insights into both the long-term and short-term trends in the cost and take-up of IBTIs and role of policy design changes. Furthermore, it explores the scope for developing indicators that provide a more complete picture of the value of expenditure- and income-based tax relief for R&D and innovation in the OECD area and beyond.

Keywords: Science and technology, Tax, Innovation

JEL codes: O38, H25, L25

Acknowledgements

This report is the result of joint work by the OECD Directorate for Science, Technology and Innovation (DSTI) and the OECD Centre for Tax Policy and Administration (CTPA). It has been prepared by Silvia Appelt (DSTI), Ana Cinta González Cabral (CTPA), and Tibor Hanappi (CTPA) under the supervision of Fernando Galindo-Rueda (DSTI) and Pierce O'Reilly (CTPA), in the framework of the OECD KNOWINTAX project.

The authors would like to thank David Bradbury and Kurt van Dender (CTPA), Alessandra Colecchia (DSTI) for their comments on earlier versions of this work. The authors would also like to thank Melissa Dejong, Paul Hondius and Jessica de Vries (CTPA) for supporting the KNOWINTAX surveys through the contribution of policy information collected as part of the peer review process of preferential tax regimes by the OECD Forum on Harmful Tax Practices (FHTP) and their valuable inputs to earlier drafts. The authors would also like to express their gratitude to members of the OECD KNOWINTAX network for their valuable contributions to the surveys supporting this work and for their valuable comments. This network includes delegates from the OECD Working Party of National Experts on Science, Technology and Innovation (NESTI), OECD Working Party No. 2 on Tax Policy and Statistics (WP2) and the OECD FHTP.

This work has benefitted from voluntary contribution funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004099.

Executive summary

Income-based tax incentives for R&D and innovation (IBTIs) feature in the innovation policy mix of many OECD countries and partner economies, often in combination with expenditure-based tax incentives. While the latter offer a preferential tax treatment to R&D inputs, the former provide relief to the outcome of R&D and related efforts in form of a reduced tax rate or tax exemption. IBTIs comprise two broad categories: (i) intellectual property (IP) regimes that provide relief to the income derived from certain eligible IP assets (e.g. patent boxes), which can be related to the innovation activity of the firm, and (ii) dual category' regimes which provide relief to the entirety of business income (i.e. not necessarily IP-based) but restricted to eligible businesses deemed to be engaged in R&D or other innovation-related activities.

Comprehensive and systematic evidence on their availability, design, generosity, cost and take-up of IBTIS has been relatively scarce up to date. Relatedly, evidence on the overall generosity and total cost of tax support for business R&D and innovation via both expenditure- and income-based tax incentives is lacking. The OECD launched the KNOWINTAX project in 2020 – a joint undertaking of the Directorate of Science, Technology and Innovation and the Centre for Tax Policy and Administration - with support from the EU H2020 programme with a view to closing this evidence gap. Of particular interest to the KNOWINTAX project is to provide a better understanding of the implications of the BEPS Action 5 minimum standard - one of the four minimum standards introduced by the OECD/G20 BEPS project -, seeking to ensure that the preferential tax treatment provided to income from geographically mobile activities, such as income from intangibles, does not have harmful effects on the tax base of other countries.

The first results from this project - published in a set of four interconnected OECD papers – provide some first insights into the design (González Cabral, Appelt and Hanappi, 2022[1]) and cost and uptake (Appelt et al., 2023[2])of IBTIs, the implied tax subsidy to firms (González Cabral et al., 2023[3]; González Cabral et al., 2023[4]). This report - the latest output of the OECD KNOWINTAX project - advances the existing OECD evidence base on IBTIs in three ways: it (i) brings together the latest evidence on the adoption, design, generosity, cost and take-up of IBTIs, (ii) gives new insights into both the long-term and short-term trends in the cost and take-up of IBTIs and role of policy design changes, and (iii) explores the scope for developing indicators that provide more complete picture of government efforts to support R&D and innovation through the preferential tax treatment of both R&D inputs and outputs.

The main findings of this report can be summed up as follows:

- **In 2022, 21 out of 38 OECD countries and 21 out of 27 EU countries offered IBTIs,** IP regimes representing the most common form of IBTI in both the OECD and EU area.
- **IBTIs provide preferential tax treatment to income from the commercialisation of formally protected intangible assets but in around 75% of IBTIs (i.e., 28 out of the 37 IBTIs covered) tax relief also extends to income from the protection of qualifying intangibles.** While the former includes income from licensing, sale and IP income embedded in goods and services, the latter includes income from the insurance, damages or compensation in relation to the qualifying IP right.

- **In 2022, IBTIs reduce the tax liability that firms face on a qualifying internally generated R&D intangible by 66% on average, with a significant cross-country variation.** EATRs fall on average from 19.6% to 6.7% when IBTIs are accounted for, the latter ranging from -0.09% to 25.78% across countries.
- **Estimates of the cost of IBTIs for 2020 (or latest) suggest that the magnitude of this support is very small overall**, amounting to less than 0.01% of GDP in 10 out of 22 countries for which data are available. The cost of IBTIs was largest in the Netherlands (0.24% of GDP), Belgium (0.18% of GDP) and Israel (0.15% of GDP).
- **Income-based tax benefits tend to accrue to a small subset of companies. In half of all countries for which data are available, less than 100 firms benefitted from this support in 2020 (or latest).** While SMEs typically accounted for most income-based tax relief recipients, large companies accounted for the bulk of income-based tax benefits, which may reflect the concentration of IP among few large corporations.
- **From 2000 to 2020, an increase in the cost and uptake of IBTIs can be observed in nearly all twenty-two countries for which data are available,** with a large cross-country variation in the level and evolution of income-based tax relief.
- **Between 2015 and 2020 (or closest), the uptake and cost of IBTIs tends to have increased moderately in 15 countries for which data are available.** In the median OECD country, the number of beneficiaries increased by 30 and the value of this support by 0.01% of GDP. It remains challenging to assess the effect of BEPS Action 5. Few countries can report separate data for pre- and post-nexus regimes.
- **In 2022, most OECD countries and EU countries offered IBTIs in combination with expenditure-based R&D tax incentives, highlighting the need for new policy indicators that reflect the value of tax support for both R&D inputs and R&D outputs.** In 2022, 20 out of 38 OECD countries and 14 out of 27 EU countries offered tax incentives for both R&D inputs and R&D outputs. New indictors of the overall tax subsidy for R&D and innovation would need not only need to account for the key design features of these two types of tax instruments but also their interaction, different scenarios of tax instrument use (e.g., in-house vs outsourced R&D) and some additional key features of R&D investments (e.g., uncertainty, risk, obsolescence).
- **An exploratory indicator of the cost of income- and expenditure-based tax relief, for the first time presented in this report, shows that the total level of tax support for R&D and innovation increases notably when IBTIs are accounted for but their role varies largely across countries.** The share of IBTIs in total R&D and innovation tax support varies from close to 0% in Japan, Portugal, and Korea to around 40% in Belgium, 60% in the Netherlands and 100% in Cyprus, Israel and Luxembourg.

Future OECD work seeks to further advance and extend the existing OECD policy evidence base and new data infrastructure on income-based tax incentives for R&D and innovation developed as part of the KNOWINTAX project. This includes the development of a new class of policy indicators that reflect the role, interaction and total value of government tax relief for R&D inputs and outputs in the OECD area and beyond.

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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 study on IBTIs covers 48 countries including all OECD countries, EU countries and five partner economies (Argentina, Brazil, the People's Republic of China – China henceforth –, 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.

In contrast to expenditure-based R&D tax incentives (OECD, 2023[5]; OECD, 2023[6]) comprehensive and systematic evidence on the availability, design, generosity and actual cost of IBTIs across OECD countries and other major economies has been relatively scarce up-to-date, especially on a time-series basis (Appelt et al., 2016[7]; Hall, 2019[8]). Relatedly, there is currently no evidence on the overall generosity and total cost of tax support for business R&D and innovation via both expenditure- and income-based tax incentives. Combined R&D and innovation tax relief statistics that would account for both expenditure-based and income-based tax relief provisions for business R&D and innovation in OECD countries and other major economies are still lacking.

The first results from OECD KNOWINTAX project[2] - published in a set of three interconnected OECD papers – provide novel insights into the design (González Cabral et al., 2023[9]) and cost (Appelt et al., 2023[2]) of IBTIs, their uptake by businesses and their implied notional level of tax subsidy to firms (González Cabral et al., 2023[3]; González Cabral et al., 2023[4]). Drawing on country contributions to the 2022 KNOWINTAX survey, this report - the latest output of the OECD KNOWINTAX project - advances and extends the existing OECD evidence base on income-based tax incentives in three ways.

This report (i) provides updated information on the availability, design and generosity of IBTIs in 2022 and the cost and take-up of income-based tax incentives in 2020 (or closest year), (ii) delivers insights into long-term and short-term trends in the cost and take-up of income-based tax incentives, including role of policy design changes, and (iii) explores the scope for developing combined implicit tax subsidy and cost indicators that provide an integrated view of the magnitude of expenditure-based and income-based tax support for business R&D and innovation. Policy design changes include changes affecting the scope of income-based tax relief 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.

The paper is organised as follows. Section 2 provides a snapshot overview of the availability of income-based tax and key design features of IBTIs incentives in 2022. Section 3 presents measures of the implicit level of tax subsidy granted by income-based tax incentives in 2022, derived based on the new design information available for 2022. Section 4 presents updated measures of foregone tax revenue and business uptake for 2020 and the results of an OECD analysis of the long-term and short-term trends in the cost and uptake of IBTIs over the 2000-20 and 2015-20 periods respectively. Section 5 discusses ongoing efforts develop indicators that provide a more complete view of government efforts to support R&D and innovation through the tax system and reflect the value of both expenditure- and income-based tax incentives. Section 6 concludes.

2 Policy adoption and design

2.1. Availability of income-based tax incentives

Income-based tax incentives are available in at least half of OECD countries and EU countries. As Table 2.1 shows, 21 out of 38 OECD countries and 16 out of 27 EU countries offered income-based tax incentives in 2022 (57% of OECD countries vs 63% of EU countries). In total, 27 out of the 48 countries covered by the KNOWINTAX project had IBTIs in place in 2022.

Table 2.1. Tax incentives for R&D and innovation, 2022

Economies within the scope of this study

Income-based tax support	OECD	Non-OECD EU	Other economies
Available	Belgium, Canada(i), Czechia, France, Greece, Hungary, Ireland, Israel, Japan, Korea, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Spain(ii), Switzerland(i), Türkiye, United Kingdom, United States	Cyprus[3], Malta, Romania	Argentina, People's Republic of China, Thailand
Not available	Australia, Austria, Chile, Colombia, Costa Rica, Germany, Denmark, Estonia, Finland, Iceland, Italy, Latvia, Mexico, Norway, New Zealand, Slovenia, Sweden	Bulgaria, Croatia	Brazil, South Africa

Note: (i) Incentive available at the subnational level. (ii)Incentives available at the central and subnational level. Country coverage refers to the 48 countries covered in the study, including OECD and EU countries and selected economies and refers to tax incentives available as of July 2022.
Source: OECD.

IP regimes are the most common form of IBTI among OECD and EU countries. IBTIs include IP regimes and dual category regimes. IP regimes such as patent boxes provide relief to the income derived from certain IP assets. Dual category regimes, such as tax holidays for businesses, extend relief to other non-IP income of the firm if offered to businesses doing R&D or innovation related activities. Dual category regimes are broader in scope and the link to innovative outcomes may be more diffuse than under IP regimes. Dual category regimes represent 18% of IBTIs in the OECD and 11% of the IBTIs in the EU.

Countries may offer multiple incentives where support is granted at the subnational level or if IBTIs are targeted to different activities, sectors, investment locations, or types of taxpayers. In 2022, among the 21 OECD countries providing income-based tax support, the total number of IBTIs surveyed equals 28. For the 16 EU countries with IBTIs in 2022, the total number of IBTIs surveyed equals 18. Some countries offer multiple IBTIs either because IBTIs may target different activities or taxpayers (e.g., Israel) or because some are offered at the subnational level (e.g., Spain or Switzerland). Most of the IBTIs surveyed refer to the central level. Considering all 48 countries in the study, 27 have IBTIs in place in 2022 and account for a total of 37 IBTIs in 2022. Among the 37, 32 are offered at the central level (84%).

2.2 Key design features

The extent of tax benefits provided by IBTIs is strongly influenced by their design. Figure 2.1 provides a representation of the two key factors that affect the level of tax benefits provided by IBTIs. Design elements that affect the scope of the regime such as the types of assets and income that give rise to preferential tax treatment, and elements that affect the calculation of tax benefits such as the reduced tax rates offered and calculation of the tax base.

Figure 2.1. Key characteristics of income-based tax incentives

Factors influencing the scope of the regime	**Eligible taxpayer and eligibility conditions**	• Firm size (SMEs/Large firms), type of R&D or innovation activity, minimum level of R&D investment, other non-R&D investment requirements, e.g. employment
	Qualifying assets and IP development conditions	• Type of IP that qualifies, including formal and informal protection • Requirements to develop or have developed IP • Location of R&D, IP registration and status of protection
	Qualifying income	• Types of income flows that qualify, e.g. commercialisation or protection of IP, other non-IP income (dual regimes)
Factors influencing the calculation of tax benefits	**Preferential tax rates**	• Regime rate • Number of years for which preferential tax treatment is available
	Definition of the tax base	• Treatment of ongoing expenses • Treatment of past expenses • Treatment of IP losses • Development conditions (nexus ratio)
	Limitations to tax benefits and treatment of unused benefits	• Ceilings or caps on income or tax benefits, time limits • Carry-over provisions or refundability of unused tax benefits

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

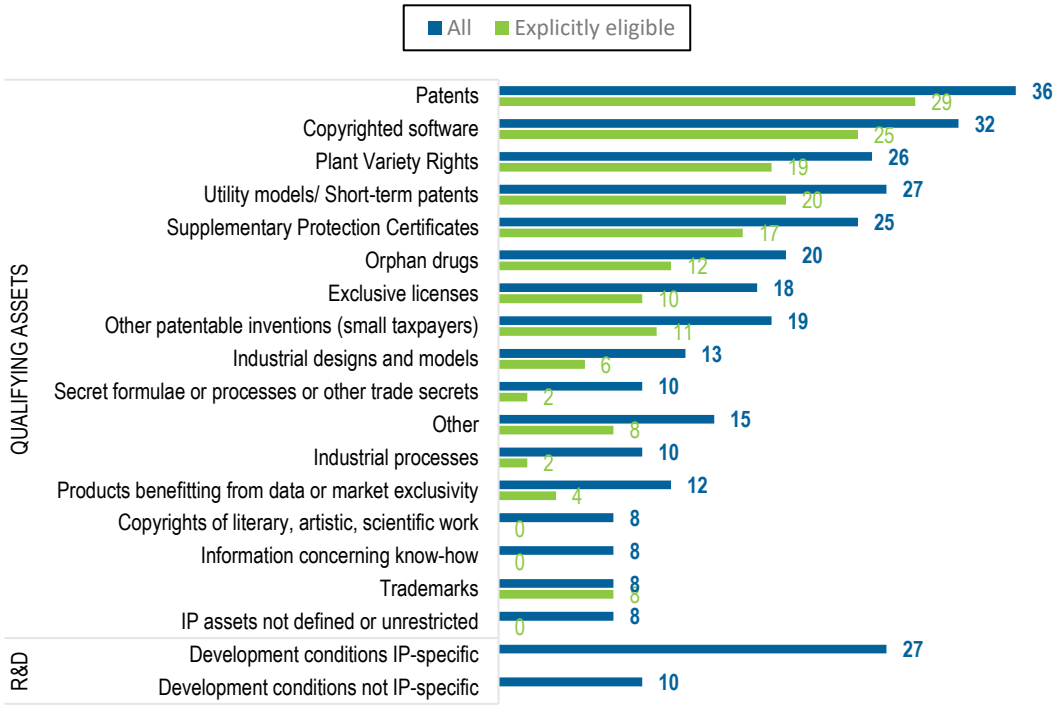
The design of IBTIs is strongly affected by the BEPS Action 5 minimum standard. BEPS Action 5 introduced common development conditions to limit the access of transferred IP to preferential tax treatment.[4] BEPS Action 5 restricted the types of assets and income that could benefit from IBTIs and also restricted the conditions under which qualifying taxpayers could benefit from income-based tax relief (OECD, 2015[10]). 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.

This section provides a summary overview of key design features of IBTIs available in 2022 (Table A.1).[5] Country-level identifiers are used to refer to IBTIs throughout this paper

Qualifying assets, income and development conditions

Income-based tax incentives grant preferential tax treatment to a variety of IP assets that generally benefit from formal protection. All, but one of the IBTIs covered in the study provide relief to patents[6], and most jurisdictions extend eligibility to IP assets similar to patents. Figure 2.2 provides a summary for all 37 IBTIs covered in 2022.

Figure 2.2. Qualifying IP assets and IP-specific development conditions, 2022



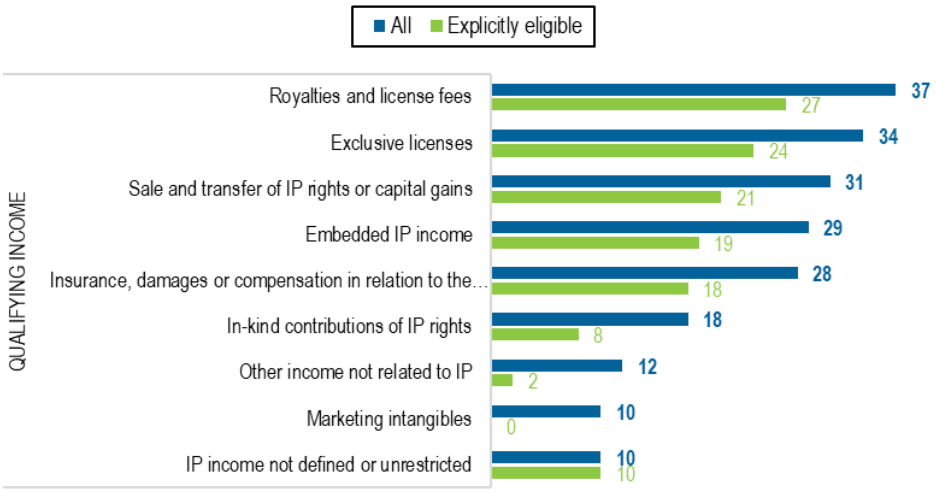
Note: 'All' in the chart refers to the total number of regimes for which the IP asset listed may be eligible for relief either explicitly, by means of a positive list in the legislation ('explicitly eligible') or implicitly by not being specifically excluded from eligibility. The total number of IBTIs covered in 2022 equals 37. Other qualifying assets includes topographies, protected data. In the development condition section of the chart, regimes are divided into those that offer IP or non-IP specific development conditions.
Source: 2022 KNOWINTAX survey, update of González Cabral et al (2023[3]).

Patents, copyrighted software and utility models/short-term patents constitute the three IP assets that are most frequently eligible for relief. Out of all 29 IBTIs where qualifying assets are explicitly listed, 29 provide support to patents, 25 to copyrighted software and 20 to utility models/short-term patents. IP assets that extend the period of effective protection are also often eligible - supplementary Protection Certificates (SPCs), which extend the period of effective protection of the patent on new medical products, are eligible in 17 out of the 29 IBTIs that explicitly list qualifying assets.

In some countries, small taxpayers can access preferential tax treatment for an extended category of IP assets with less stringent criteria on the protection of the asset for the asset to be qualifying. While very few regimes are exclusively available to SMEs (China – CHN2 and Korea are exceptions), smaller taxpayers may be granted relief for a larger set of intangible assets than larger taxpayers in certain countries. The regimes in Cyprus, France, Israel, Ireland, Korea, Malta, the Netherlands and Türkiye provide tax relief for smaller taxpayers for inventions that share similar traits to patents or copyrighted software and that are certified by a competent government authority ('other patentable inventions (smaller taxpayers'). This category of IP assets falls within the third category of assets defined in the BEPS Action 5 minimum standard and they are not required to be liable for legal protection in order to qualify for tax relief under the IP regime. Across jurisdictions, the scope of qualifying assets varies from narrowly defined regimes to regimes providing relief to a broad spectrum of IP. Table A.2 provides details of the scope of IBTIs covered. Relief can be targeted to a strict set of IP assets as is the case in Portugal (patents, SPCs and industrial designs and models) or the Slovak Republic (patents, SPCs, copyrighted software and plant variety rights). Other countries, such as the Netherlands or Malta, provide for a wider coverage of IP.

Most regimes provide relatively generous coverage to the income related to or derived from the commercialisation of IP (Figure 2.3). This includes licensing, sale and IP income embedded in goods and services. However, income from the protection of IP (i.e., income from the insurance, damages or compensation in relation to the qualifying IP right) is also eligible for relief in 28 out of the 37 IBTIs covered.

Figure 2.3. Qualifying IP income, all regimes, 2022



Note: 'All' in the chart refers to the total number of regimes for which the IP asset listed may be eligible for relief either explicitly, by means of a positive list in the legislation ('explicitly eligible') or implicitly by not being specifically excluded from eligibility.
Source: 2022 KNOWINTAX survey, update (González Cabral et al., 2023[3]).

Most countries condition tax relief on the requirement that the taxpayer performs the underlying R&D activity that led to the qualifying IP. For regimes following the BEPS Action 5 minimum standard, the link between R&D performance and tax benefits is implemented through the nexus ratio, which acts as a proxy for substantive research-related activities of the taxpayer (Box 2.1 and Table A.3). The requirements to develop the IP to access IBTIs benefits is made with reference to the IP asset in 27 out of the 37 IBTIs covered (Figure 2.3). Such conditions may be in addition to or in lieu of R&D or innovation eligibility criteria at the taxpayer level (González Cabral et al., 2023[9]). Where regimes do not establish specific development conditions in relation to a specific IP asset, qualifying income from IP assets generated through different acquisition strategies may be in principle eligible, provided all other eligibility conditions are met.

Box 2.1. 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:

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

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 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])

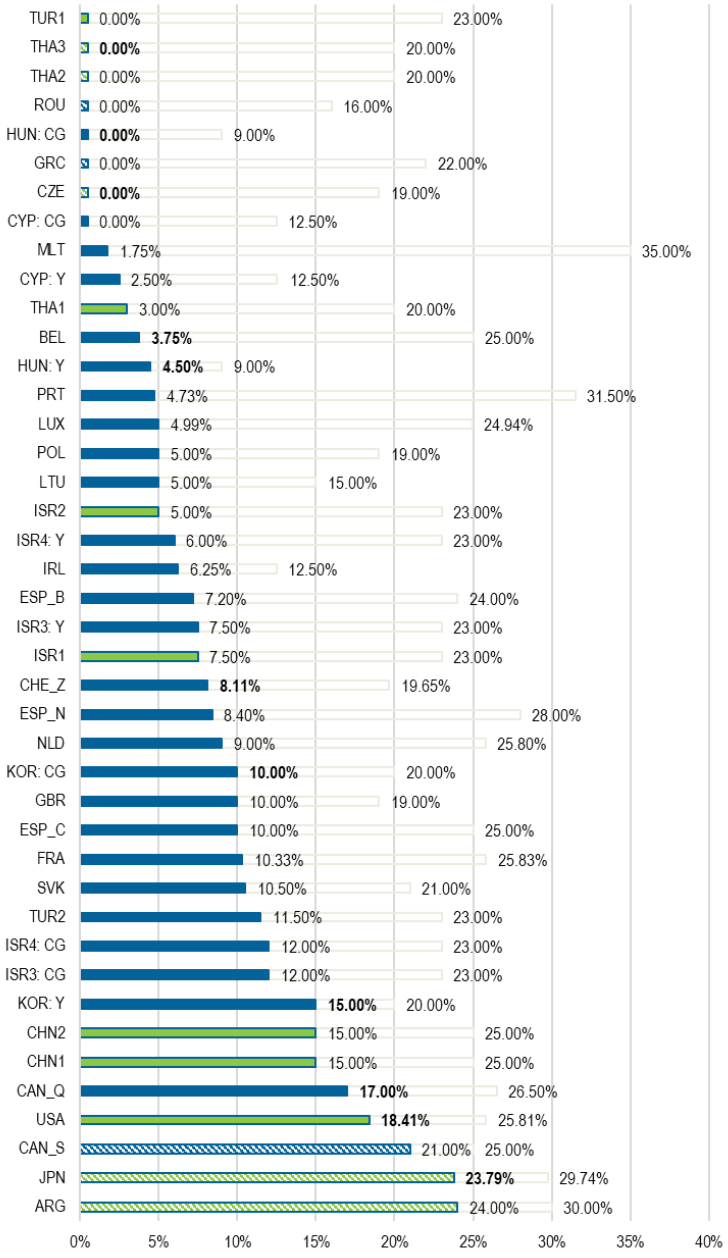
Tax rates and base

Income-based tax incentives offer preferential tax rates that range from 0% to 24% compared to a full rate ranging from 9% to 35% in 2022 (Figure 2.4). IBTIs are operationalized through a reduced tax rate or an exemption from the standard CIT rates. As shown in Figure 2.4, there is substantial variation in the extent of the reduction offered by IBTIs from the standard tax rate. Out of the regimes covered, the average reduction offered equals 65% of the full rate and ranges from a partial exemption of 20% of the full rate in Japan to a full exemption available in six jurisdictions (Czechia, Greece[7], Türkiye TUR1, Romania and Thailand THA2 and THA3 and for capital gains only in Cyprus and Hungary[8]). The generosity of preferential tax treatment varies with the type of qualifying income (e.g., Korea), the size or location of investment (Thailand, THA3) in the jurisdiction and in certain cases with firm size (Israel, ISR1-ISR4).

Preferential tax rates may not provide an accurate reflection of generosity where IBTIs are time-bound or subject to limitations. In some cases, preferential tax treatment only applies during a predefined time period (bars with a diagonal pattern in Figure 2.4); or the extent of tax benefits that can be granted is subject to a ceiling or a cap (bold codes in Figure 2.4). Both of these features will limit the generosity of IBTIs.

Beyond preferential tax rates, the calculation of the tax base (qualifying profits) varies across jurisdictions affecting the extent of tax benefits offered by IBTIs. Table A.3 in Annex A provides a summary of the design features affecting the calculation of qualifying profits. Among the regimes studied, tax relief applies to income net of ongoing expenses (and losses)[9] associated with the IP ('net approach' which is part of BEPS Action 5 minimum standard requirements). IBTIs differ in how they account for expenses incurred in the past in computing the tax base, i.e., prior to the moment when the asset started generating income. Some IBTIs do not require the tax base to be adjusted for past expenses (only ongoing expenses are deducted), others require the recapturing of past expenses and in other cases there is a requirement to capitalise R&D expenses to benefit from IBTIs. The stringency of such requirements vary across jurisdiction.

Figure 2.4. Lowest tax rate applying to IP income vs full rate, 2022



Note: The chart displays the lowest rate applicable under the regime if multiple rates exist and compares this to the full tax rate in that jurisdiction. Bars with a diagonal pattern indicate preferential tax treatment is limited to a fixed number of years, darker shaded bars indicate dual category regimes, rates in bold indicate that the regime has in place limitations to tax benefits that may cap tax benefits. The full rate is defined as the statutory tax rate or the applicable tax rate if different such as where capital gains are taxed at a different schedule. While the rates comparison provides an indication of generosity of the regime, it does not account for certain design features that affect the computation of tax benefits such as the number of years for which the preferential tax rate applies, the definition of the tax base or the presence of ceilings that cap relief.

[1] IP income in Switzerland can benefit from a 90% exemption of qualifying IP income in cantonal taxation. This exemption is capped at 70% of a firm's total profits (IP or not). The 8.11% rate 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 the cap does not apply. If the firm had enough qualifying IP income for the 70% maximum relief limitation to apply, the rate applied to IP income in the city of Zurich would rise to 11.39% (100% IP Income).

Source: 2022 KNOWINTAX survey, González Cabral et al (2023[3]).

3 Measures of implicit tax subsidies

This section relies on 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[11]; Klemm, 2008[12]), and in the case of IBTIs, the case of investments in R&D intangibles (González Cabral et al., 2023[3]). The methodology and calibration in this section follows (González Cabral et al., 2023[3]).[10]

3.1. Modelling income-based tax incentives

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, 27 countries of which offered IBTIs in 2022, resulting in a total of 37 regimes that are considered for modelling purposes.[11] The indicators 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.

The indicators capture the impact of the following key design features of IBTIs - both IP regimes and dual category regimes:

- the preferential tax rate[12]: equivalent to the reduced tax rate or in the case of income tax exemptions, the exemption rate multiplied by the statutory tax rate (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.

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.[13] 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 (2023[3]).

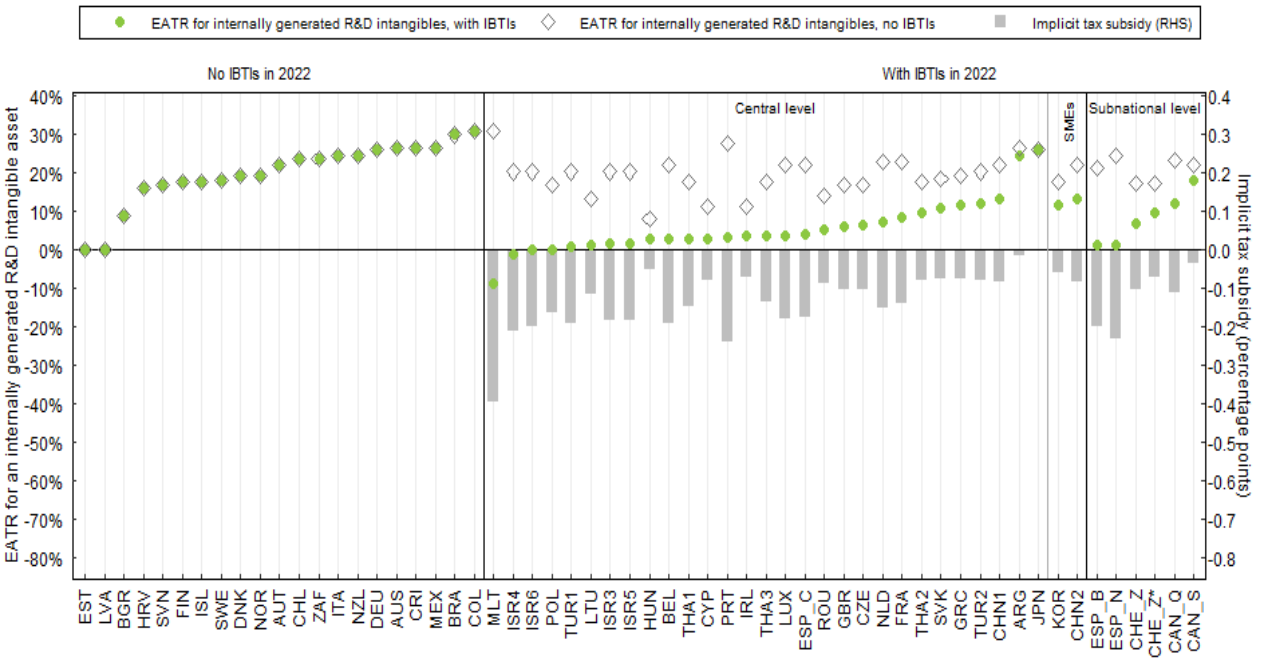
3.2. The impact of IBTIs on internally generated R&D intangibles, 2022

IBTIs significantly reduce the overall tax liability that firms face on their R&D intangible investment resulting from their own R&D. The EATR for internally generated R&D intangibles accounting for IBTIs in 2022 (Figure 3.1) range from -0.09% to 25.78% compared to a range between 7.86% and 31% in the absence of IBTIs. At the sample average, IBTIs reduce the overall tax liability that the firm faces on an internally generated R&D investment by 66%, with significant variation across countries. EATRs fall from an average of EATR of 19.6% without support to an EATR of 6.7% when IBTIs are accounted for, as shown in Figure 3.1. Compared to 2021, it is worth highlighting the removal of the IBTI in Italy that has been replaced by an expenditure-based tax incentive. Portugal markedly reduced the preferential tax rate from 15.8% to 4.7%, which made its EATR drop from 13% to 3% in 2022. The difference between the EATR with and with no IBTIs provide an estimate of implicit tax subsidies. The greater implicit tax subsidies, the greater the deviation from the standard tax treatment conferred to qualifying R&D intangibles in a given jurisdiction.

Aside acting as a country-specific benchmark, the EATR with no IBTIs has interest in its own right as it would be the relevant rate for similar investments that would not qualify for tax support such as for instance those informally protected, e.g., by trade secrets (Section 2.2 and González Cabral et al (2023[3])). In this calibration, the baseline EATR lies just below the STR as the investment is assumed to be in current expenditure, which is immediately deductible, but it does not fully align due to the presence of a gestation lag and the fact that the investment takes place in two phases (at the onset of the development and commercialisation phases).[14]

Figure 3.1. EATR for internally generated R&D intangibles, 2022

Estimates of the implicit tax subsidy from IBTIs, inframarginal investments (EATR)



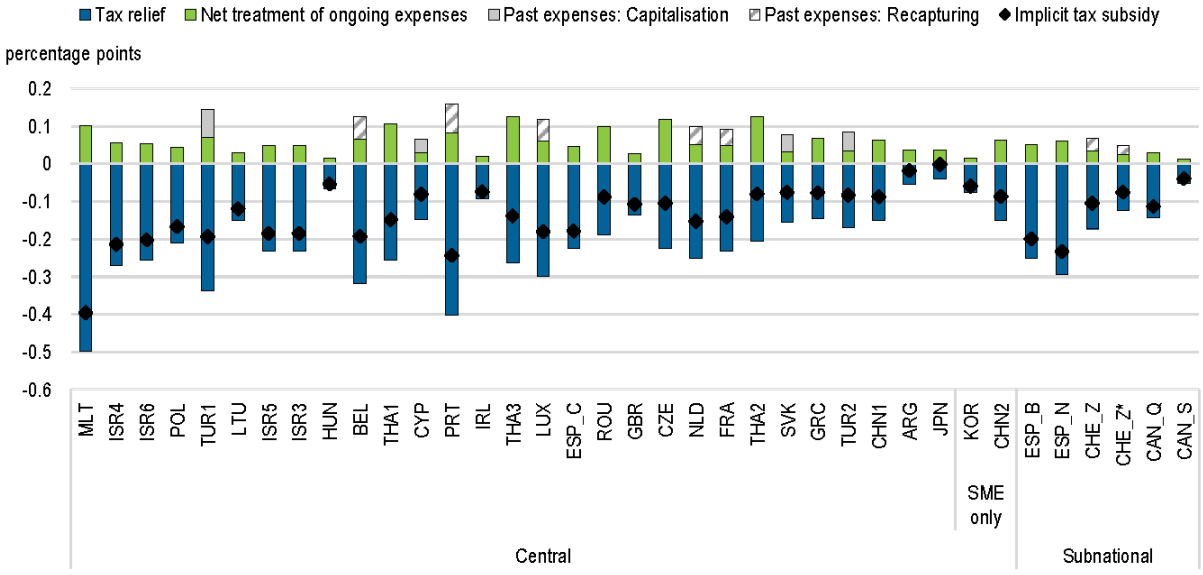
Note: The estimates consider an R&D investment with a gestation lag of two years after which the intangible asset starts generating profits. Baseline refers to an equivalent investment that does not benefit from income-based tax support. Preferential tax treatment is obtained by the difference between the baseline and the cost of capital including income-based support. The results assume all IP income qualifies for relief. CHE_Z 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* assume that the maximum relief limitation is binding.
Source: OECD.

Differences in the extent of implicit tax subsidies granted through IBTIs are strongly affected by differences in the design of these provisions. Figure 3.2 decomposes the preferential tax treatment measured in Figure 3.1, to analyse the contribution of each of the four design elements captured in the estimation of implicit tax subsidies.[15]

- **Tax relief:** This factor measures the difference between the taxation at the full rate compared to the reduced rate available under the IBTI. This bar is larger for countries offering a greater reduction from the headline rate in absolute terms.
- **The treatment of ongoing expenses:** This factor measures the correction in the tax base due to the requirement that associated ongoing expenses associated with the intangible be deducted against qualifying income as opposed to ordinary income. The size of this factor is proportional to the distance between the full and the reduced rate.
- **The treatment of past expenses:** This factor measures the correction in the tax base due to the requirement some treatment of associated past expenses either by requiring that they are deducted against IP income as opposed to ordinary income (recapturing method in light blue) or capitalised into the value of the asset (dark blue).
- **The presence of development conditions:** In this case of an internally generated intangible the nexus ratio is equal to one for all cases. The nexus ratio will be separately analysed in the following subsection. Differences in design captured in Figure 3.2 therefore come from variation in factors (1)-(3) above.

Figure 3.2. Determining the contribution of design to implicit subsidies for R&D, 2022

Preferential tax treatment for inframarginal investments (EATR for internally generated R&D intangible)



Note: This figure decomposes the implicit tax subsidies (bar in Figure 3.2) to disentangle the composition of each design feature and is hence tied to the calibration parameters outlined in Section 3.1. It is important to note that EATRs are not static indicators and are dependent on the calibration parameters that comprise the R&D investment, e.g., the pre-tax rate of return, the gestation lag, etc. The contribution of each of these elements to the overall rate would vary with changes to the underlying calibration parameters, shifting the weight of each element to the overall implicit tax subsidy. 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. CHE 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* assume that the maximum relief limitation is binding.
Source: OECD.

The extent of implicit tax subsidies is largely driven by the difference in the tax rates offered under standard and preferential tax treatment, but certain base provisions act to reduce the generosity of IBTIs. Where special provisions are in place that require either the recapturing or capitalisation of past expenses, IBTIs are modestly less generous all else equal (grey bars show up in the positive domain reducing the extent of implicit tax subsidies). Similarly, the requirement to deduct ongoing expenses at the preferential tax rate, part of the BEPS Action 5 nexus approach, contributes to reduce the generosity of IBTIs compared to a hypothetical situation where such requirements were not in place.

4 Measures of forgone tax revenue and policy uptake

The financial cost to governments in providing income-based tax relief for business R&D and innovation can be measured in terms of forgone tax revenue. This value depends not only on how generous the tax relief provisions are, but also on the extent to which eligible businesses use them. The KNOWINTAX project extends the OECD measurement work on expenditure-based R&D tax incentives, developing a common methodology for deriving internationally comparable estimates of foregone tax revenue for income-based tax incentives (Appelt et al., 2023[2]) and building a new data infrastructure for this class of tax instruments in collaboration with OECD and EU countries and partner economies. This includes the production of income-based tax relief statistics that reflect the cost of income-based tax relief to governments and their uptake by businesses over time.

This section presents the latest income-based tax relief statistics produced by the KNOWINTAX project, drawing on country responses to the 2022 OECD KNOWINTAX survey. While data reporting and coverage at country and regime level has slightly improved in the 2022 KNOWINTAX survey relative to the first two KNOWINTAX surveys carried out in 2020 and 2021, the reporting of metadata on the estimation methodology and overall data coverage remains partial, in particular for more granular data requests (Table B.2 and Table B.3). This is at least in parts attributable to the measurement challenges identified in the first two KNOWINTAX surveys (Appelt et al., 2023[2]). These limitations call for some degree of caution when attempting to interpret and compare these figures across countries, or with available statistics on expenditure-based R&D tax relief.

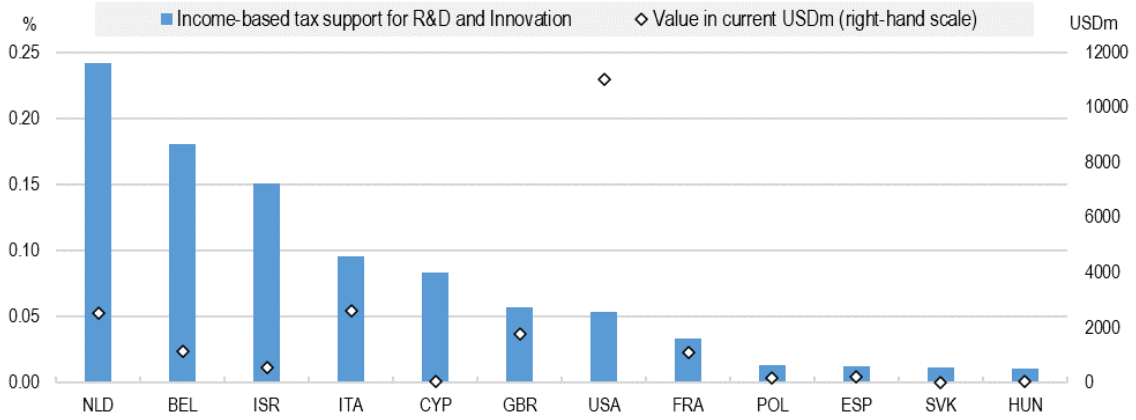
4.1. Cost and uptake of income-based tax relief in 2020

The cost of income-based tax support varies across jurisdictions that provide this type of relief. Figure 4.1 displays estimates of the cost of income-based tax support in 2020 (or latest year) - as a percentage of GDP and in current USD million (right-hand scale) - for 22 reporting countries. The median country for which data are available provides tax relief worth 0.01% of GDP, ranging from less than 0.001% of GDP in Argentina, Korea and Japan to over 0.15% of GDP in the Netherlands (0.24% of GDP), Belgium (0.18% of GDP) and Israel (0.15% of GDP). In absolute terms (current USD million), the largest providers of support, as reported in the data collection, were the United States (~USD million 11 020), followed by Italy (~USD million 2615) and the Netherlands (~USD million 2520). Absolute subsidy amounts are higher for larger countries such as the United States.

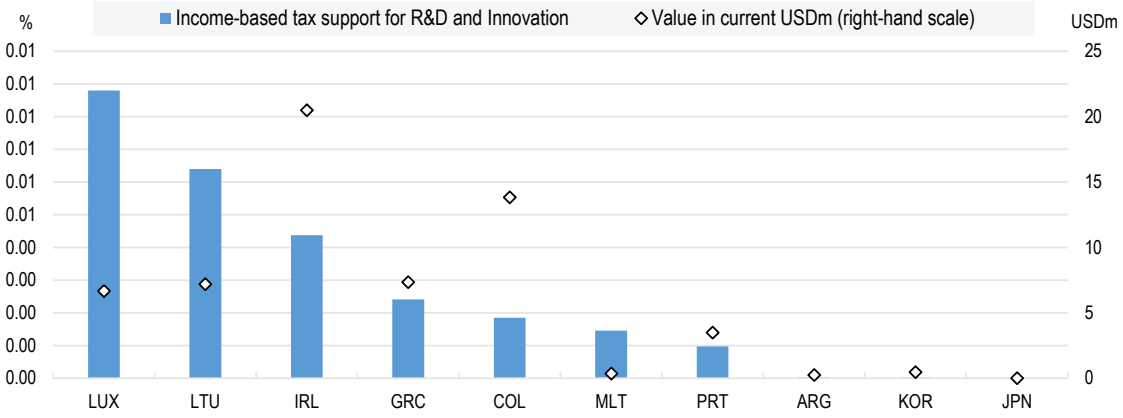
Figure 4.1. Income-based tax support for R&D and Innovation, 2020

As a percentage of GDP, current USD million (right-hand scale)

Panel A. Countries where income-based tax relief amounts to 0.01% of GDP or more



Panel B. Countries where income-based tax relief amounts to less than 0.01% of GDP

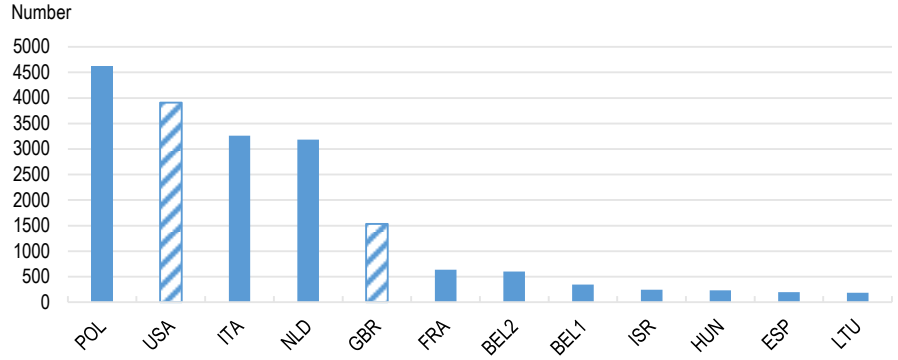


Note: This indicator is preliminary and may only provide an incomplete picture of the overall magnitude of income-based tax support for R&D and innovation. For a number of countries, estimates are currently either not available (China, Canada – Province of Québec, Czechia, Switzerland, Türkiye and Thailand) or cover only a subset of regimes (see Table B.2 and Table B.3). In the case of Spain, figures refer to the partial exemption for income from certain intangible assets (Federal regime). For Argentina, Italy, Korea and Malta, figures refer to 2019 instead of 2020 while those for Colombia, Japan and the United States refer to 2018. Provisional figures are reported for the Netherlands and the United Kingdom.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

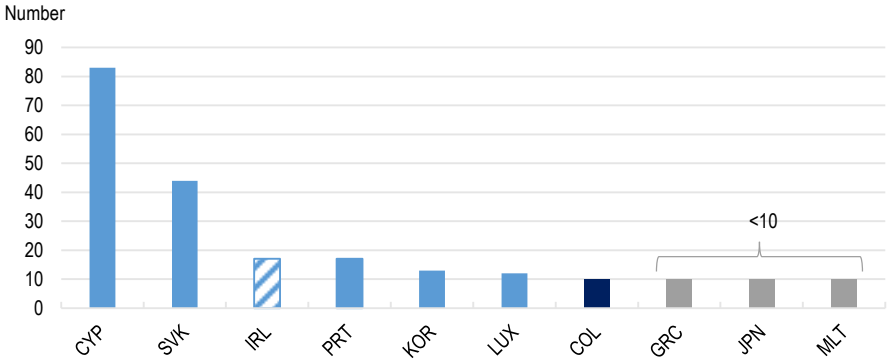
Information on the number of beneficiaries provides a measure of the uptake of income-based tax relief provisions across jurisdictions. Figure 4.2 reports on the number of income-based tax relief recipients in 2020 (or the latest available year), with separate figures reported for the two income-based tax incentives in the case of Belgium due to the non-additive nature of beneficiary figures across the two incentives. [16] Bars are shaded in dashed blue (dark blue) when figures refer to claimants (applicants) instead of beneficiaries.[17]

Figure 4.2. Number of income-based tax relief beneficiaries, 2020

Panel A. Countries with 100 or more beneficiaries



Panel B. Countries with less than 100 beneficiaries

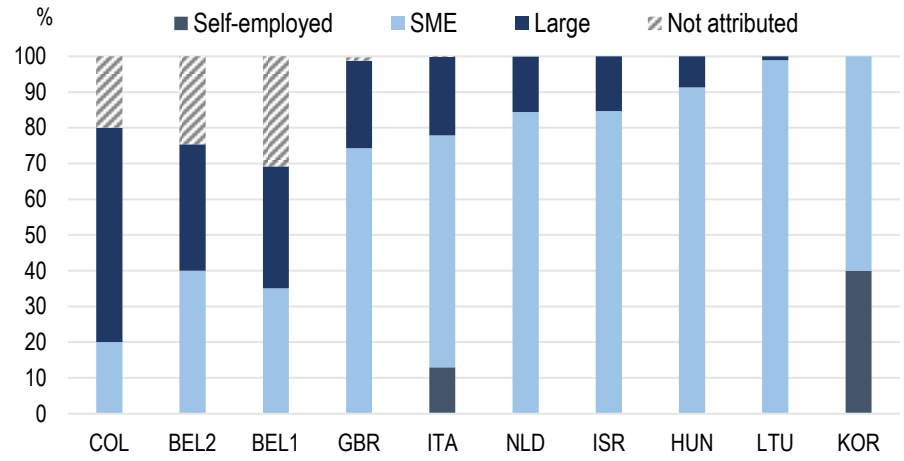


Note: This indicator is preliminary and may only provide an incomplete picture of the overall uptake of income-based tax support for R&D and innovation. For a number of countries, beneficiary figures are currently either not available (Argentina, Canada – Province of Québec, China, Czechia, Romania, Switzerland, Türkiye and Thailand) or cover only a subset of regimes (see Table B.2 and Table B.3). In the case of Spain, figures refer to the partial exemption for income from certain intangible assets (Federal regime). In the case of Ireland, the United Kingdom and the United States, figures refer to claimants instead of beneficiaries and in the case of Colombia, they refer to applicants. For, Italy, Korea, Malta, the Netherlands, and Spain, figures refer to 2019 instead of 2020 while those for Colombia, Japan and the United States they refer to 2018. BEL1 refers to the Deduction for patent income and BEL2 refers to the Deduction for innovation income; beneficiary figures are not additive in the case of Belgium. For Italy, the total number of beneficiaries – sum of three non-additive scheme components – might be slightly overestimated. In the case of Greece, Japan and Malta, with less than ten recipients (Panel B), data are rounded to 10 for confidentiality reasons.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

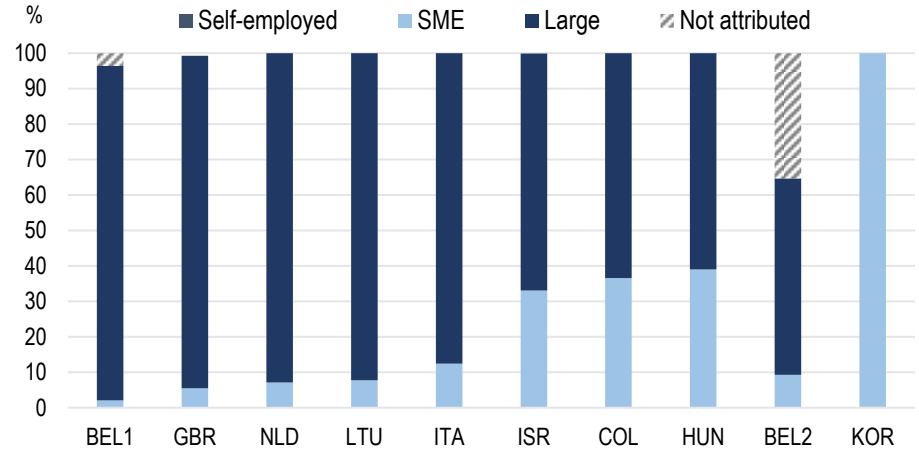
Panel A reports on countries with 100 or more beneficiaries and Panel B on countries with less than 100 beneficiaries. In 10 out of 21 countries (Panel B), less than 100 firms benefitted from income-based tax relief, with close to 20 recipients in Ireland and around 80 recipients in Cyprus, for instance. In the case of the other 11 countries (Panel A), more than 100 firms received income-based tax relief for R&D and innovation, the most recipients being reported by Poland (~4620), followed by the United States (~3910) and Italy (~3260).[18]

Figure 4.3. Distribution of income-based tax relief by firm size, 2020

Panel A. Number of tax relief recipients



Panel B. Cost of income-based tax relief for R&D and innovation

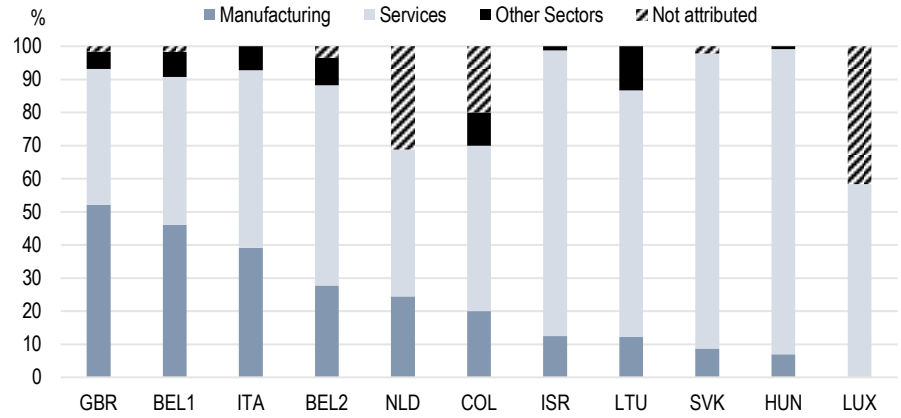


Note: This indicator is preliminary and may only provide an incomplete picture of the distribution of the uptake (Panel A) and cost (Panel B) of income-based tax support for R&D and innovation by firm size. For a number of countries, such granular data are currently either not available or cover only a subset of regimes (see Table B.2 and Table B.3). In the case of Ireland, United Kingdom and the United States, figures refer to claimants instead of beneficiaries, and in the case of Colombia, they refer to applicants. For Italy figures refer to 2019 instead of 2020, while those for Colombia and Korea refer to 2018. BEL1 refers to the Deduction for patent income and BEL2 refers to the Deduction for innovation income; beneficiary figures are not additive in the case of Belgium. The breakdowns for Japan and Malta are not included due to low uptake of the scheme.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

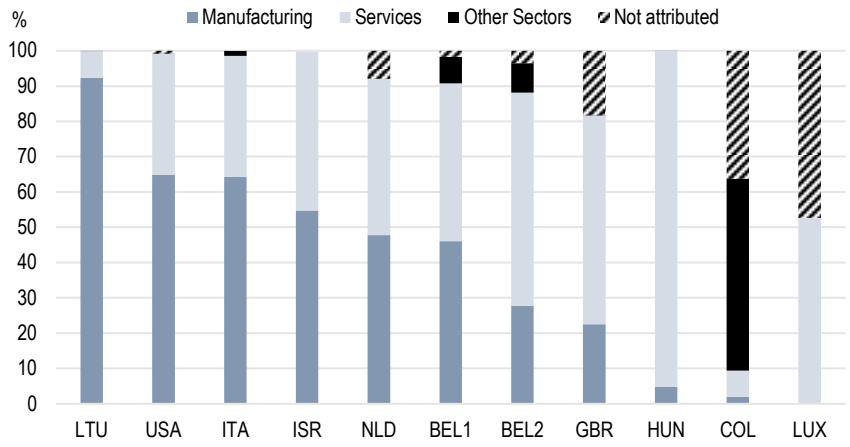
The cost and uptake of income-based tax relief varies across firm sizes and industries (Figure 4.3 and Figure 4.4). For a majority of income-based tax relief recipients in 2020 (or closest year) are SMEs, while the distribution of income-based tax benefits is largely tilted towards large firms (Figure 4.3). This result appears to reflect the degree of concentration of eligible IP assets and related income among a small number of large, typically multinational, corporations (Dernis et al., 2019[13]; Appelt et al., 2016[14]).

Figure 4.4. Distribution of income-based tax support by industry, 2020

Panel A. Number of tax relief recipients



Panel B. Cost of income-based tax relief for R&D and innovation



Note: This indicator is preliminary and may only provide an incomplete picture of the distribution of the uptake (Panel A) and cost (Panel B) of income-based tax support for R&D and innovation by industry. For a number of countries, such granular data are currently either not available or cover only a subset of regimes (see Table B.2 and Table B.3). In the case of Ireland, United Kingdom and the United States, figures refer to claimants instead of beneficiaries, and in the case of Colombia, they refer to applicants. For Italy figures refer to 2019 instead of 2020, while those for Colombia and Korea refer to 2018. BEL1 refers to the Deduction for patent income and BEL2 refers to the Deduction for innovation income; beneficiary figures are not additive in the case of Belgium. The breakdowns for Japan and Malta are not included due to low uptake of the scheme.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

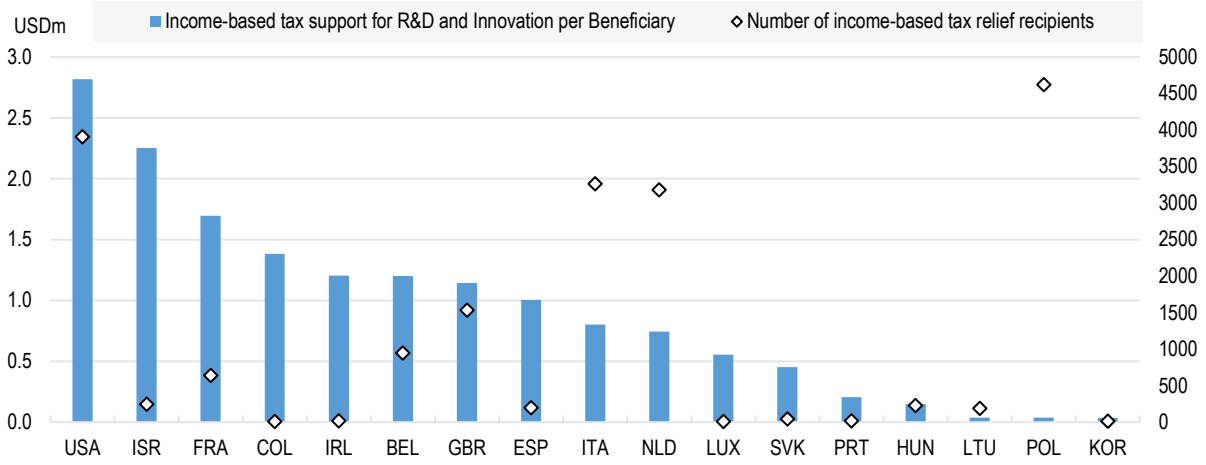
While there is also significant heterogeneity in the take-up and cost of income-based tax support by industry among the ten countries covered (Figure 4.4), no clear-cut pattern emerges regarding the distribution of the take-up and cost of income-based tax relief across firms in different industry groups. This may be a reflection of cross-countries differences in the R&D and IP filing activity of certain industries and level of qualifying income eligible under different income-based tax incentives.

Leveraging information on the total cost of income-based tax support and the number of income-based tax relief beneficiaries within a country, it is possible to calculate the average amount of tax relief per beneficiary across regimes. Figure 4.5 reports the average amount of income-tax relief (in current USD

million) that beneficiaries received across countries in 2020 (or latest year). In 9 out of 17 cases, firms received on average less than USD 1 million in income-based tax relief. In the median country, the average amount of tax relief per beneficiary is equal to USD 800 000. This amount is largest in the United States, Israel and France, and it reaches less than USD 100 000 in Lithuania, Poland and Korea. While average subsidy amounts are influenced by outliers (in contrast to median values), they provide a first and sometimes the only available indication of the magnitude of income-based tax subsidies. This is particularly the case when other statistical moments (e.g. median) in the distribution of income-based tax relief cannot be retrieved due to limited access to relevant microdata. However, the drivers of such levels of implicit subsidy can be a function of several factors such as differences in the number, size and production intensity of beneficiaries and the generosity of income-based tax relief across countries.

Figure 4.5. Average amount of income-based tax support per beneficiary, 2020

Average amount of income-based tax subsidy



Note: This indicator is preliminary and may only provide an incomplete picture of the average amount of income-based tax subsidy for R&D and innovation. For a number of countries, cost and beneficiary figures are currently either not available (Argentina, China, Canada – Province of Québec, Czechia, Switzerland, Türkiye and Thailand) or cover only a subset of regimes (see Table B.2 and Table B.3). In the case of Spain, figures refer to the partial exemption for income from certain intangible assets (Federal regime). In the case of Ireland, the United Kingdom and the United States, figures are based on claimants instead of beneficiaries, and in the case of Colombia, they refer to applicants. For Italy, Korea, the Netherlands and Spain, figures refer to 2019 instead of 2020 while those for Colombia and the United States refer to 2018. Provisional figures are reported for the Netherlands and the United Kingdom. BEL1 refers to the Deduction for patent income and BEL2 refers to the Deduction for innovation income; beneficiary figures are not additive in the case of Belgium. For Italy, the total number of beneficiaries – sum of three non-additive scheme components – might be slightly overestimated, understating the average amount of income-based tax relief per beneficiary. The figures for Greece, Japan and Malta are not included due to low uptake of the scheme.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

4.2. Trends in the cost and uptake of income-based tax relief

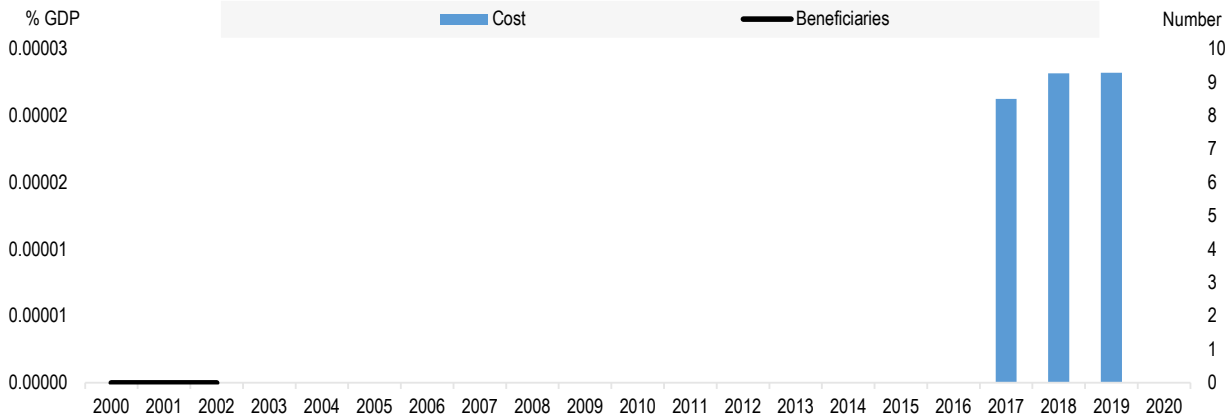
This section describes the main trends in the cost and uptake of IBTIs, taking a long-run (2000-2020 period) and more short-run (2015-2020 period) perspective. It provides a summary overview of the country-specific trends in the cost and uptake of IBTIs in overall twenty-two jurisdictions over the 2000-2020 period, including cross-country overview of key trends observed in the OECD area and beyond. This is followed by an exploratory analysis of the more short-term trends in the cost and uptake of IBTIs between 2015 and 2020, covering a subset of fifteen countries for which relevant data are available.

Long-term trends, 2000-2020

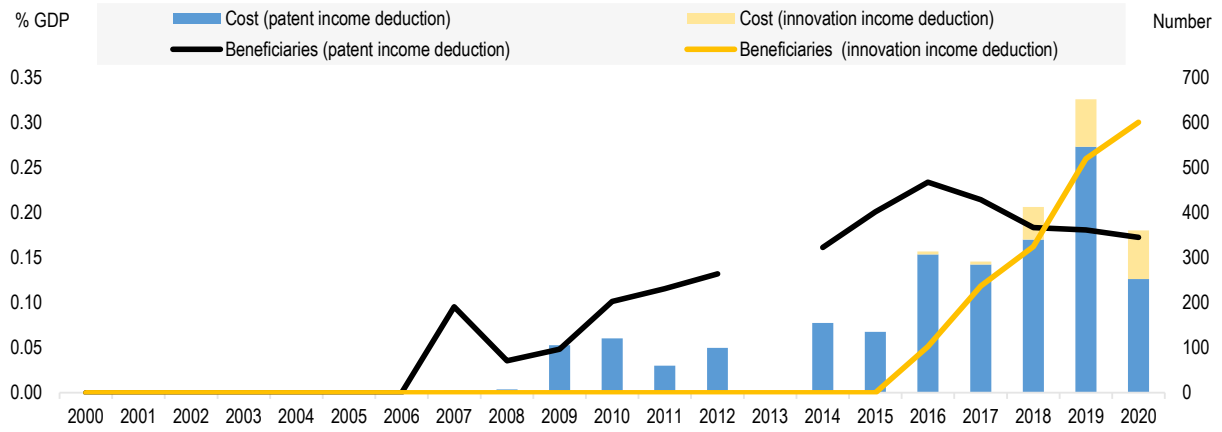
Time-series data on the cost and uptake of income-based tax support over the 2000-2020 period are currently available for overall twenty-two jurisdictions (Argentina, Belgium, Colombia, Cyprus, France, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovak Republic, Spain the United Kingdom and the United States).[19] Over the 2000-2020 period, an increase in the cost and uptake of income-based tax relief can be observed (Figure 4.6) in nearly all twenty-two countries covered, with the exception of Colombia, Cyprus, and Ireland.

Figure 4.6. Country-specific trends in cost and uptake of income-based tax relief, 2000-20

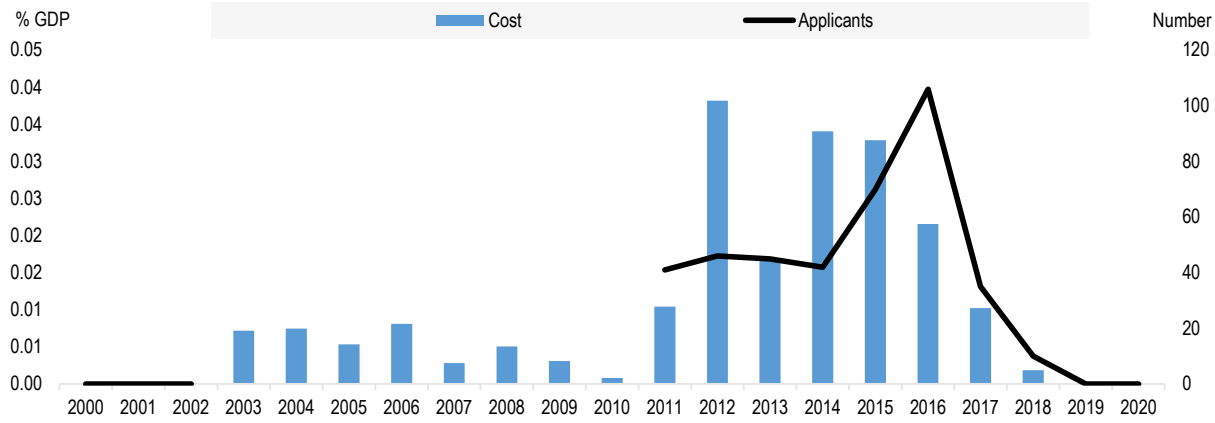
Panel A. Argentina



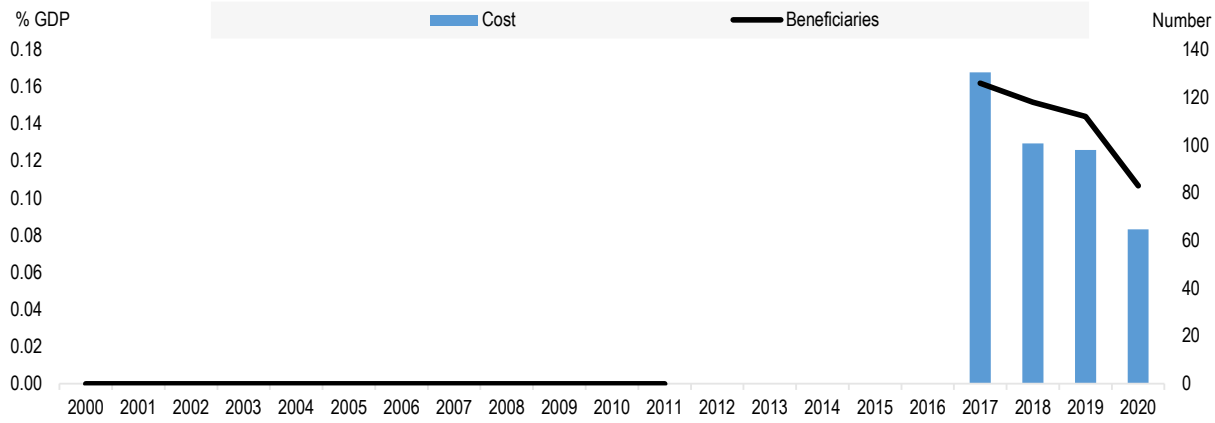
Panel B. Belgium



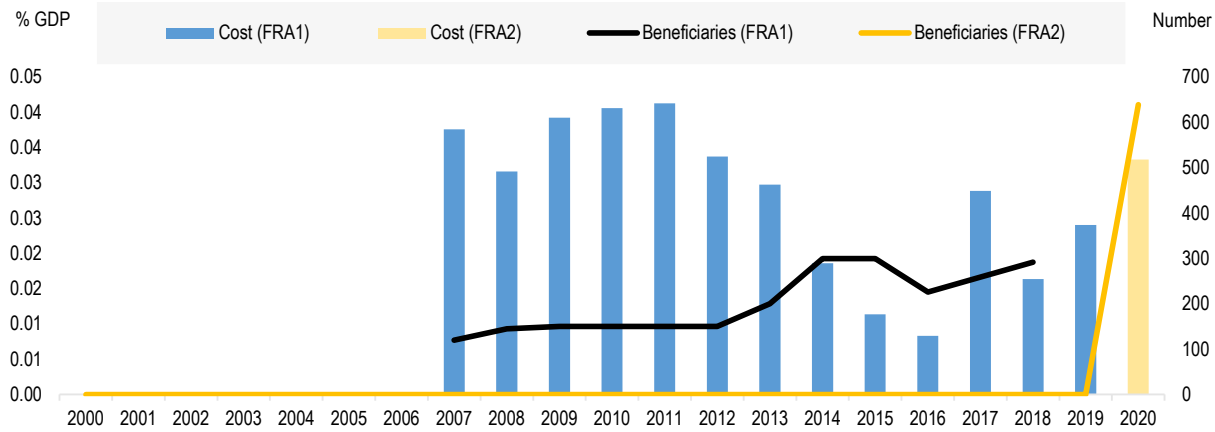
Panel C. Colombia



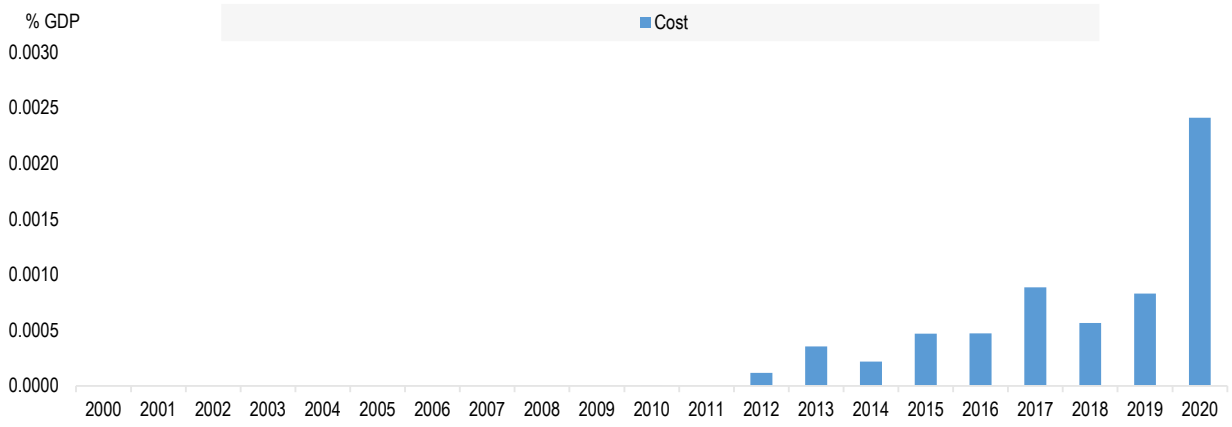
Panel D. Cyprus



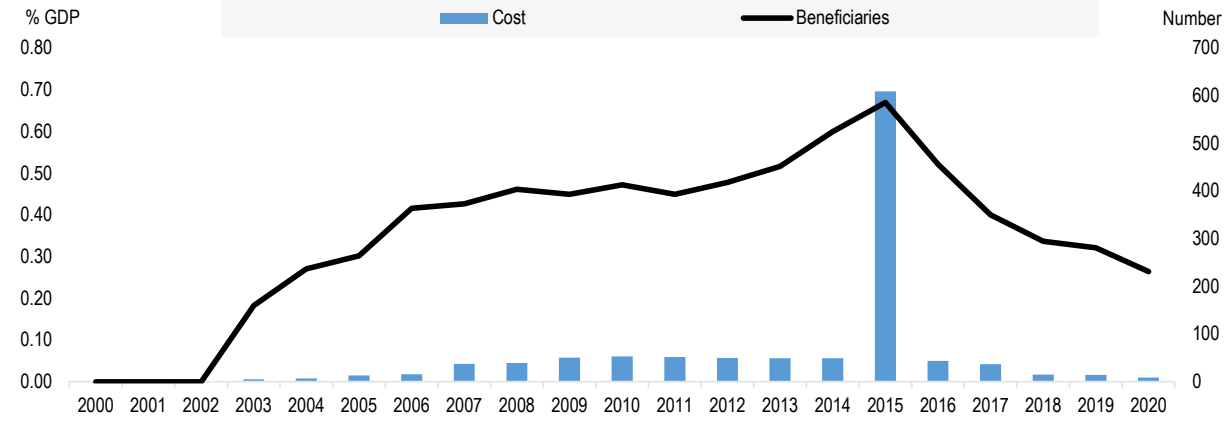
Panel E. France



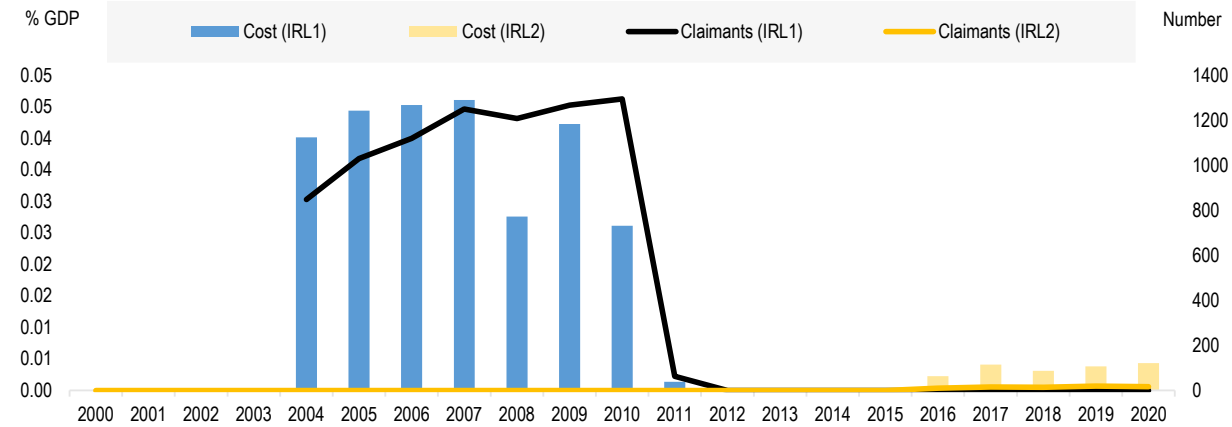
Panel F. Greece



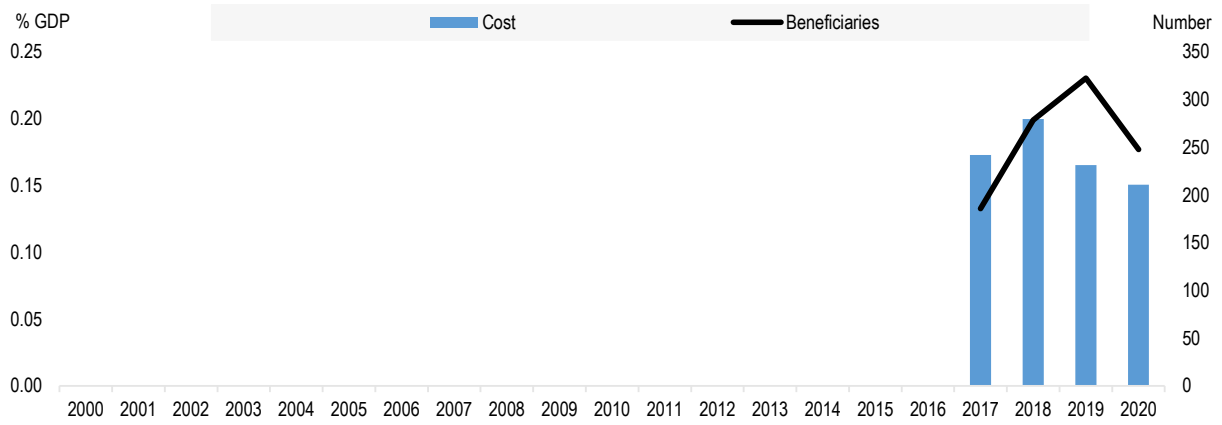
Panel G. Hungary



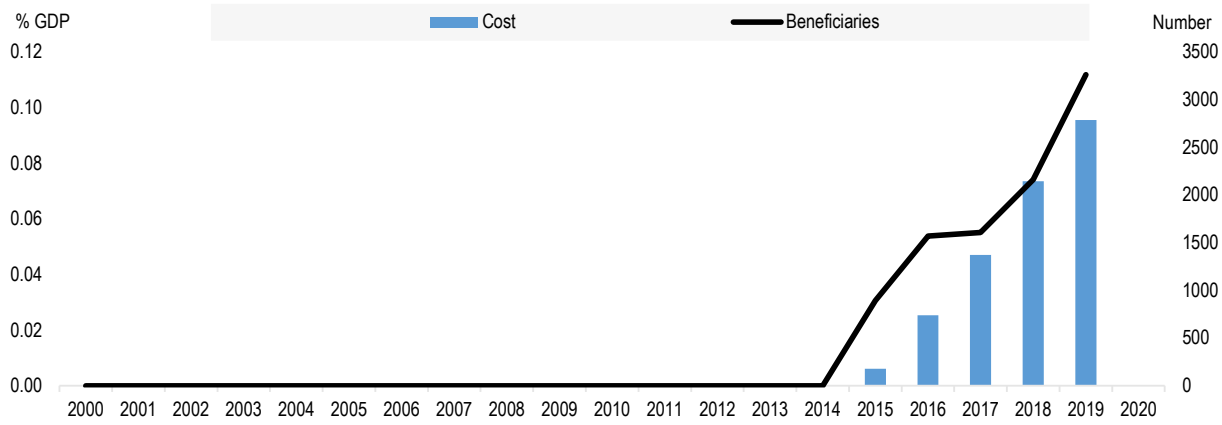
Panel H. Ireland



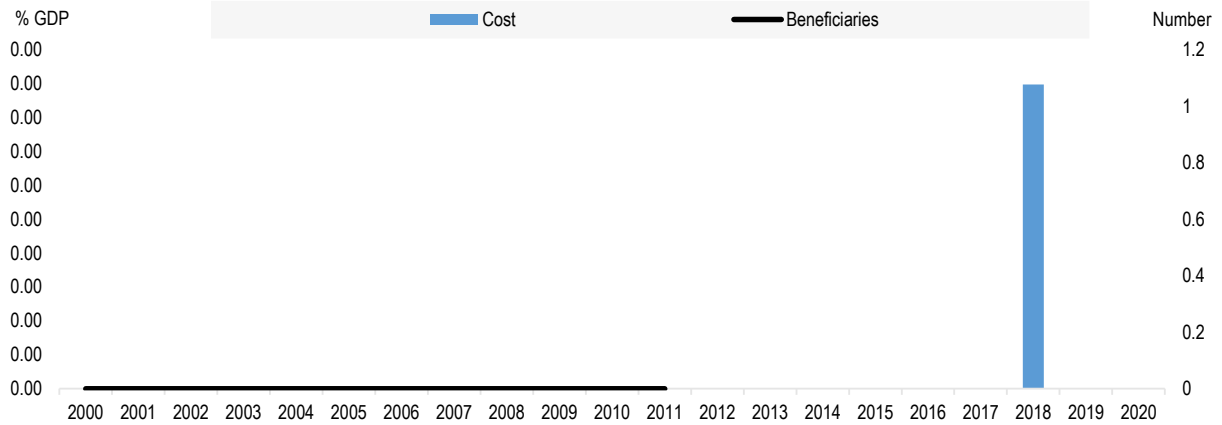
Panel I. Israel



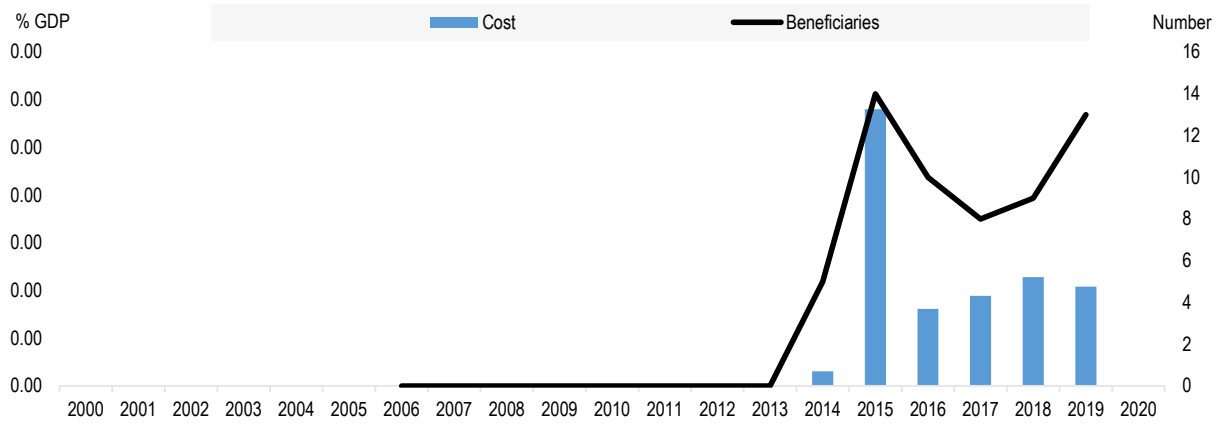
Panel J. Italy



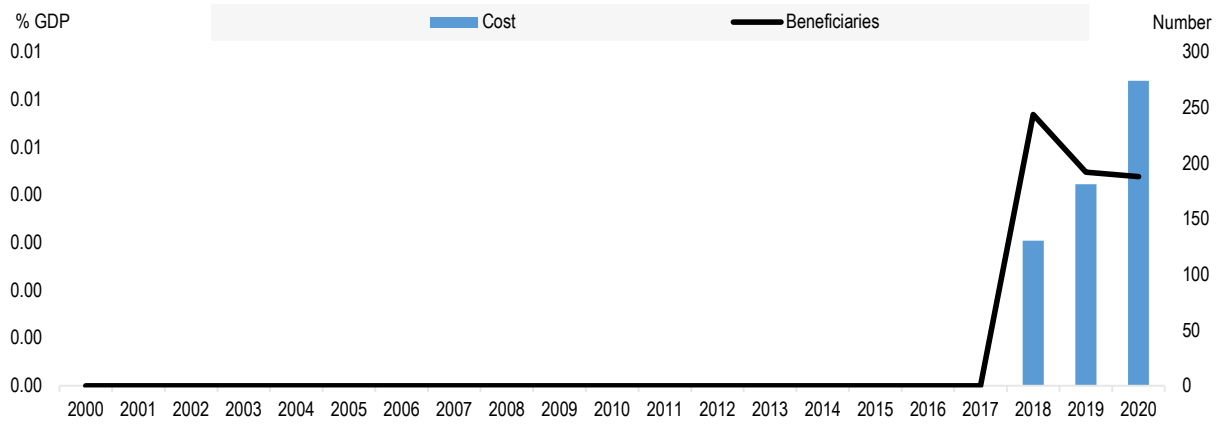
Panel K. Japan



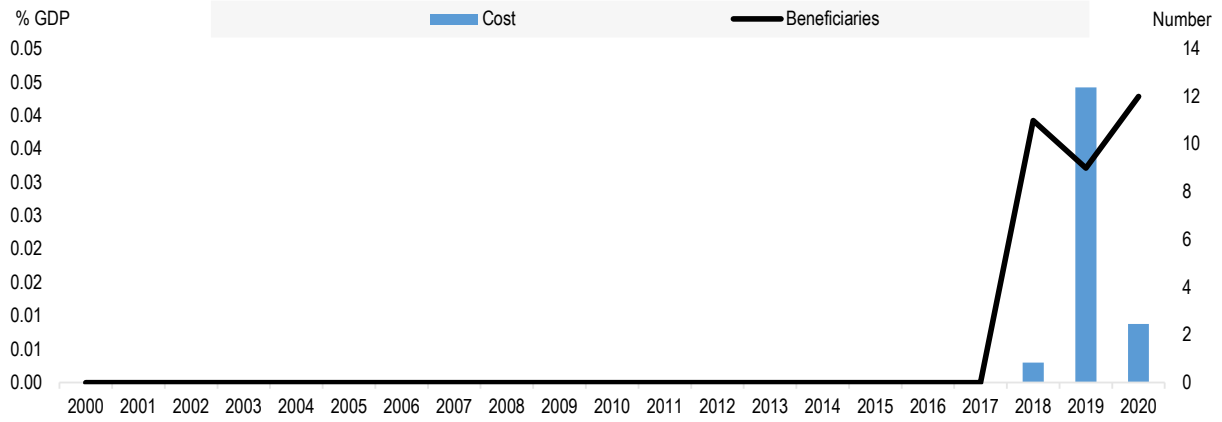
Panel L. Korea



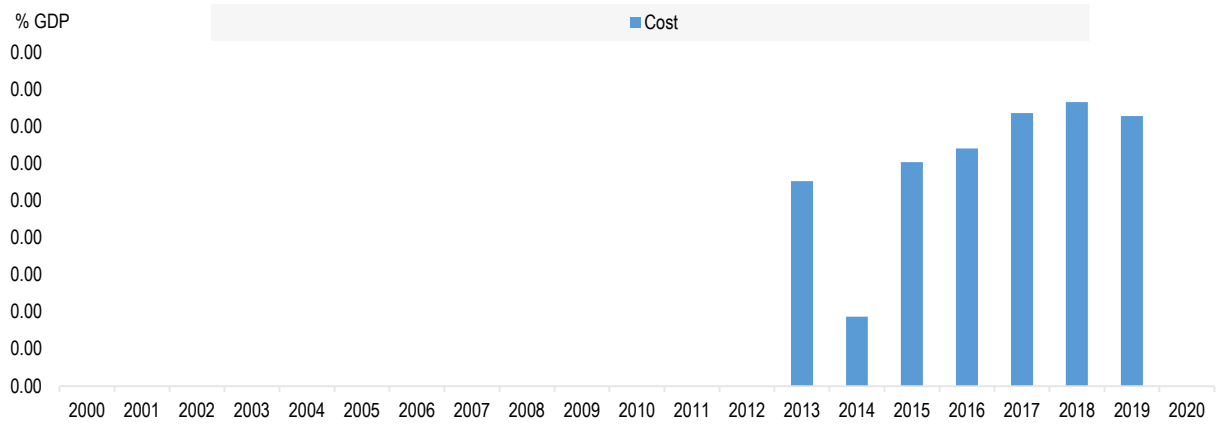
Panel M. Lithuania



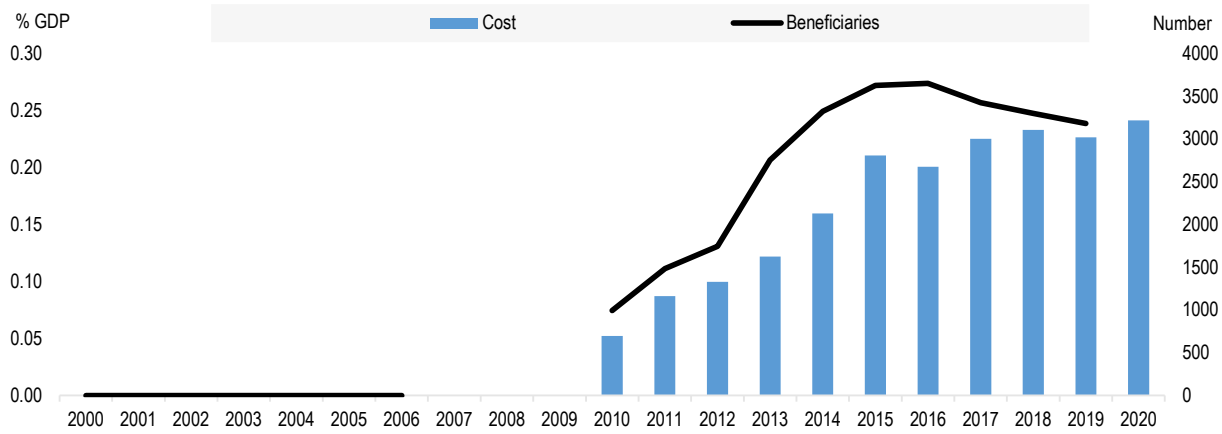
Panel N. Luxembourg



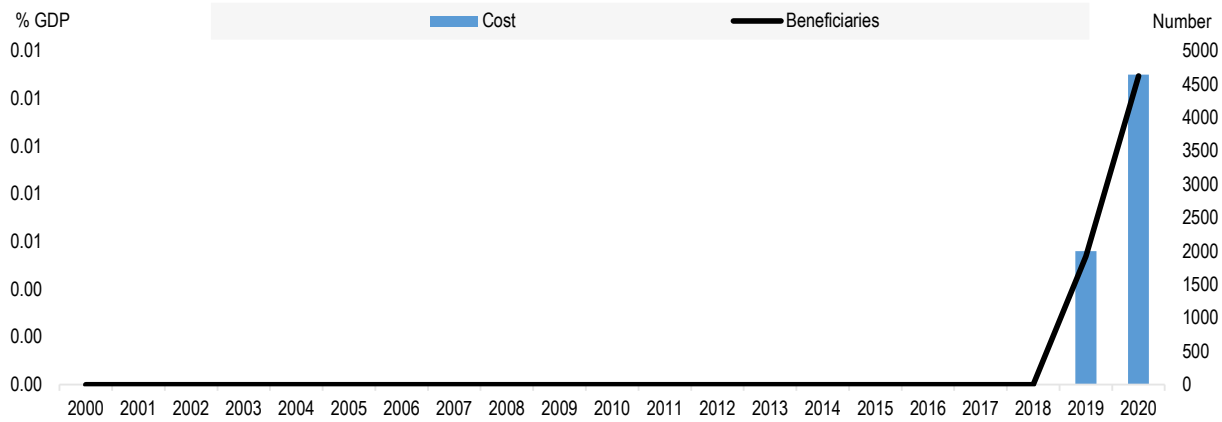
Panel O. Malta



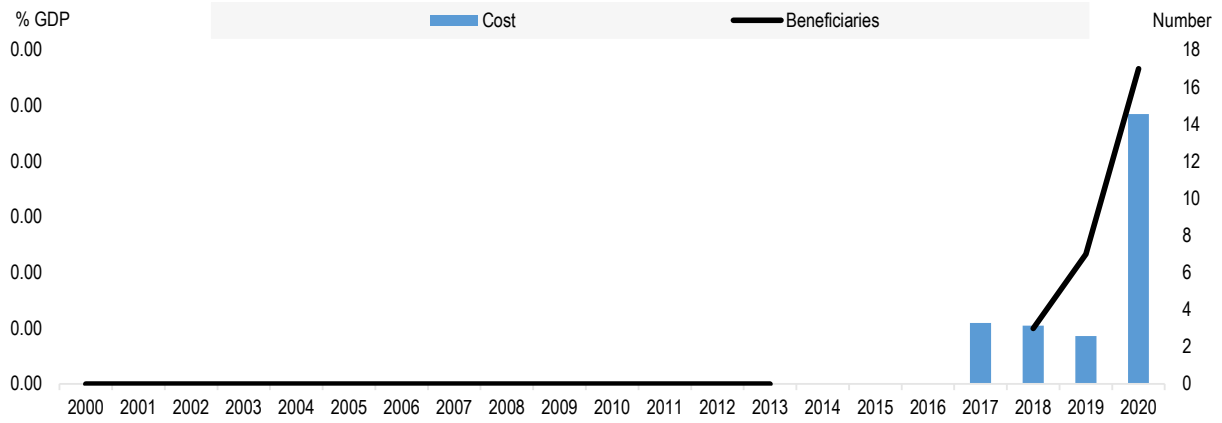
Panel P. Netherlands



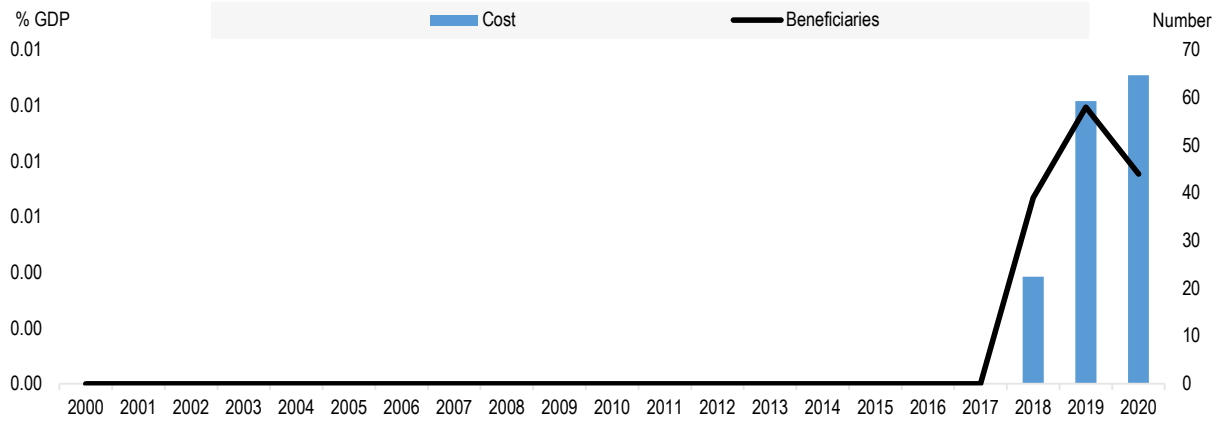
Panel Q. Poland



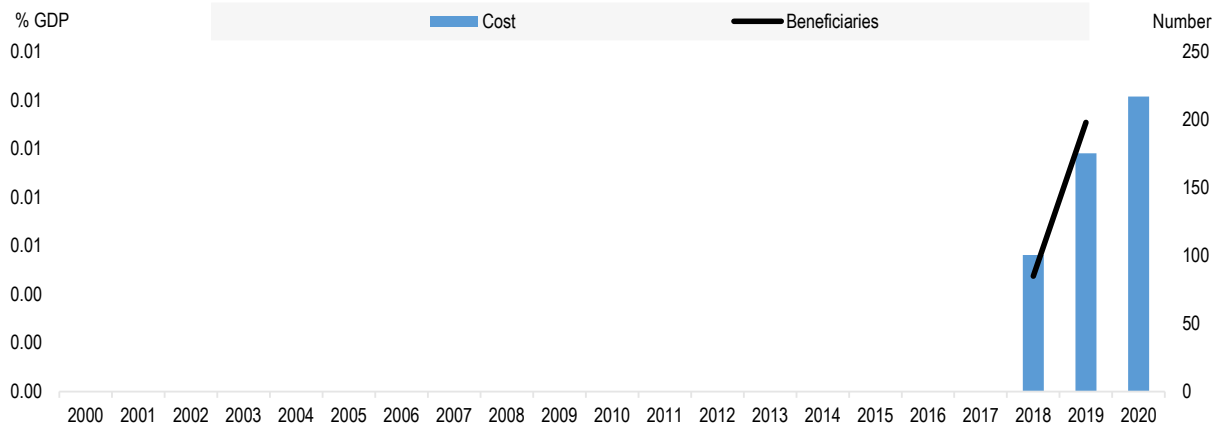
Panel R. Portugal



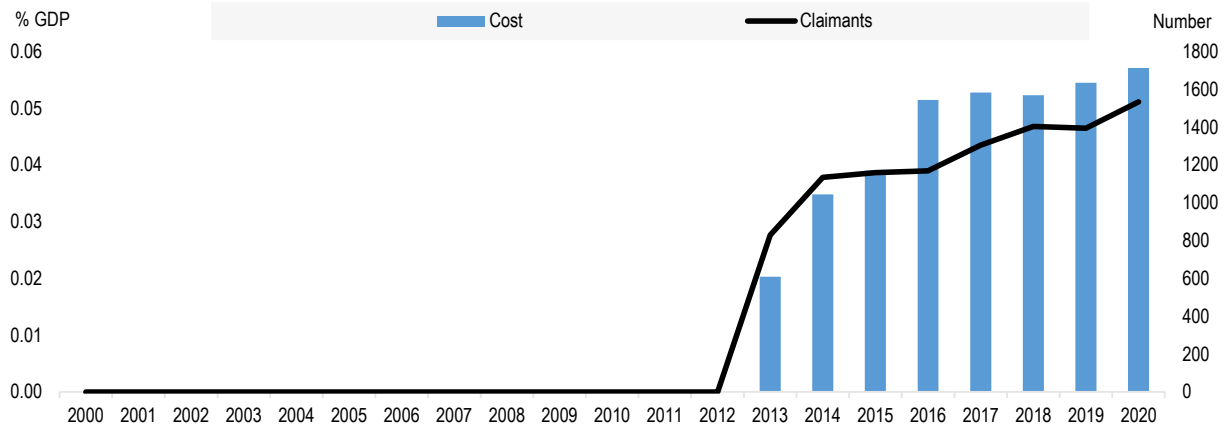
Panel S. Slovak Republic



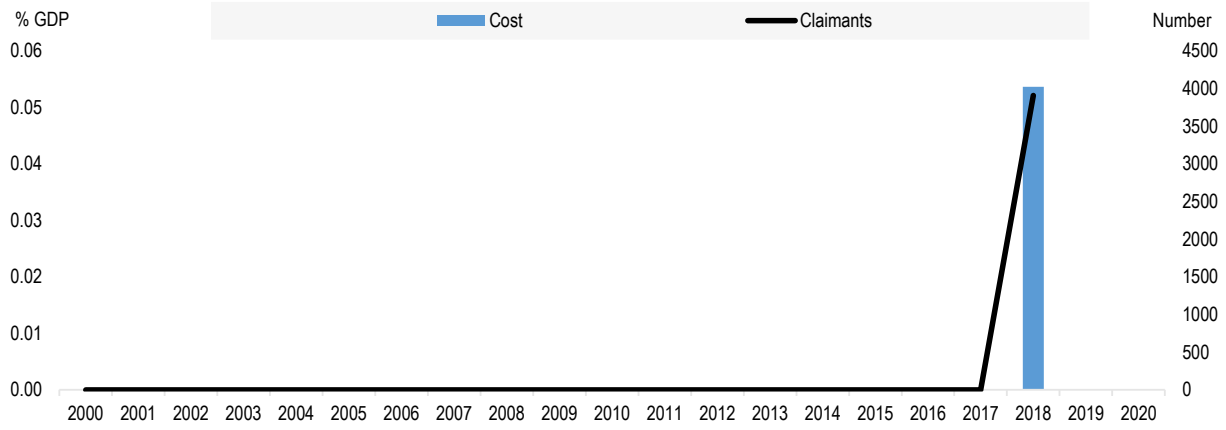
Panel T. Spain



Panel U. United Kingdom



Panel V. United States



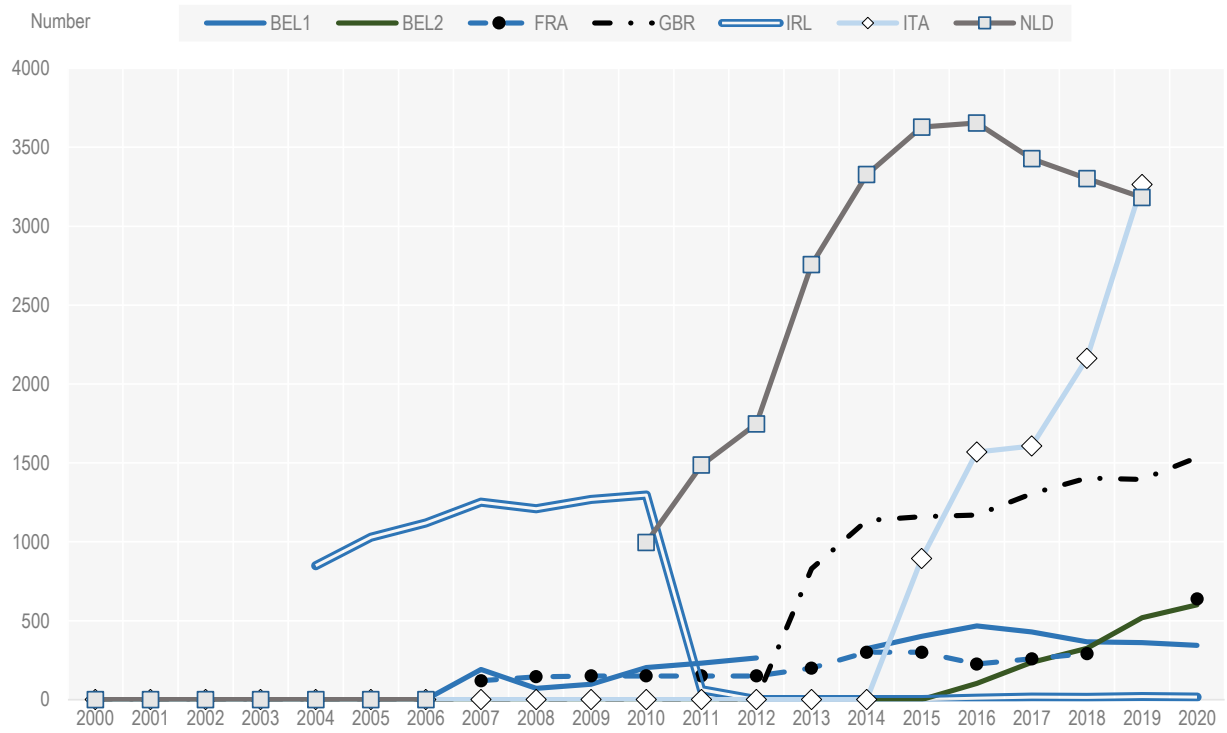
Note: This figure presents data (schemes and years of data availability in brackets) for countries for which relevant cost and/or beneficiary figures are available: Argentina (Software Promotional Regime, 2017-19), Belgium (BEL1: deduction for patent income, 2007-12, 2014-20; BEL2: deduction for innovation income, 2016-20), Colombia (Tax exemption on new software with high scientific content, 2003-18), Cyprus (IP Box regime – new regime, 2016-20), France (FRA1: Reduced rate for long term capital gains and profits from the licensing of IP rights, 2007-19; FRA2: Reduced corporation tax rate on IP income, 2020), Greece (Tax patent incentives, 20120-20), Hungary (IP regime for royalties and capital gains, 2003-20), Ireland (Knowledge development box - first regime, 2004-11; Knowledge development box - second regime, 2016-20), Israel (Preferred technology enterprise regime, 2017-20; Special preferred technology enterprise regime, 2017-20), Italy (Taxation of income from intangible asset, 2015-19), Japan (Tax incentive for specified business in the National Strategic Zones, 2018), Korea (Tax reduction for transfer of technology - second regime, 2014-19, estimates for the first regime, available until 2005 are not available; Tax reduction for leases of technology - second regime; 2015-19, estimates for the first regime, available until 2005 are not available), Lithuania (IP taxation regime, 2018-20), Luxembourg (IP regime, 2018-20), Malta (Exemption on royalties derived from patent rules, 2013-19), the Netherlands (Innovation Box, 2010-20), Poland (IP box, 2019-20), Portugal (Partial exemption for income from certain intangible property, 2017-20), Slovak Republic (Patent box, 2018-20), Spain (Partial exemption for income from certain intangible assets - Federal regime, 2018-2020), the United Kingdom (Patent Box, 2013-20), and the United States (Foreign derived intangible income - FDII, 2018). In the case of three countries (Greece, Japan and Malta) with less than ten recipients, beneficiary figures are not displayed in this chart for confidentiality reasons. For Argentina, beneficiary figures are not available. For Italy, the total number of beneficiaries – sum of three non-additive scheme components – might be slightly overestimated. In the case of Ireland and the United Kingdom, figures refer to claimants instead of beneficiaries, and in the case of Colombia, they refer to applicants.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

Putting together all country trends, the cost and uptake of income-based tax support increases overall across the board but differences in levels and changes call for more in-depth examination. Figure 4.7 provides a summary overview of cross-country trends in uptake (Panel A) and cost (Panel B) of income-based tax relief for selected OECD countries over the 2000-20 period, where relevant longitudinal data are available for a time span of at least four years. It shows a general upward trend in the cost and uptake of income-based tax relief across most OECD countries (Ireland is one exception), but also points to some significant differences in the overall magnitude and evolution of income-based tax relief across the countries under consideration (see also Figure 4.6). Fluctuations in the cost of income-based tax support may be expected when new profitable IP assets apply for the IBTI or the period of tax benefits expires.

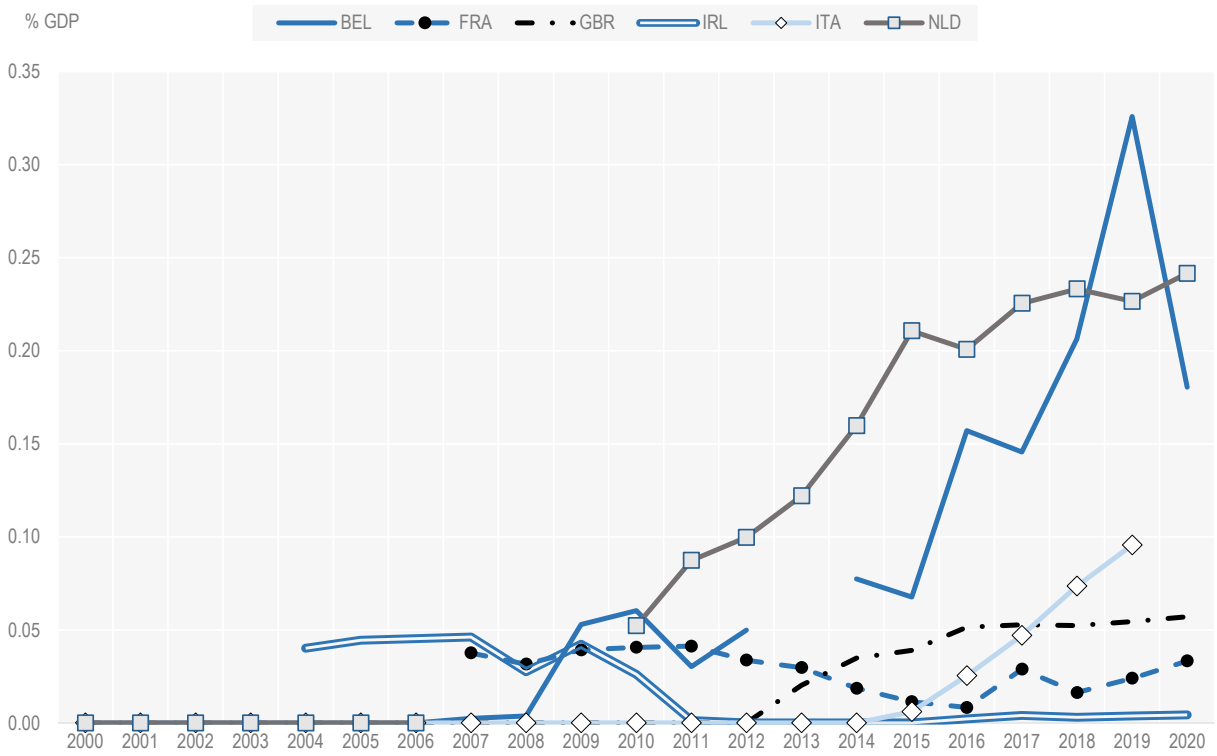
Some fluctuations are also observable around the time of BEPS Action 5 implementation (Figure 4.6 and Figure 4.7), such as the short-term spike in Hungary (2015) and Korea (2015), the short-term drop in Malta (2014) or France (2019). But apart from these sometimes only short-term fluctuations observable in some OECD economies, the upward trend in the cost and uptake of income-based tax support does not appear to significantly change after the introduction of the BEPS Action 5 minimum standard in most countries for which relevant data are available.[20] That said, data limitations prevent a more comprehensive and systematic analysis of the impact of BEPS Action 5 at this stage.

Figure 4.7. Cross-country trends in income-based tax relief, selected OECD countries, 2000-20

Panel A. Number of tax relief beneficiaries



Panel B. Cost of income-based tax relief for R&D and innovation



Note: This figure presents data (schemes and years of data coverage in brackets) for Belgium (BEL1: deduction for patent income, 2007-20; BEL2: deduction for innovation income, 2016-20), France (Reduced rate for long term capital gains and profits from the licensing of IP rights, 2007-19; Reduced corporation tax rate on IP income), Ireland (Knowledge development box - first regime, 2004-11; Knowledge development box - second regime, 2016-20), Italy (Taxation of income from intangible assets, 2015-19), and the Netherlands (Patent box, 2007-09; Innovation Box, 2010-20 and the United Kingdom (Patent Box, 2013-20). In the case of Ireland and the United Kingdom, figures refer to claimants instead of beneficiaries.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

Short-term trends, 2015-2020

Around the time of BEPS Action 5 implementation, countries with regimes in scope of the minimum standard amended their regimes in line with BEPS Action 5 or introduced new nexus compliant regimes. Analysing the impact of BEPS Action 5 is met with significant data limitations as the necessary data to analyse the effect of BEPS Action 5 minimum standard is lacking.

Among the twenty-two countries under consideration, six countries (Italy - 2015, Ireland – 2016, Lithuania - 2018, Poland - 2019, Slovak Republic – 2018, United States - 2018) only launched IBTIs in 2015 or thereafter, while complete data, spanning the pre-BEPS and post BEPS period, are only available for 9 out of the 16 remaining countries where IBTIs were already in place in 2015. This largely limits the possible scope of the analysis of BEPS Action 5. In addition, at the time of implementing the BEPS Action 5 minimum standard, some countries put in place transitional measures that allowed taxpayers already benefiting from an existing regime to keep their entitlements until no longer than 30 June 2021 (Table A.1). This implies that for countries with transitional measures, there was a period of coexistence of the nexus compliant regime with the pre-nexus compliant regime (albeit closed to new entrants[21]). Only three countries (Belgium[22], France[23], Ireland) are currently in a position to report separate estimates for pre-nexus vs. post nexus regimes. This in turn makes it challenging to disentangle the extent to which more

recent changes in the cost of IBTIs or number of recipients are driven by pre- vs. post-nexus regimes, i.e., by the introduction of the BEPS Action 5 minimum standard.

With these caveats in mind, Figure 4.8 provides a snapshot of the evolution of the magnitude of income-based tax relief over time. It shows how the number of income-based tax relief recipients (Panel A) and cost of income-based tax support (Panel B and C) have changed between 2015 and 2020 (or closest years) in the fifteen countries for which data are available. The left-hand side of the chart shows countries where IBTIs were already in place in 2015 (9 countries for which complete data is available for both 2015 and 2020), while the right-hand side shows countries where IBTIs became available in 2015 or subsequent years (Italy - 2015, Ireland – 2016[24], Lithuania - 2018, Poland - 2019, Slovak Republic – 2018, United States - 2018). Panel B reports the growth (absolute change) in the amount of income-based tax support as a percentage of GDP, whereas Panel C reports changes in constant USD million (2015 prices).

Among the nine countries where IBTIs were already in place in 2015 and for which complete data is available for 2015 and 2020, the number of beneficiaries (Panel A) increased in one third of them, while the cost of IBTIs as a percentage of GDP (Panel B) rose in around half of them. As Panel A shows, the number of income-based tax relief recipients increased in three countries (United Kingdom, France, Greece), stayed constant in two countries (Malta, Korea) and declined in four (Belgium, Colombia, Hungary, Netherlands) between 2015 and 2020. The cost of income-based tax relief as percentage of GDP (Panel B) rose in four countries (Belgium, Netherlands, France, United Kingdom); stayed constant in three (Greece, Malta, Korea) and declined in two (Hungary and Colombia, which repealed its scheme in 2017). In absolute levels (Panel C), the cost of this support rose in five countries (Belgium, Netherlands, France, United Kingdom, Greece), stayed constant in one (Malta) and declined in three (Korea, Hungary and Colombia). Despite the decrease in the number of beneficiaries, the cost of IBTIs increased in some countries (e.g. Netherlands).

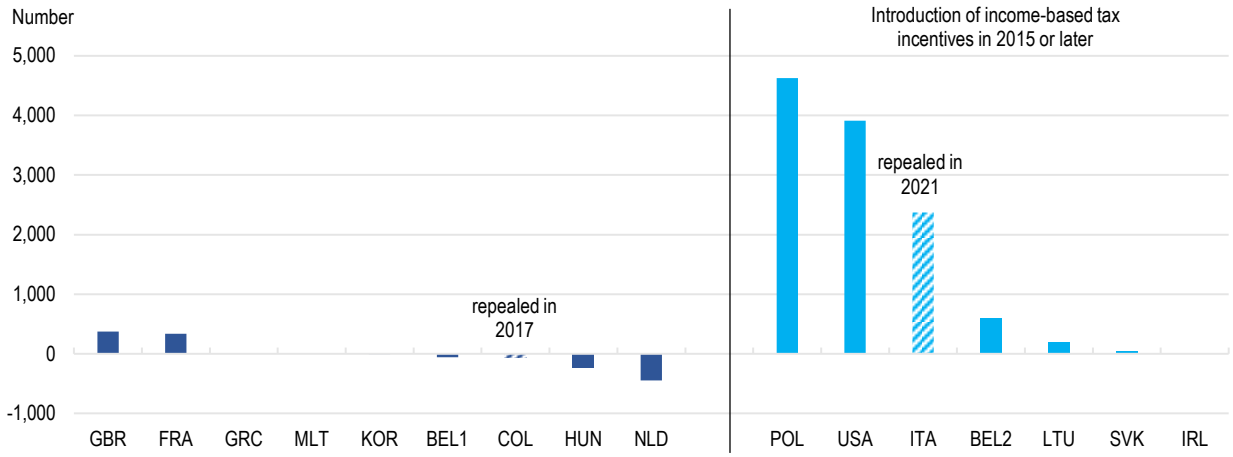
Apart from Belgium, where the increase in income-based tax support is in absolute levels less marked than in relative terms, the two analyses (Panel B and C) yield similar results. The growth in the cost of income-based tax relief over time appears to have been moderate in the nine countries covered – both in relative and absolute terms. In the median OECD country, the cost of income-based tax relief increased by 0.01% of GDP in relative terms and by USD 20 million in absolute levels (Const. USD million) between 2015 and 2020 (or closest years). This finding appears to match the observation that the rate of preferential tax treatment provided by income-based incentives changed on average little in OECD countries over the 2015-22 period (González Cabral et al., 2023[4]). Similarly, the number of income-based tax relief recipients only changed moderately over the 2015-2020 period. In the median OECD country, the number of beneficiaries increased by 30 from 2015 to 2020 and stayed effectively constant (decline in the number of beneficiaries by one) when the subset of nine countries that already offered IBTIs in 2015 is considered.

By construction, the number of income-based tax relief recipients and cost of income-based tax relief - as a percentage of GDP (Panel B) and in absolute levels (Panel C) - increased from 2015 to 2020 (or closest years) in all six countries that launched income-based tax incentives in 2015 or subsequent years. Among those countries, the largest absolute increase in the uptake of IBTIs has been reported by Poland (~4600 beneficiaries), followed by the United States (~3900 beneficiaries), while the strongest increase in the cost of income-based tax support can be observed for Italy (0.09% of GDP, Const. USD million 2100) which in fact abolished and replaced its income-based incentive with a cost-based incentive in 2021.

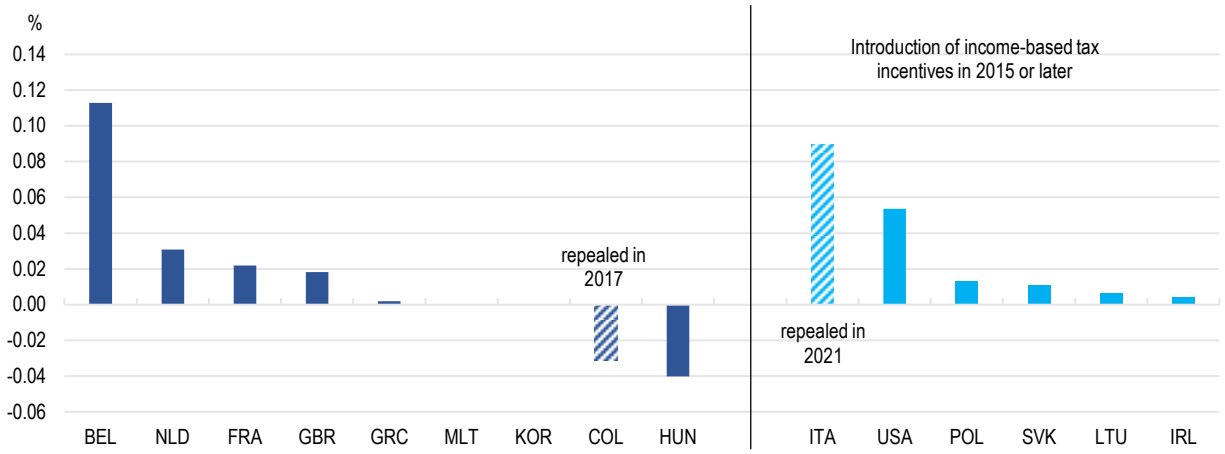
As the work on the design and modelling of IBTIs progresses and additional estimates and more comprehensive metadata become available in the future, it will be possible to provide a more in-depth analysis of trends in the uptake and cost of IBTIs for a broader group of OECD countries and other major economies, leveraging the historic design information collected in 2022.

Figure 4.8. Growth in income-based tax support for R&D and innovation, 2020 vs 2015

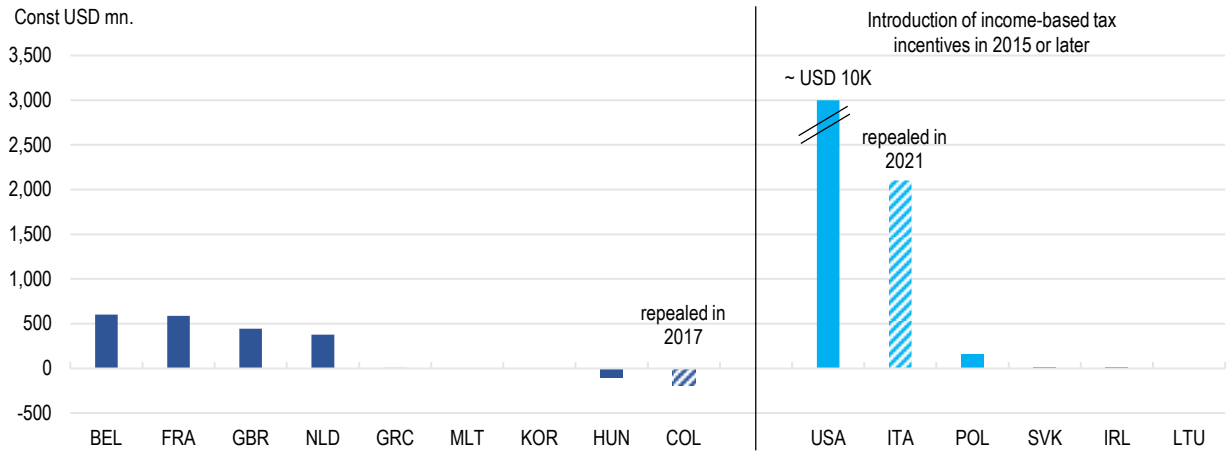
Panel A. Difference in number of tax relief beneficiaries



Panel B. Difference in amounts (as a percentage of GDP)



Panel C. Difference in amounts (Const. USD million)



Note: This indicator is preliminary and may only provide an incomplete picture of the overall magnitude of income-based tax support for R&D and innovation. This figure presents data for fifteen countries for which relevant cost figures are available for 2015 and 2020 (or closest years). For Italy, Korea and Malta, figures refer to 2019 instead of 2020 while those for Colombia and the United States refer to 2018. In the case of the Netherlands cost figures refer to 2020, while beneficiary figures refer to 2019. Provisional figures are reported for the Netherlands and the United Kingdom. For Hungary, figures refer to 2016 instead of 2015. BEL1 refers to the Deduction for patent income and BEL2 refers to the Deduction for innovation income (regime-level identifier in Table A.1); beneficiary figures are not additive in the case of Belgium (country-level identifier, BEL, is used in Panel B).
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

5 Government tax relief for R&D inputs and outputs

Income-based tax incentives are mostly offered alongside expenditure-based tax incentives (Table 5.1), underscoring the need for a new class of policy indicators that provide an integrated view of governments efforts to support R&D and innovation through the tax system - through both expenditure- and income-based tax incentives. With the exception of Luxembourg among OECD countries and Cyprus among EU countries that offer income-based tax support in isolation, most countries combine the use of expenditure-based and income-based tax incentives. In 2022, 20 out of 38 OECD countries and 14 out of 27 EU countries offer tax incentives for both R&D inputs and the outputs of the innovation process.

Table 5.1. Tax incentives for R&D and innovation, 2022

Economies within the scope of this study

Type of tax support	OECD	Non-OECD EU	Other economies
(I) Income-based and expenditure-based	Belgium, Canada(i), Czechia, France, Greece, Hungary, Ireland, Israel, Japan, Korea, Lithuania, Netherlands, Poland, Portugal, Slovak Republic, Spain(ii), Switzerland(i), Türkiye, United Kingdom, United States	Malta, Romania	People's Republic of China, Thailand(iii)
(II) Income-based only	Argentina(iii), Luxembourg	Cyprus	
(III) Expenditure-based only	Australia, Austria, Chile, Colombia, Germany, Denmark, Finland, Iceland, Italy, Mexico, Norway, New Zealand, Slovenia, Sweden	Croatia	Brazil, South Africa
None	Costa Rica, Estonia, Latvia	Bulgaria	

Note: (i) Incentive available at the subnational level. The subnational expenditure-based tax incentive in Switzerland is only available in certain cantons as its introduction was deemed optional (at the discretion of cantons) as part of the 2020 tax reform. The introduction of income-based tax support at the cantonal level was however compulsory for all cantons. (ii)Incentives available at the central and subnational level. (iii) At the time of reporting, the retroactive extension of the R&D tax allowance in Thailand for 2021 is pending government approval. Since 2017, there have been no calls for the R&D tax incentive in Argentina. Country coverage refers to the 48 countries covered in the study, including OECD and EU countries and selected economies and refers to tax incentives available as of July 2022.
Source: OECD.

This section outlines how the existing framework for modelling the implied tax subsidy of IBTIs, developed as part of the KNOWINTAX project, can be extended to additionally capture expenditure-based tax incentives. Furthermore, it presents for the first time some exploratory tax relief indicators of the total level of government tax support for R&D and innovation, drawing upon the expenditure-and income-based tax relief statistics compiled by the OECD.

5.1. Overall implicit tax subsidy for R&D and innovation

In most countries offering income-based tax incentives, expenditure-based tax incentives to R&D and innovation are also available to firms as part of the innovation promotion package. As aforementioned, with only two exceptions among OECD countries and EU countries, all countries offer income-based tax support alongside expenditure-based tax incentives.

The possibility to use both forms of support calls for a better understanding of the overall implicit tax subsidies that governments provide innovative firms through the tax system. Firms may combine the use of expenditure-based and income-based tax incentives at different stages of the innovation lifecycle. Expenditure-based R&D tax incentives may be used early on the investment to support the R&D investment as they target the inputs of the innovation process. Income-based tax incentives may be accessed once the innovation has emerged and is being commercially exploited as these incentives target the output of the innovation process. Over time, it is key to understand how both forms of support combine and interact to ascertain the level of combined support offered through the tax system.

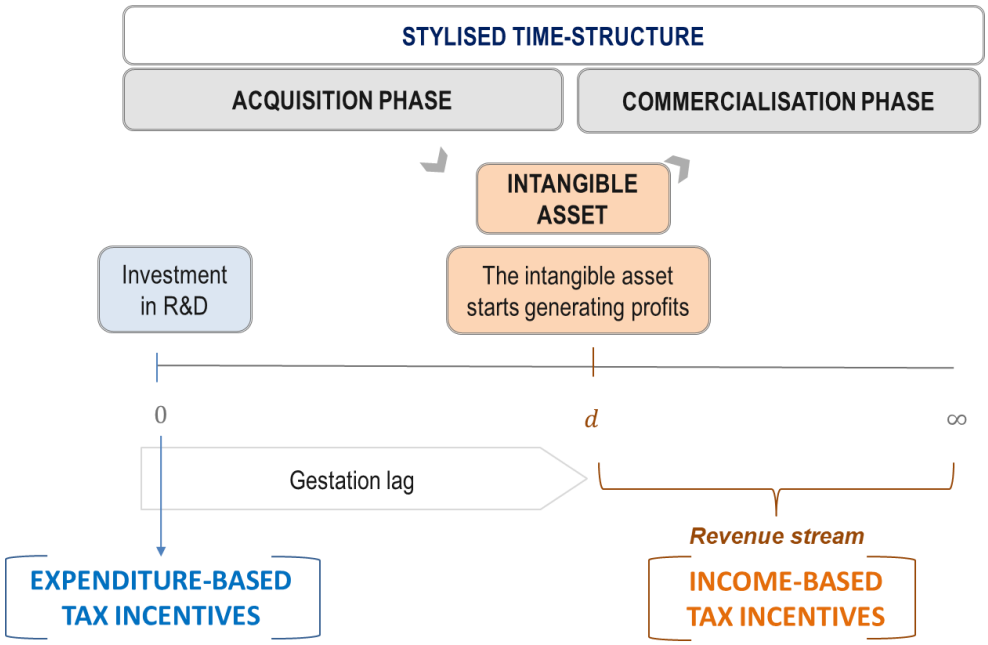
This section outlines how the existing modelling methodology for income-based tax incentives can be extended to capture expenditure-based tax support. It discusses the key components of such an extension and reflects on potential scenarios that could be covered in an empirical calibration and the interactions that would need to be considered aside some additional key features of R&D investment that could be captures in future modelling extensions.

Extending the IBTI methodology to expenditure-based tax incentives

The model used to capture the effect and implicit tax subsidy of income-based tax incentives (Section 3) can be extended to incorporate the impact of expenditure-based tax incentives. The structure of the model (Figure 5.1) follows, in a stylised way, firms' decisions over the innovation lifecycle. This structure is useful in analysing the tax implications of alternative firms' choices over time. The model runs from the acquisition phase where the firm performs the R&D, until the moment of protection and commercialisation. The firm invests in R&D at time 0 during the acquisition phase. The R&D investment takes d periods to yield a revenue-generating intangible. At this point the commercialisation phase starts and the firm exploits the R&D intangible (own use, licensing or sale).

This extended model can accommodate the modelling of expenditure-based tax incentives during the acquisition phase and the modelling of income-based tax incentives during the commercialisation phase. At present, the current modelling of IBTIs captures their impact on reducing the after-tax profits of qualifying firms against a baseline where the standard tax treatment applies to innovation related income. By contrast, the previous OECD modelling work on expenditure-based R&D tax incentives (Appelt, Galindo-Rueda and González Cabral, 2019[15]; González Cabral, Appelt and Hanappi, 2021[16]; OECD, 2023[5]) has focused on modelling their impact against a baseline where the standard tax treatment would apply to R&D expenditures. This extension would bring the two approaches together.

Figure 5.1. Stylised model structure to capture tax incentives for R&D and innovation



Source: Based on González Cabral et al.(2023[1]).

A stylised example

To illustrate the workings of the model, a simple example is presented where firms can use expenditure- and income-based incentives cumulatively. A firm invests EUR 1 in current expenditure (e.g., labour costs) and the upfront cost of investing is reduced by the net present value of all deductions[25] that the firm obtains over the lifetime of the asset, A. The second term in Equation (1), $1 - A$, shows the after-tax cost of investment, i.e., how much the firm needs to invest and finance for to undertake the investment given its tax treatment. This investment generates income after d periods, where p represents the pre-tax rate of return for the investor and δ the economic depreciation of the asset. The income that the investment generates decay over time at the economic depreciation rate of the asset (i.e. due to the obsolescence of the asset). The first part of Equation (1) summarises the post-tax revenue stream over the lifetime of the investment. Taken together, the first and second term of Equation (1) express the after-tax economic profit, R, of this firm once all streams of revenue, deductions and taxes (τ being the STR) are accounted for. This variable is the key to calculate estimates of the forward-looking ETRs and of the cost of capital (or B-Index).[26] Consider further, for simplification, that the firm only invests during the acquisition phase and the whole R&D investment benefits from expenditure-based tax incentives; and that the asset qualifies for IBTIs.

$$R = \frac{(p+\delta)(1-\tau)}{(1+r)^d(r+\delta)} + (\boldsymbol{A-1})\ \ if\ \forall t\ \tau_t = \tau \qquad \text{Equation 1}$$

NPV of revenue stream

(Investment in NPV terms)

No expenditure-based tax incentives: $\boldsymbol{A} = \tau$ **Equation 2**

With an enhanced tax allowance of a : $\boldsymbol{A} = \tau(1 + a)$ **Equation 3**

With a tax credit of c: $\boldsymbol{A} = \tau + c$ **Equation 4**

With income-based tax incentives: $\frac{(p+\delta)\left(1-\tau^{IP}\right)}{(1+r)^{d}(r+\delta)}$ **Equation 5**

Expenditure-based tax incentives contribute to a reduction in the upfront cost of the investment while income-based tax incentives increase after-tax profits (González Cabral, Appelt and Hanappi, 2021[16]). Under the case of standard taxation, the firm can generally immediately deduct the investment in current expenditure as an expense at the STR (Equation 2). Modelling a tax allowance that allows the firm to increase the deduction made by a given allowance rate a (Equation 3) or a tax credit on the investment at a rate c (Equation 4) will contribute to a reduction in the upfront cost of investing $1 - A$. Income-based tax incentives (in this simple example), simply lower taxes paid in the profit, and affect only the taxation of profits at a rate τ^{IP}.[27] Both measures will contribute to affect the cost of capital (or B-Index) and the EATR differently, which means that they will each have a different effect on decisions that affect the intensive or extensive margins.

Accounting for the interaction between tax instruments

Aside from the specific design of income-based and expenditure-based tax incentives, the integration of the two different classes of incentives would need to consider the interaction in the use of both instruments. In some countries, such as Czechia or Malta, the use of expenditure-based R&D tax incentives precludes the use of IBTIs. In others, firms can use both instruments, but the base for the IBTI needs to be reduced to account for expenditure-based tax incentives. This is the case in the Netherlands, the payroll withholding tax credit (WBSO) that effectively reduces the labour cost for the firm is not grossed up to compute IP profits for the purpose of the Innovation Box. It is also the case in Lithuania where associated R&D costs are included in the computation of qualifying IP profits, which include the value of the special tax allowance for R&D. This leads to an adjustment to the value of the expenditure-based incentive at the regime rate.

Considering different scenarios of tax instrument use

The population of users of income-based tax incentives may differ from the population of users of expenditure-based tax incentives. This is linked to the nature of the instrument. Income-based tax incentives provide support only to the income of certain R&D intangibles that are typically formally protected (Section 2). This implies that it only applies to firms that (i) have been successful in their R&D investment and that generate and exploit a profitable innovation; (ii) have contributed to the development of the R&D asset themselves (or outsourced R&D to unrelated parties) meeting the BEPS Action 5 nexus requirements where applicable (Box 2.1); (iii) have protected their innovation through a qualifying asset (typically formally protected); (iv) that commercialise the IP in a manner that gives rise to qualifying income. Firms that do not meet these conditions will not be able to access IBTIs but may still be users of the expenditure-based tax incentive.

Capturing the implicit tax subsidies firms face requires accounting for several scenarios where firms may use expenditure-based and income-based tax incentives in isolation or jointly. There are several reasons why firms may use only one of the forms of support, besides compliance costs that may result in both cases depending on the design of the tax incentives. Firms may use income-based tax incentives in isolation if (i) they are using other forms of support which exclude the use of expenditure-based tax incentives but do not prevent the use of IBTIs; (ii) there is a misalignment between the R&D definition under the expenditure-based tax incentive and the activity the firm performs, while still qualifying for IBTIs. In addition, there is typically no pre-condition of using the expenditure-based tax incentives to access income-based tax benefits. Among the countries covered, only the Netherlands creates a link between users of the expenditure-based tax incentive (WBSO) and users of the income-based tax incentive.[28]

Other features of R&D investment

The model outlined above captures certain key features of R&D investments, but fails to account for the uncertainty and risky nature of R&D. The model is constructed to match key observed features of R&D investments such as the presence of a gestation lag (between when the investment is made and the intangible starts becoming productive) or the rate of obsolescence of R&D. By nature, R&D is uncertain and risky. This feature may interact with the role of expenditure-based and income-based tax incentives in the innovation policy mix. The work could extend this model to incorporate this element.

Similarly, the investment considers a generic R&D investment which matches the overall decay of R&D. A potential extension of the model could consider alternative IP assets and their path of decay. Differences in lifecycles may lead to differences in the role of income-based and expenditure-based tax incentives.

5.2. Total cost of government tax relief for R&D and innovation

Several measurement and comparability issues may arise when comparing and combining income-based and expenditure-based tax relief statistics. Their comparability can be compromised because of reporting differences (e.g., accrual vs. cash-based estimates), differences in data and estimation method or differences in the scope of tax relief (e.g., R&D&I link, eligible taxpayers). Most countries allow companies to use income-based and expenditure-based tax incentives in a combined fashion, and only few (e.g., Lithuania and Switzerland) require an adjustment in the calculation of the tax base of income-based tax incentives for tax benefits received through expenditure-based tax incentives (Appelt et al., 2023[2]).

Scope for comparing and combining the tax relief statistics for expenditure-based R&D tax incentives and income-based R&D&I

The 2022 KNOWINTAX survey asked national contact points to specify to what extent it was possible to compare and combine the tax relief statistics for expenditure-based R&D tax incentives and income-based R&D&I tax incentives collected by the OECD for their country. Seven out of 27 countries offering income-based tax relief in 2022 responded to this question: Canada, Hungary, Ireland, Italy, Lithuania, the Netherlands and the United States (Table 5.2).

While a few countries pointed to differences in the estimation method and underlying data (Italy) and scope of tax relief, - i.e., differences in eligible taxpayers (Netherlands) and strength of R&D&I link (United States) -, most countries confirmed either the additivity[29] of comparability of income- and expenditure-based R&D&I tax relief statistics, except for Hungary where the latter are non-additive. While these first expert opinions tend to speak in favour of the compatibility of income- and expenditure-based R&D&I tax relief statistics, it is important to receive similar information from additional countries to corroborate this preliminary evidence.

Table 5.2. Possibility to combine income- and expenditure-based R&D&I tax relief statistics

			CAN	HUN	IRL	ITA	LTU	NLD	USA
Data and estimation	**Data source**	Similar		x					
		Different				x			
	Method	Similar		x					
		Different				x			
	Type of estimate	Similar							
		Different							
Scope	**Eligible taxpayers**	Similar							
		Different						x	
	R&D&I link	Similar							
		Different							x
Combination of estimates	**Additivity**	Yes	x		x		x		x
		No		x					
	Comparability	Yes	x			x			
		Limited							
		No							

Note: This table provides a summary overview of country responses 2022 KNOWINTAX survey question on the possibility to compare and combine the tax relief statistics for expenditure-based R&D tax incentives and income-based R&D&I tax incentives collected by the OECD for the given country.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

Exploratory indicators of income- and expenditure-based tax relief

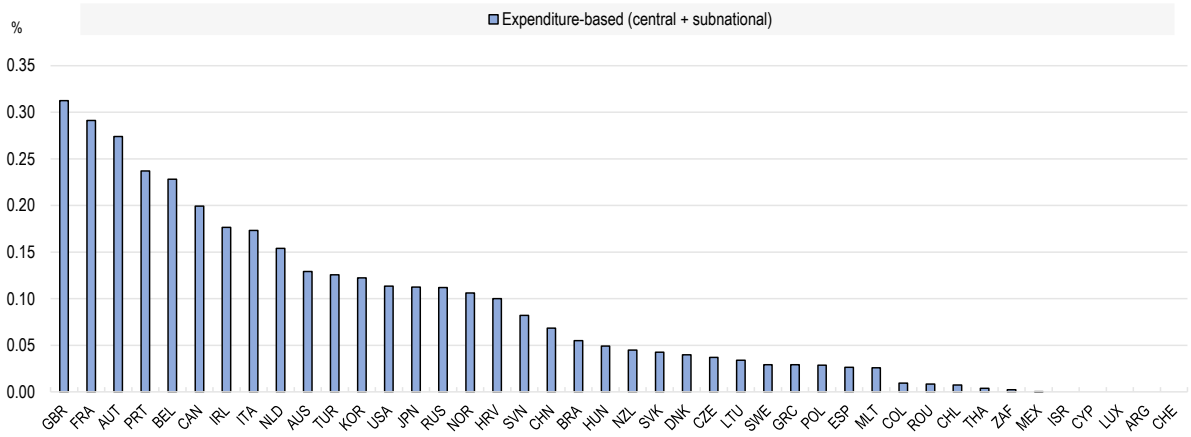
Figure 5.2 brings together indicators of the cost of expenditure-based and income-based tax relief for R&D and innovation, drawing on country contributions to the 2022 OECD KNOWINTAX and OECD R&D tax incentives surveys. It provides estimates of the cost of central and subnational tax support for R&D expenditures (Panel A), income-based tax relief for R&D and innovation (Panel B) and the total cost of tax support for R&D and innovation (Panel C) – the sum of the two former elements.

Compared to expenditure-based tax support (Panel A), the use and magnitude of income-based tax relief (Panel B) tends to be smaller but reaches a similar size at the top, i.e. the top 3 countries with largest amount of expenditure- and income-based tax relief. In 2020, the United Kingdom (0.31% of GDP), France (0.29% of GDP) and Austria (0.27% of GDP) provide most tax support for R&D expenditures as a percentage of GDP, while the Netherlands (0.24% of GDP), Belgium (0.18% of GDP) and Israel (0.15% of GDP) provide the largest amount of income-based tax relief as a percentage of GDP in that year. Several factors pertinent to IP regimes explain why income-based tax relief figures are usually much lower than those observed for expenditure-based R&D tax incentives:

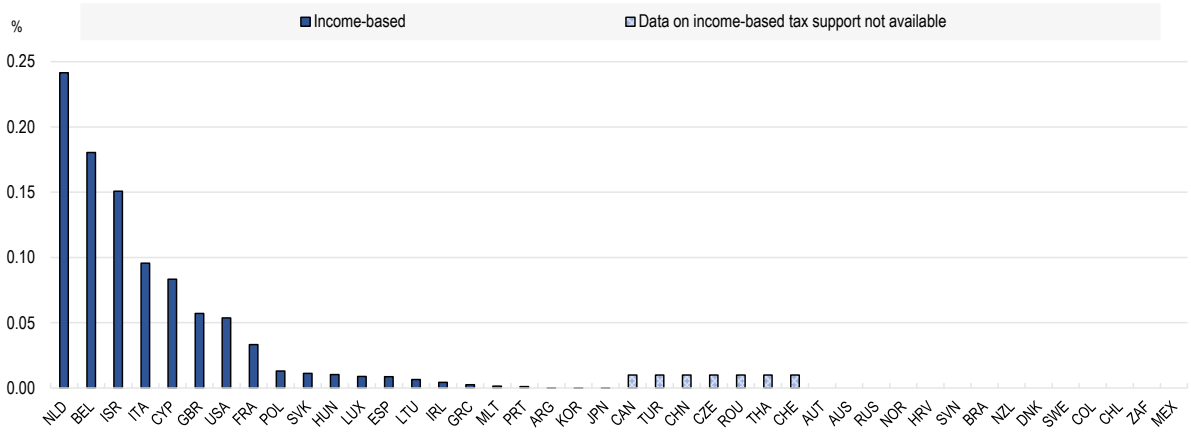
- Income-based tax incentives target successful R&D outcomes which are risky and uncertain; some R&D investments will fail but still encourage innovation.
- Income-based tax incentives are only available to profitable firms.
- Not all R&D inventions are patented or protected through other patent-equivalent rights covered by BEPS Action 5 or are commercialised in a way that give rise to tax benefits.
- The cost and complexity of IP protection may put firms off seeking commercial protection, in particular SMEs which are more prone to be cash constrained.[30]

Figure 5.2. Expenditure- and income-based tax relief for R&D&I (% GDP), 2020

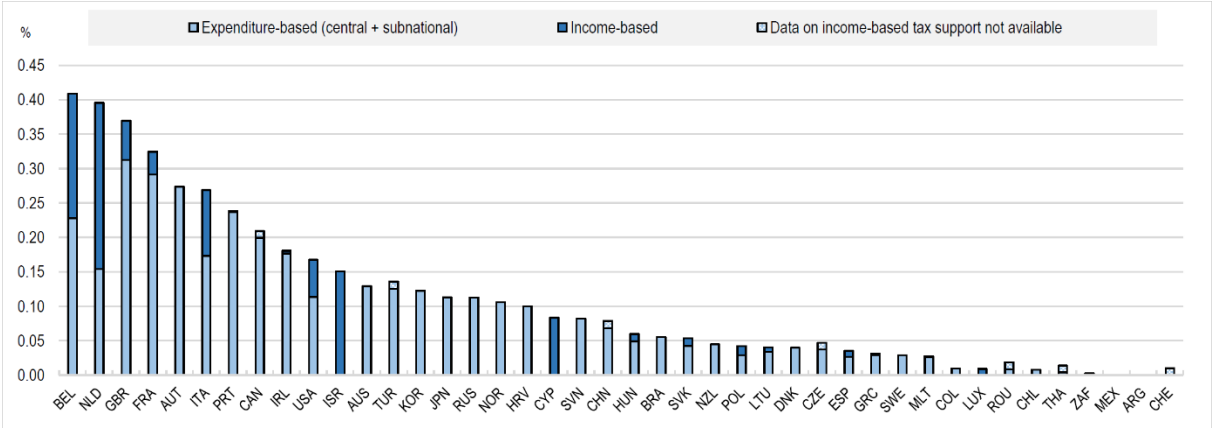
Panel A. Expenditure-based tax support



Panel B. Income-based tax support



Panel C. Expenditure-based and income-based tax support combined



Note: Data for Argentina, Italy, Korea, Malta, and Thailand refer to 2019 instead of 2020. Data for Japan, Spain and the United States refer to 2018 while those for China refer to 2017. Data on income-based tax support are not available for China, Czechia, Türkiye, Thailand and Switzerland.
Source: OECD based on 2022 KNOWINTAX survey, March 2023.

When expenditure-based and income-based cost estimates are combined (Panel C), a visible uplift in the amount of tax support for R&D and innovation can be seen. Among countries that offer R&D tax incentives of either type, the total amount of tax support for R&D innovation as percentage of GDP ranges from 0.01% in Chile, Colombia, Croatia and Luxembourg to more than 0.35% in Belgium, the Netherlands and the United Kingdom. However, the role of income-based incentives varies strongly. Among countries that offer tax incentives, the share of income-based in total tax relief for R&D and innovation varies from close to 0% in Japan, Portugal, Korea to around 40% in Belgium, 60% in the Netherlands and 100% in Cyprus, Israel and Luxembourg.[31]

The combined indicator of income- and expenditure-based tax relief provides some new and policy relevant insights into the overall magnitude and structure of government tax support for business R&D and innovation. As a result of the partial and preliminary nature of income-based tax relief statistics and possible measurement differences, this combined indicator is still very exploratory at this stage and requires further vetting by the OECD in close collaboration with countries to ensure an accurate interpretation of the combined tax relief statistics and cross-country comparability.

6 Concluding remarks

This paper documents the latest evidence on the availability, design, generosity and cost of income-based tax incentives for R&D and innovation, drawing on country responses to the 2022 OECD KNOWINTAX survey. Furthermore, it explores the scope for developing experimental, combined policy indicators of income-based and expenditure-based tax relief for business R&D and innovation, that provide a more complete picture of the overall generosity and cost of government tax support for R&D and innovation in the OECD area and beyond.

The paper highlights that income-based tax incentives (IBTIs) are widely adopted across OECD countries and EU countries. In 2022, 27 out of 38 OECD countries and 21 out of 27 EU countries offered this form of tax relief. IBTIs apply to formally protected assets and to all forms of commercialisation in most countries. In a third of IBTIs covered, special provisions apply to smaller taxpayers that relax the requirements for formal protection. IBTIs reduce the taxation of internally generated R&D assets significantly. In 2022, EATRs fall from an average of EATR of 19.6% without support to an EATR of 6.7% when IBTIs are accounted for, with significant variation across countries that can be traced back to differences in the design of IBTIs. The EATR for internally generated R&D intangibles accounting for IBTIs in 2022 range from -0.09% to 25.78% compared to a range between 7.86% and 31% in the absence of IBTIs.

The paper further provides updated evidence on the cost and uptake of IBTIs in 2020 and their evolution over time, taking a long-run (2000-2020 period) and more short-run (2015-2020) perspective. While the previously cited evidence provides a sense of the generosity of IBTIs, measures of cost and uptake produce evidence on the actual use of IBTIs by firms. In 2020, the cost of this support appears to be very small (below 0.01% of GDP) in 10 out of 22 countries for which data are available. Income-based tax benefits tend to accrue to a subset of firms. In 10 of 21 countries for which data are available, less than 100 firms benefitted from this support in 2020, large firms typically accounting for the bulk of income-tax benefits.

Over the 2000-20 period, the cost and uptake of this support has increased in nearly all 22 countries for which sufficiently extensive time-series data are available. However, the growth in the number of income-based tax relief recipients and cost of income-based tax relief appears to have been moderate in more recent years, looking at 15 OECD countries for which changes in the number of beneficiaries and cost of income-based tax relief can be computed from 2015 to 2020 (or closest years). In the median OECD country, the number of beneficiaries increased by 30 from 2015 to 2020 and stayed effectively constant when the subset of nine countries that already offered income-based tax relief in 2015 is considered. The cost of IBTIs in turn increased in the median OECD country by 0.01% of GDP in relative terms and by USD 20 million in absolute levels (2015 prices) over this period. However, data limitations prevent a more comprehensive and systematic analysis of the effect of BEPS Action 5 at this stage. Few OECD countries (Belgium, France, Ireland) can report separate data for pre-nexus vs post-nexus regimes and current data spans only until 2020. The presence of transitional measures in some countries which enabled existing taxpayers to keep using existing tax benefits under the old regime (up until no later than 30 June 2021), despite the regime being closed off to new entrants, further complicates the comparison of pre- and post-BEPS trends.

The report also points to the high concurrence of expenditure-based and income-based tax support for R&D and innovation, underscoring the need for a new class of policy indicators that provide an integrated view on the combined value of government tax support for R&D inputs and outputs. The report sketches how the existing OECD framework for modelling the implicit tax subsidy of IBTIs could be extended to additionally capture expenditure-based tax incentives. Furthermore, it presents for the first time an exploratory indicator of the combined cost of income- and expenditure-based tax relief to provide a more integrated view of the total cost of government support for business R&D and innovation via the tax system.

Compared to expenditure-based R&D tax incentives, the adoption and magnitude of income-based tax relief tends to be overall smaller as income-based tax incentives target successful R&D investments for which IP protection is sought and are only available to profitable firms. When expenditure-based and income-based cost estimates are combined, the total amount of tax support for R&D and innovation increases notably. However, the relative magnitude of income-based vis-à-vis expenditure-based tax support varies largely across countries. Care should be taken in interpreting this combined indicator given the partial and preliminary nature of income-based tax relief statistics and possible measurement differences that impair the comparability of income-based and expenditure-based tax relief statistics.

Future OECD work aims to further advance and extend the existing OECD policy evidence base and new data infrastructure on income-based tax incentives for R&D and innovation developed as part of the KNOWINTAX project. This new data infrastructure comprises qualitative policy information on the adoption and design of IBTIs but also the quantitative indicators of implicit tax subsidies and the cost of income-based tax relief to governments and their take-up by business. Future OECD efforts will also continue focus on the development of a new class of policy indicators that reflect the role and value of government tax relief for both R&D inputs and outputs in the OECD area and beyond. Such indicators of the combined tax subsidy and cost of tax relief for R&D and innovation are key to assessing the role and interaction of both types of tax instruments within national innovation policy mixes.

References

Appelt, S. et al. (2016), "R&D Tax Incentives: Evidence on design, incidence and impacts", *OECD Science, Technology and Industry Policy Papers*, No. 32, OECD Publishing, Paris, https://doi.org/10.1787/5jlr8fldqk7j-en. [14]

Appelt, S. and F. Galindo-Rueda (2016), "Measuring the Link between Public Procurement and Innovation", *OECD Science, Technology and Industry Working Papers*, No. 2016/3, OECD Publishing, Paris, https://doi.org/10.1787/5jlvc7sl1w7h-en. [4]

Criscuolo, C. et al. (2023), "Quantifying industrial strategies across nine OECD countries", *OECD Science, Technology and Industry Policy Papers*, No. 150, OECD Publishing, Paris, https://doi.org/10.1787/5f2dcc8e-en. [5]

Criscuolo, C., G. Lalanne and L. Díaz (2022), "Quantifying industrial strategies (QuIS): Measuring industrial policy expenditures", *OECD Science, Technology and Industry Working Papers*, No. 2022/05, OECD Publishing, Paris, https://doi.org/10.1787/ae351abf-en. [20]

EC, IMF, OECD, UN and the World Bank (2009), *System of National Accounts, United Nations, New York*, https://unstats.un.org/unsd/nationalaccount/docs/sna2008.pdf. [18]

EC-OECD (2020), *STIP Compass Taxonomies describing STI Policy data, edition 2019*, https://stip.oecd.org/assets/downloads/STIPCompassTaxonomies-2019.pdf. [19]

Eurostat (2008), *Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets (NABS), Comparison between NABS 2007 and NABS 1992, Eurostat, Luxembourg*, http://www.oecd.org/science/inno/43299905.pdf. [15]

Galindo-Rueda, F. and V. López-Bassols (2022), *Implementing the OECD Frascati Manual: Proposed reference items for business R&D surveys*, OECD Publishing, Paris, https://doi.org/10.1787/d686818d-en. [21]

González Cabral, A. et al. (2023), "A time series perspective on income-based tax support for R&D and innovation", *OECD Taxation Working Papers*, No. 62, OECD Publishing, Paris, https://doi.org/10.1787/dae3cd5c-en. [2]

González Cabral, A. et al. (2023), "Effective tax rates for R&D intangibles", *OECD Taxation Working Papers*, No. 63, OECD Publishing, Paris, https://doi.org/10.1787/191dad43-en. [1]

González Cabral, A. et al. (2023), "Design features of income-based tax incentives for R&D and innovation", *OECD Taxation Working Papers*, No. 60, OECD Publishing, Paris, https://doi.org/10.1787/a5346119-en. [3]

OECD (2023), *Government support for business innovation: Results from measurement pilots in five OECD countries*, https://one.oecd.org/document/DSTI/STP/NESTI(2023)3/FINAL/en/pdf. [12]

OECD (2023), "Government support in industrial sectors: A synthesis report", *OECD Trade Policy Papers*, No. 270, OECD Publishing, Paris, https://doi.org/10.1787/1d28d299-en. [6]

OECD (2021), "Government support for business research and innovation in a world in crisis", in *OECD Science, Technology and Innovation Outlook 2021: Times of Crisis and Opportunity*, OECD Publishing, Paris, https://doi.org/10.1787/7a7891a5-en. [7]

OECD (2015), *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development*, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris, https://doi.org/10.1787/9789264239012-en. [11]

OECD (2001), *Improving Measures of Government Support to Industrial Technology. STI Review.*, https://www.oecd.org/sti/37124998.pdf. [13]

OECD (1995), *Industrial Subsidies: A Reporting Manual, OECD, Paris.*. [9]

OECD/Eurostat (2018), *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition*, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris/Eurostat, Luxembourg, https://doi.org/10.1787/9789264304604-en. [8]

United Nations (2015), *Transforming our World: The 2030 Agenda for Sustainable Development*, http://sustainabledevelopment.un.org. [17]

United Nations (2008), *International Standard Industrial Classification of all Economic Activities (ISIC) Revision 4. Department of Economic and Social Affairs, Statistics Division, Statistical papers, Series M, No 4, Rev. 4. United Nations, New York*, https://unstats.un.org/unsd/classifications/. [10]

United Nations (2000), *Classification of expenditure according to purpose: Classification of the functions of government, United Nations, New York*, http://unstats.un.org/unsd/class/default.asp. [16]

Endnotes

[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. Czechia provides expenditure-based tax-incentives but they are incompatible with the tax holiday for investments in R&D centres.

[2] The OECD launched in 2020 the KNOWINTAX project as part of its EU-funded project on Mapping Business Innovation Support (MABIS). KNOWINTAX, carried out jointly by the Directorate of Science, Technology and Innovation (STI) and the Centre for Tax Policy and Administration (CTPA), aims to extend the existing OECD data collection and indicator infrastructure (https://oe.cd/rdtax) from expenditure-based to income-based tax incentives. Indicators for expenditure-based R&D tax incentives feature in the in the OECD R&D Tax Incentive database (OECD, 2023[5])and the Corporate Tax Statistics database (OECD, 2023[27]) including the new indicator on effective tax rates for R&D (González Cabral, Appelt and Hanappi, 2021[16]). KNOWINTAX includes the collection of information on the design and cost of income-based provisions and the integration of these schemes in the modelling of R&D tax subsidy rates and effective tax rates (ETRs) to support tax and innovation policy analysis.

[3] 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.

[4] 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 (Evers, Miller and Spengel, 2013[21]). Empirical evidence suggests that the transfer of IP was less pronounced where regimes had development conditions in place (Ciaramella, 2017[23]; Alstadsæter et al., 2018[24]; Gaessler, Hall and Harhoff, 2018[25]; Bradley, Dauchy and Robinson, 2015[26]). Gonzalez Cabral et al. (2023[4]) describe the policy changes related to the implementation of BEPS Action 5.

[5] For a more detailed description of the design features of IBTIs and key policy changes over the 2000-2021 period, see González Cabral et al. (2023[3]).

[6] The regime in Argentina provides support to software.

[7] In Greece, according to par. 1 of article 71A of the Income Tax Code, the profits of a company arising from the exploitation of an internationally recognised patent in its name and developed by itself are exempt from income tax for up to three consecutive years, starting from the year in which these profits were realised for the first time.

[8] In Hungary, capital gains are fully exempt only if they arise from the sale or in-kind contribution (i) of notified intangible assets held for over a year; or (ii) of intangibles transferred to a tied-up reserve provided that capital gains are used in the following five years to purchase other intangible assets. These purchased assets must embody rights to royalties. A 'notified' intangible is any intangible asset embodying rights to royalties, acquired or produced, for which the taxpayer

notifies the tax authority of its acquisition within sixty days of the date of acquisition or production. In Belgium, relief for the sale of IP is conditional upon allocating the proceeds arising from the sale and transfer of IP as qualifying expenditure to other IP within five years of disposal.

[9] There are different methods that jurisdictions can pursue to ensure that IP losses cannot be used to offset ordinary income according to the BEPS Action 5 minimum standard. See González Cabral et al.(2023[3]) for more details.

[10] 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 (Lester and Warda, 2018[22]; Li and Hall, 2020[31]). 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.

[11] The United States also offered IBTIs in 2022 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 37 regimes is obtained using the unique regime count in Table A.1.

[12] 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.

[13] 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.

[14] The timing difference between when investment takes place and profits appear lowers the profitability of the investment in NPV terms.

[15] This decomposition is achieved by switching-on and off each of the design elements (i)-(iii) for each of the regimes, keeping everything else constant. The relative weighting of each design feature may vary with alternative calibrations of the investment and with the order in which they are switched on and off.

[16] Certain taxpayers may be filing claims under the old non-BEPS compliant regime and the new BEPS-compliant regime in countries where a BEPS Action 5 transitional period which could not extend beyond 30 June 2021 was in place. Where countries can report claims separately, e.g., Belgium, adding the figures of taxpayers under the old and new regime can lead to double-counting, hence figures being non-additive.

[17] As described in Appelt et al. (2023[2]), the term “claims” is used to denote requests for support for qualifying income, and is distinguished from the concept of claimants as referring to the unique firms behind one or more claims. The concept of tax support beneficiary (recipient) is also important because of the gap between claims and realised support. This difference has a direct translation in the income-based tax relief figures provided on an accrual or cash basis.

[18] Absolute taxpayer numbers may likewise be higher in larger jurisdictions.

[19] No data are available for Canada (Province of Québec, China, Czechia, Romania, Switzerland, Thailand and Türkiye). In the case of three countries (Greece, Japan and Malta) with less than ten recipients, beneficiary figures are not displayed in the chart for confidentiality reasons.

[20] This is likely due to two factors: (i) the co-existence of nexus compliant and non-nexus compliant regimes (albeit with the latter closed to new entrants) due to the existence of BEPS Action 5 transitional measures; and (ii) the inability of most countries to report separate cost and beneficiary figures for compliant vs non-compliant regimes. This again highlights the importance of reporting separate data for pre- vs. post-BEPS Action 5 regimes, especially in the period of overlap, in order to accurately assess trends over time and the implications of the BEPS Action 5 minimum standard.

[21] New entrants mean new taxpayers and new IP assets (OECD, 2015[10]). See also González Cabral et al. (2023[3]).

[22] Belgium can report separate claims under the old and the new regime.

[23] France did not introduce any transitional measures, which allows for a clean reporting between the pre- and post-nexus regimes.

[24] Ireland had an IP regime in place previously that was repealed in 2011 (Table A.1).

[25] Deduction is used in an ample sense to refer to all provisions that reduce firms' tax liabilities, including not only tax allowances but also credits.

[26] See Annex B in González Cabral et al. (2023[3]).

[27] Interactions are more complex when differences between the treatment of past and ongoing expenses in IBTIs are introduced. The modelling of expenditure-based and income-based tax incentives is complex and is highly stylised in this example.

[28] Applying to the expenditure-based scheme is a necessary step to access IBTIs. Firms could not access income-based tax incentives without having applied for expenditure-based tax support.

[29] Estimates of the cost of income-based and expenditure-based tax relief statistics can be aggregated as the two forms of tax relief can be used by firms in a cumulative fashion.

[30] This concern is typically alleviated under BEPS Action Category III assets which provide IBTIs for smaller taxpayers for patent-equivalent rights but with less formal registration requirements. See Section 2 and Table A.2.

[31] Cyprus introduced an enhanced tax deduction for R&D in 2022 which is not yet reflected in this report. For additional details, see https://stip.oecd.org/innotax/countries/Cyprus.

Annex A. Additional policy information

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	01/07/16			Not harmful (amended)
CAN	CAN_Q	CAN1	Dduction pour socits manufacturires innovantes (DSI) (Quebec)		x		01/01/17		31/12/20		
CAN	CAN_Q	CAN2	Dduction 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		x	x	01/01/12		30/06/16	30/06/21	
CYP	CYP	CYP2	IP Box regime (new 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	01/07/16	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	01/07/16	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	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 incentive		x	x	01/01/10	01/01/22	31/12/21		Not harmful (amended)
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	06/04/1973		24/11/10		
IRL	IRL	IRL2	Knowledge development box (second regime)	x	x	x	01/01/16	01/01/16			Not harmful
ISR	-	ISR1	Approved enterprise regime			x	01/01/58		31/03/05		
ISR	-	ISR2	Priority enterprise regime			x	01/04/05		01/01/11		Not harmful (amended)
ISR	ISR1	ISR3	Preferred enterprise regime	x		x	01/01/11		30/06/16	30/06/21	Not harmful (amended)
ISR	ISR2	ISR4	Special Preferred enterprise regime	x		x	01/01/11		30/06/16	30/06/21	Not harmful (amended)
ISR	ISR3	ISR5	Preferred technology enterprise regime	x	x	x	01/01/17	01/01/17			Not harmful
ISR	ISR4	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	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	01/01/18			Not harmful (amended)
LTU	LTU	LTU1	IP taxation regime	x	x	x	01/01/18	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	01/01/18			Not harmful
MLT	MLT	MLT1	Exemption on royalties derived from 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	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	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	01/01/18			Not harmful
THA	THA1	THA1	International business centre	x		x	02/05/19	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 regime	x	x	x	06/07/01	19/10/17	19/10/17	30/06/21	Not harmful (amended)
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 June 2023 (OECD, 2023[17]).
Source: KNOWINTAX Surveys 2020-22.

Table A.2. Scope of IBTIs, 2022

ISO3	Country-level ID	Regime-level ID	Patent[1]	Supplementary Protection Certificates[2]	Utility models/ Short-term patents	Plant variety rights	Other patentable inventions (small taxpayers) [3]	Orphan drugs[4]	Industrial designs and models[5]	Industrial processes[6]	Secret formulae or processes or other trade secrets	Information concerning know-how	Products benefitting from data or market exclusivity[7]	Copyrighted software[8]	Trademarks[9]	Other[10]	IP assets not defined or unrestricted	Income from royalties and license fees[11]	Income from the sale and transfer of IP rights or capital gains[12]	Embedded IP income	Income from IP protection[13]	Income from marketing intangibles	Other income not related to IP[14]	IP income not defined
ARG	ARG	ARG2												x		x		(x)	(x)	(x)	(x)	(x)	(x)	x
BEL	BEL	BEL2	x	x	x	x		x		x			x	x				x	x	x	x			
CAN	CAN_Q	CAN2	x	x		x								x				x		x	x			
CAN	CAN_S	CAN3	x			x					x			x				(x)	(x)	(x)	(x)	(x)	(x)	x
CHE	CHE_Z	CHE2	x	x		x		x					x			x		x	x	x	x			
CHE	CHE_Z*	CHE2																x	x	x	x			
CHN	CHN1	CHN1	x	(x)	x	x	(x)	(x)	x	(x)	(x)	(x)	(x)	x	(x)	x	x	(x)	(x)	(x)	(x)	(x)	(x)	x
CHN	CHN2	CHN2	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
CYP	CYP	CYP2	x	x	x	x	x	x						x				x	x	x	x			
CZE	CZE	CZE1	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
ESP	ESP_B	ESP2	x	x	x									x				x						
ESP	ESP_C	ESP1	x	x	x				x					x		x		x	x					
ESP	ESP_N	ESP3	x	x	x				x					x		x		x	x					
FRA	FRA	FRA2	x	x	x	x	x			x				x				x	x					
GBR	GBR	GBR1	x	x		x		x										x	x	x	x			
GRC	GRC	GRC1	x															x	x	x				

Table A.2. Scope of IBTIs, 2022

ISO3	Country-level ID	Regime-level ID	Patent[1]	Supplementary Protection Certificates[2]	Utility models/ Short-term patents	Plant variety rights	Other patentable inventions (small taxpayers) [3]	Orphan drugs[4]	Industrial designs and models[5]	Industrial processes[6]	Secret formulae or processes or other trade secrets	Information concerning know-how	Products benefitting from data or market exclusivity[7]	Copyrighted software[8]	Trademarks[9]	Other[10]	IP assets not defined or unrestricted	Income from royalties and license fees[11]	Income from the sale and transfer of IP rights or capital gains[12]	Embedded IP income	Income from IP protection[13]	Income from marketing intangibles	Other income not related to IP[14]	IP income not defined
HUN	HUN	HUN1	x	x	x	x		x						x		x		x	x	x				
IRL	IRL	IRL2	x	x		x	x							x				x		x	x			
ISR	ISR1	ISR3	x		x	x	x	x						x				x		x	x		x	
ISR	ISR2	ISR4	x		x	x	x	x						x				x		x	x			
ISR	ISR3	ISR5	x		x	x	x	x						x				x	x	x	x			
ISR	ISR4	ISR6	x		x	x	x	x						x				x	x	x	x			
JPN	JPN	JPN2	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
KOR	KOR	KOR2	x		x		x				x							x	x					
LTU	LTU	LTU1	x	x										x				x	x		x			
LUX	LUX	LUX2	x	x	x	x		x						x		x		x	x	x	x			
MLT	MLT	MLT2	x	x	x	x	x	x	x					x				x	x	x	x			
NLD	NLD	NLD1	x	x	x	x	x	x					x	x				x	x	x	x			
POL	POL	POL1	x	x	x	x			x				x	x		x		x	x	x	x			
PRT	PRT	PRT1	x						x					x				x	x		x			
ROU	ROU	ROU1	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
SVK	SVK	SVK1	x	x	x									x				x		x				

Table A.2. Scope of IBTIs, 2022

ISO3	Country-level ID	Regime-level ID	Patent[1]	Supplementary Protection Certificates[2]	Utility models/ Short-term patents	Plant variety rights	Other patentable inventions (small taxpayers)[3]	Orphan drugs[4]	Industrial designs and models[5]	Industrial processes[6]	Secret formulae or processes or other trade secrets	Information concerning know-how	Products benefitting from data or market exclusivity[7]	Copyrighted software[8]	Trademarks[9]	Other[10]	IP assets not defined or unrestricted	Income from royalties and license fees[11]	Income from the sale and transfer of IP rights or capital gains[12]	Embedded IP income	Income from IP protection[13]	Income from marketing intangibles	Other income not related to IP[14]	IP income not defined
THA	THA1	THA1	x											x									x	
THA	THA2	THA2	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
THA	THA3	THA3	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x
TUR	TUR1	TUR1	x		x	x	x							x				x	x					
TUR	TUR2	TUR2	x		x													x	x	x	x			
USA	USA	USA1	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	x	(x)	(x)	(x)	(x)	(x)	(x)	x

Note: Brackets are used to signal that a specific list of IP assets is not defined under the regime, but that none of the IP assets are explicitly excluded and hence potentially eligible. Note that for regimes found to be compliant with the BEPS Action 5 minimum standard, all assets ticked above must be legally protected or liable for legal protection and should be the result of R&D carried out by the taxpayer. Notes are organised by columns. Income from royalties includes income from exclusive licenses. Income from the sale and transfer of IP includes income from capital gains. Income from IP protection refers to income from the insurance, damages or compensation in relation to the qualifying IP right.

[1] **CHN1:** In order to qualify for HNTE status the firm must hold ownership of the IP related to its core technology, which can be protected through one of several different forms of IP marked with an 'x' in this table. Upon qualifying as a HNTE, the reduced tax rate applies to all income from the firm, which may include other forms of IP.

[2] **ESP/ ESP-B/ ESP-N**: SPCs of medical products and plant protection products. **LUX**: Including prorogations of SPCs. **POL:** Supplementary protection certificates for patents of medicinal products or plant protection products.

[3] Other patentable inventions (small taxpayers) refers to assets in the spirit of Category III in BEPS Action 5 report (OECD, 2015[10]), par. 34 and 37.

[4] **BEL**: Limited to the first 10 years of listing in the Community Register of orphan medicinal products.

[5] **CHN1**: Lay-out design of integrated circuits.
[6] **FRA**: Processes directly related to the patents. **GBR:** Processes if patented.
[7] **BEL**: Limited to the first 11 years. **POL:** Refers to rights from registration of the medicinal and veterinary product with marketing authorisation.
[8] **CHE**: Software can qualify if patented outside of Switzerland or if it is part of a patented invention in Switzerland. **ESP/ ESP-B/ ESP-N**: Advanced copyrighted software resulting from R&D projects.
[9] **CAN-S:** Trademarks and industrial design rights are excluded from eligibility but can be included to assist in the assessment of the overall strength of the IP in the Canadian market.**CHN1:** Trademarks are excluded from the types of IP that can protect the core technology. Upon qualifying as a HNTE, the reduced tax rate applies to all income from the firm, which may include other forms of IP.
[10] **CHE**: Topographies protected under the Federal Act on Topographies of 9 October 1992; Data protected under the Federal Act on Therapeutic Products of 15 December 2000; Reports protected under an implementing provision of the Federal Act on Agriculture of 29 April 1998 and foreign rights corresponding to the abovementioned comparable rights. **CHN1:** In order to qualify for HNTE status the firm must hold ownership of the IP related to its core technology, which can be protected through one of several different forms of IP marked with an 'x' in this table. Upon qualifying as a HNTE, the reduced tax rate applies to all income from the firm, which may include other forms of IP. **NLD:** IP connected to items, which are so closely connected to qualifying assets that it would require an unrealistically detailed level of administration by the taxpayer to monitor the costs related to the IP. **POL:** Rights related to integrated circuit topography. **USA:** For purposes of section 250, intangible property does not include copyrighted articles as defined in 1.861-18(c) (3).
[11] **USA**: FDII only applies to *foreign-derived* Deemed Intangible Income (DII). DII is calculated by subtracting from Deduction Eligible Income (DEI), which is calculated as gross income net of associated expenses (some exclusions apply), a Deemed Tangible Income Return to isolate the contribution of intangible assets. It is possible that DII contains income that is not solely related to IP. To determine the share that is foreign-derived, the ratio of Foreign Derived Deduction Eligible Income (FDDEI) to Deduction Eligible Income (DEI) is derived. FDDEI includes income from the sales of property (intangible and general property) by the taxpayer to a foreign person and for foreign use (FDDEI sales) and income from services provided by the taxpayer to any person not located in the US or with respect to property not located in the US (FDDEI services). Foreign use means use, consumption or disposition which is not within the U.S. Since the categories of income are not defined, all categories are marked as potentially eligible. In principle, any income from IP meeting the FDDEI definitions would qualify. Income from IP could include income from royalties, licenses, income from the sale of IP, exchange, embedded IP income, etc. Income from marketing intangibles is not explicitly excluded.
[12] **BEL**: The firm is obliged to allocate the sums obtained on the occasion of the sale and transfer of IP rights to qualifying expenses relating to other IP rights, within a period of five years counting from the first day of the calendar year of the disposal and at the latest upon cessation of the professional activity. **HUN**: Capital gains are exempt if they arise from the sale or in-kind contribution (a) of notified intangible assets held for over a year; or (b) of intangibles transferred to a tied-up reserve if capital gains are used in the following five years to the constitution of the reserve to purchase intangible assets embodying rights to royalties. **ITA**: Capital gains realised from the sale of the intangible are exempt (excluded from the tax base) provided that at least 90% of the related consideration is re-invested for the maintenance or the development of other intangible assets, before the end of the second tax year following the year of the disposal. **NLD**: Applies to capital gains.
[13] **BEL**: Only damages, any income with punitive character does not qualify.
[14] **CZE**: The regime applies to all types of incomes excluded interest incomes and all incomes subject to withholding tax. **ISR1/ ISR1-S:** These regimes apply to 'preferred income' which is income derived from the manufacturing activity of the preferred enterprise in Israel and it contains: income from selling manufactured products (excludes any income from selling products linked to natural resources), income from granting permission to use know-how or computer software developed by the enterprise, income from services and services connected to know-how or computer software, and income from industrial R&D for a foreign resident. IP income not attributable to manufacturing such as income form marketing intangibles is not considered 'preferred income' and hence not eligible for relief.
Source: 2021-22 KNOWINTAX surveys, FHTP peer review questionnaires and public sources, updates (González Cabral et al., 2023[3]).

Table A.3. Calculation of tax benefits, 2022

Country-level ID	Regime-level ID	Income[1]	Lowest preferential tax rate[2]	Full rate[3]	Duration (number of years)[4]	Ongoing expenses	Past expenses	IP losses	Development conditions apply	Nexus ratio in the spirit of BEPS Action 5[5]	Limitations to tax benefits[6]
ARG	ARG2	Royalties and other income	24%	30%	7	Net	None	None		.	
BEL	BEL2	Royalties and other income	3.75%	25%	.	Net	Recapture	Recapture Method	Y	**Y**	Ceiling (TI)
CAN_Q	CAN2	Royalties and other income	17%	26.5%	.	Net	None	None	Y	Y	Ceiling (TI)
CAN_S	CAN3	Royalties and other income	21%	25%	10	Net	None	NA			
CHE_Z	CHE2	Royalties and other income	8.11%	19.65%	.	Net	Recapture	Recapture Method	Y	**Y**	Ceiling (TI)
CHE_Z*	CHE2	Royalties and other income	11.38%	19.65%	.	Net	Recapture	Recapture Method	Y	**Y**	Ceiling (TI)
CHN1	CHN1	Royalties and other income	15%	25%	.	Net	None	None		.	
CHN2	CHN2	Royalties and other income	15%	25%	.	Net	None	None		.	
CYP	CYP2	Royalties and other income	2.5%	12.5%	.	Net	Capitalisation	Separate loss method	Y	**Y**	
CYP	CYP2	Capital gains	0%	12.5%	.	Net	Capitalisation	Separate loss method	Y	**Y**	
CZE	CZE1	Royalties and other income	0%	19%	10	Net	None	Separate loss method		.	Ceiling (X)
ESP_C	ESP1	Royalties and other income	10%	25%	.	Net	None	Reduced value / Recapture method	Y	**Y**	
ESP_B	ESP2	Royalties and other income	7.2%	24%	.	Net	None	Reduced value method	Y	**Y**	

Table A.3. Calculation of tax benefits, 2022

Country-level ID	Regime-level ID	Income[1]	Lowest preferential tax rate[2]	Full rate[3]	Duration (number of years)[4]	Ongoing expenses	Past expenses	IP losses	Development conditions apply	Nexus ratio in the spirit of BEPS Action 5[5]	Limitations to tax benefits[6]
ESP_N	ESP3	Royalties and other income	8.4%	28%	.	Net	None	Reduced value / Recapture method	Y	**Y**	
FRA	FRA2	Royalties and other income	10.33%	25.83%	.	Net	Recapture	Separate loss method	Y	**Y**	
GBR	GBR1	Royalties and other income	10%	19%	.	Net	None	Separate loss method	Y	**Y**	
GRC	GRC2	Royalties and other income	0%	22%	3	Net	None	Separate loss method	Y	**Y**	
HUN	HUN1	Royalties and other income	4.5%	9%	.	Net	None	Modified reduced value method	Y	**Y**	Ceiling (TI)
HUN	HUN1	Capital gains on notified assets or assets tied-up to reserves	0%	9%	.	Net	None	Modified reduced value method	Y	**Y**	Ceiling (TI)
IRL	IRL2	Royalties and other income	6.25%	12.5%	.	Net	None	Reduced value method	Y	**Y**	
ISR1	ISR3	Royalties and other income	7.5%	23%	.	Net	None	Separate loss method	Y	**Y**	
ISR2	ISR4	Royalties and other income	5%	23%	.	Net	None	Separate loss method	Y	**Y**	
ISR3	ISR5	Royalties and other income	7.5%	23%	.	Net	None	Separate loss method	Y	**Y**	
ISR3	ISR5	Capital gains	12%	23%	.	Net	None	Separate loss method	Y	**Y**	
ISR4	ISR6	Royalties and other income	6%	23%	.	Net	None	Separate loss method	Y	**Y**	

Table A.3. Calculation of tax benefits, 2022

Country-level ID	Regime-level ID	Income[1]	Lowest preferential tax rate[2]	Full rate[3]	Duration (number of years)[4]	Ongoing expenses	Past expenses	IP losses	Development conditions apply	Nexus ratio in the spirit of BEPS Action 5[5]	Limitations to tax benefits[6]
ISR4	ISR6	Capital gains	12%	23%	.	Net	None	Separate loss method	Y	**Y**	
JPN	JPN2	Royalties and other income	23.79%	29.74%	5	Net	None	None		.	Ceiling (TI)
KOR	KOR2	Capital gains	10%	20%	.	Net	None	Separate loss method	Y	**Y**	Domestic Minimum Tax
KOR	KOR2	Royalties and other income	15%	20%	.	Net	None	Separate loss method	Y	**Y**	Domestic Minimum Tax
LTU	LTU1	Royalties and other income	5%	15%	.	Net	None	Separate loss method	Y	**Y**	
LUX	LUX2	Royalties and other income	4.99%	24.94%	.	Net	Recapture	Recapture method	Y	**Y**	
MLT	MLT2	Royalties and other income	1.75%	35%	.	Net	None	Recapture method/ Reduced value method	Y	**Y**	
NLD	NLD1	Royalties and other income	9%	25.8%	.	Net	Recapture	Recapture method	Y	**Y**	
POL	POL1	Royalties and other income	5%	19%	.	Net	None	Separate loss method	Y	**Y**	
PRT	PRT1	Royalties and other income	4.73%	31.5%	.	Net	Recapture	Separate loss method	Y	**Y**	
ROU	ROU1	Royalties and other income	0%	16%	10	Net	None	None		**.**	
SVK	SVK1	Royalties and other income	10.5%	21%	.	Net	Capitalisation	Reduced value method	Y	**Y**	
THA1	THA1	Royalties and other income	3%	20%	.	Net	None	Separate loss method	Y	**Y**	

Table A.3. Calculation of tax benefits, 2022

Country-level ID	Regime-level ID	Income[1]	Lowest preferential tax rate[2]	Full rate[3]	Duration (number of years)[4]	Ongoing expenses	Past expenses	IP losses	Development conditions apply	Nexus ratio in the spirit of BEPS Action 5[5]	Limitations to tax benefits[6]
THA2	THA2	Royalties and other income	0%	20%	8	Net	None	None		.	
THA3	THA3	Royalties and other income	0%	20%	13	Net	None	None		.	
TUR1	TUR1	Royalties and other income	0%	23%	.	Net	Capitalisation	Full exemption	Y	**Y**	
TUR2	TUR2	Royalties and other income	11.5%	23%	.	Net	Capitalisation	Separate loss method	Y	**Y**	
USA	USA1	Royalties and other income	18.41%	25.81%	.	Net	None	No deduction		.	Ceiling (other provisions)

[1] **CZE**: Other non-tax benefits apply but are out of the scope of this paper. **HUN**: Capital gains from the sale or in-kind contribution of a 'notified' intangible held for over a year. A 'notified' intangible is any intangible asset embodying rights to royalties, acquired or produced, provided that the taxpayer notifies the tax authority concerning the acquisition of such assets within sixty days of the date of acquisition or production. Profits from the sale or in-kind contribution of intangibles transferred to a tied-up reserve if used in the following five years to the constitution of the reserve to purchase intangible assets embodying rights to royalties.

[2] **CHE:** As part of the 2020 tax reform, Switzerland introduced a mandatory IP regime as well as an optional R&D super deduction at the cantonal level. The regime applies to the cantonal tax liability and allows a maximum exemption of 90% of qualifying income from cantonal level taxation. The rate of exemption varies by canton and is subject to mandatory general limitation rules of tax relief that cap the amount of relief firms can obtain from the use of tax instruments at the cantonal level. This cap also varies by canton. 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 8.11% rate 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 to 11.39% (100% IP Income). **ISR1:** 7.5% corresponds to the rate in Development Region A. The corresponding rate in other regions is of 16%. The regime also provides for reduced tax rates on dividend distributions. **ISR2:** 5% corresponds to the rate in Development Region A. The corresponding rate in other regions is of 8%. The regime also provides for reduced tax rates on dividend distributions. **ISR3:** 7.5% corresponds to the rate in Development Region A. The corresponding rate in other regions is of 12%. On capital gains, the corresponding rate in other regions is of 12%. The capital gains tax rate (for a company which owns a technology enterprise) for selling an intangible asset (that was acquired after 1 January 2017) to a foreign related company will be 12% as long as the asset was purchased from a foreign company for 200 million ILS or more. The capital gains tax rate mentioned above is contingent upon the approval of the Innovation Authority. The regime also provides for reduced tax rates on dividend distributions. **ISR4:** The reduced rate of capital gains is 6% provided that the firm developed or acquired the IP from a foreign company after 1 January 2017 if approved by the National Authority for Technological Innovation. **THA1:** Reduced CIT rate is 8%, 5% or 3% depending on the amount of operational expenditure of the IBC. 8% for up to THB 60 million, 5% for up to BHT 300 million and 3% for up to BHT 600 million.

[3] The full tax rate reflects the combined statutory tax rate as reported in the OECD Tax Database (OECD, 2023[18]), which incorporates the central and subnational statutory tax rates and includes certain CIT surcharges. The preferential tax rate is adjusted to match the full rate.
FRA: The statutory tax rate is equal to 15% for companies with less than EUR 10 million and on the first EUR 38.120 of taxable profits. **KOR:** The statutory tax rate varies with turnover between 10 and 25%. SMEs are typically taxed between 10% and 20%. **NLD**: The Netherlands also offers a reduced rate of 15% for taxpayers with taxable income less than EUR 245.000 in 2021. As the Dutch IP regime provides a base reduction, i.e. by only including 9/25.8 of income to taxation, the applicable reduced rate on qualifying IP profits is lower than 9% in those cases.
[4] **ARG1:** The regime offers a fiscal stability clause whereby beneficiaries will not see any increase in their Argentine total tax burden from the time of registration. The regime has been introduced till 31 December 2029. **CAN-S:** Firms can choose when to start their 10-15 year period of reduced taxation. **GRC**: The regime provides for an exemption on the profits from the sale of goods or services comprising the exploitation of a patent for the three consecutive fiscal years after the first year the sale is realised. The exempted profits are recorded in a special reserve and only taxed upon distribution or capitalisation. The legislation establishes no time limit for profits to be in the reserve. **THA3:** 100% for 8 years extended to 9-13 years depending on the ratio of R&D expenditure to revenues of the first three years combined. If the ratio equals 1% or expenditures incurred are larger than THB 200 million the tax holiday is increased by 1 year. If the ratio equals 2% or expenditures are larger than THB 400 million the tax holiday is increased by 2 years and if the ratio equals 3% or expenditures are larger than THB 600 million, the tax holiday is extended by 3 years. **TUR1:** Sunset provision applies: Exemption from income and corporate tax apply until 31.12.2028.
[5] This column seeks to capture the existence of ratios based on qualifying expenditures to determine qualifying income in the spirit of the BEPS Action 5 nexus ratio. Bold implies that the regime has been reviewed by the FHTP and found to be compliant with the BEPS Action 5 minimum standard.
Source: 2021-22 KNOWINTAX survey, FHTP peer review questionnaires and public sources, updates González Cabral et al. (2023[3]).

Annex B. 2022 KNOWINTAX survey and data availability

Table B.1. 2022 KNOWINTAX surveys: status of country responses

	Participation	KNOWINTAX survey 2022	
Country	Latest survey year	Cost module	Design module
ARG	2022	-	yes
BEL	2022	yes	yes
CAN	2022	yes	yes
CHE	2022	yes	yes
CHN	-	-	-
COL	2022	-	yes
CYP	2022	yes	yes
CZE	2022	yes	yes
ESP	2021	-	yes
FRA	2022	yes	yes
GBR	2022	yes	yes
GRC	2022	yes	yes
HUN	2022	yes	yes
IRL	2022	yes	yes
ISR	2022	yes	yes
ITA	2022	yes	yes
JPN	2022	yes	yes
KOR	2022	yes	yes
LTU	2022	yes	yes
LUX	2022	yes	yes
MLT	2022	yes	yes
NLD	2022	yes	yes
POL	2022	yes	yes
PRT	2021	-	yes
ROU	2021	-	-
SVK	2022	yes	yes
THA	2020	-	-
TUR	2021	-	yes
USA	2022	yes	yes
Total		21	20

Note: The 2022 OECD KNOWINTAX survey covered 29 countries that offered income-based tax incentives for R&D and innovation income during the 2000-22 period. Some countries were not in a position to address the 2022 KNOWINTAX data request. In this case, this report presents the data collected as part of the 2021 and 2020 KNOWINTAX surveys (2021 or 2020 instead of 2022 is listed as survey reference year), where available. For information on the status of data reporting at regime level, see Table B.3).
Source: OECD KNOWINTAX project, January 2023.

Table B.2. Status of data availability – summary overview

Availability of cost and beneficiary information at regime and country level

		Regime level			Country level		
		Total	Firm size	Industry	Total	Firm size	Industry
Cost							
Count	**None**	25	42	42	7	20	19
	Partial	13	5	5	14	5	6
	Complete	18	9	9	8	4	4
Percentage	**None**	45%	75%	75%	24%	69%	66%
	Partial	23%	9%	9%	48%	17%	21%
	Complete	32%	16%	16%	28%	14%	14%
Number of beneficiaries							
Count	**None**	28	42	43	8	20	19
	Partial	15	6	3	16	6	5
	Complete	13	8	10	5	3	5
Percentage	**None**	50%	75%	77%	28%	69%	66%
	Partial	27%	11%	5%	55%	21%	17%
	Complete	23%	14%	18%	17%	10%	17%

Note: At country level, the status of data availability reflects the extent to which relevant data are available for all schemes and years under consideration. At scheme level, the status of data availability reflects the extent to which relevant data are available for the availability period of income-based tax incentives (i.e. time span from the year of introduction to 2020 or year of abolishment, if smaller). Figures are based on a total of 29 countries offering income-based tax relief during the 2000-22 period, and a total of 52 regimes covered as part of the 2022 KNOWINTAX survey. For Hungary and Korea, different scheme components (provisions for different types of qualifying income) are treated as separate regimes. For information on the status of data reporting at regime level, see Table B.3).
Source: OECD KNOWINTAX project, January 2023.

Table B.3. Data on the cost of income-based tax support and number of beneficiaries at regime level, 2000-2020

ISO code	Regime code	Scheme name	Availability		Cost			Beneficiary		
			Start year	End year	Total	Firm Size	Industry	Total	Firm Size	Industry
ARG	ARG1	Software Promotional Regime	2004	2019	P					
ARG	ARG2	Promotional regime for the knowledge-based economy	2020	2029						
BEL	BEL1	Deduction for patent income	2007	2016 (2021)	C	P	P	P	P	P
BEL	BEL2	Deduction for innovation income	2016		C	C	C	C	C	C
CAN	CAN1	Déduction pour sociétés manufacturières innovantes (DSI) (Quebec)	2017	2020						
CAN	CAN2	Saskatchewan Commercial Innovation Incentive (SCII)	2017	2024						
CAN	CAN3	Déduction incitative pour la commercialisation des innovations (DICI) (Quebec)	2021		C					
CHE	CHE1	License box (Canton of Nidwalden)	2011	2019						
CHE	CHE2	IP box	2020							
CHN	CHN1	Reduced rate for high & new tech enterprises (HNTE)	2008							
CHN	CHN2	Tech-based SMEs (TSMEs)	2017							
CHN	CHN3	Preferential tax provision for enterprises transferring technology	2008							
COL	COL1	Tax exemption on new software with high scientific content	2003	2017	C	P	P	P	P	P
CYP	CYP1	IP Box regime	2012	2016 (2021)				P		
CYP	CYP2	IP Box regime (new regime)	2016		C					
CZE	CZE1	Investment incentives for R&D centres	2012							
ESP	ESP1	Partial exemption for income from certain intangible assets (Federal regime)	2014		P			P		
ESP	ESP2	Partial exemption for income from certain intangible assets (Basque country)	2008		P					
ESP	ESP3	Partial exemption for income from certain intangible assets (Navarra)	1997							

ISO code	Regime code	Scheme name	Availability		Cost			Beneficiary		
			Start year	End year	Total	Firm Size	Industry	Total	Firm Size	Industry
FRA	FRA1	Reduced rate for long term capital gains and profits from the licensing of IP rights	1965	2018	P			P		
FRA	FRA2	Reduced corporation tax rate on IP income	2019		C			C		
GBR	GBR1	Patent Box	2013		C	C	C	C	C	C
GRC	GRC1*	Tax patent incentives	2010		C			C		
HUN	HUN1a	IP regime for royalties and capital gains (measure "s": Royalties)	2003		C	C	C	C	C	C
HUN	HUN1b	IP regime for royalties and capital gains (measure "c": Sale)	2012		C	C	C	C	C	C
HUN	HUN1c	IP regime for royalties and capital gains (measure "e": Sale over 1 year)	2012		C	C	C	C	C	C
IRL	IRL1	Knowledge development box (first regime)	1973	2010	P			P		
IRL	IRL2	Knowledge development box (second regime)	2016		C			C		
ISR	ISR1	Approved enterprise regime	1958	2005						
ISR	ISR2	Priority enterprise regime	2005	2011						
ISR	ISR3	Preferred enterprise regime	2011							
ISR	ISR4	Special Preferred enterprise regime	2011							
ISR	ISR5	Preferred technology enterprise regime	2017		C	C	C	C	C	C
ISR	ISR6	Special preferred technology enterprise regime	2017		C	C	C	C	C	C
ITA	ITA1**	Taxation of income from intangible assets	2015	2021	P	P	P	P	P	P
JPN	JPN1	Tax deduction for MNEs conducting R&D	2012	2015						
JPN	JPN2	Tax incentive for specified business in the National Strategic Zones	2016		P			P		
KOR	KOR1a	Tax reduction for transfer or leases of technology (first regime: transfer of technology)	1983	2005						
KOR	KOR1b	Tax reduction for transfer or leases of technology (first regime: leases of technology)	1983	2005						

ISO code	Regime code	Scheme name	Availability		Cost			Beneficiary		
			Start year	End year	Total	Firm Size	Industry	Total	Firm Size	Industry
KOR	KOR2a	Tax reduction for transfer or leases of technology (second regime: transfer of technology)	2014		P	P		P	P	
KOR	KOR2b	Tax reduction for transfer or leases of technology (second regime: leases of technology)	2015		P	P		P	P	
LTU	LTU1	IP taxation regime	2018		C	C	C	C	C	C
LUX	LUX1	Partial exemption for income/gains derived from certain IP rights	2008	2016 (2021)						
LUX	LUX2	IP regime	2018		C		C	C		C
MLT	MLT1	Exemption on royalties derived from patent rules	2010	2015 (2021)	P			P		
MLT	MLT2	Patent Box regime	2019							
NLD	NLD1	Innovation box	2007		C	C		P	P	P
POL	POL1	IP box	2019		C			C		
PRT	PRT1	Partial exemption for income from certain intangible property	2014		P			P		
ROU	ROU1	Exemption for taxpayers engaged in R&D and innovation	2017							
SVK	SVK1	Patent Box	2018		C			C		C
THA	THA1	International business centre	2019							
THA	THA2	Activity-based tax incentive	2002							
THA	THA3	Merit-based tax incentive	2015							
TUR	TUR1	Technology development zones regime	2001							
TUR	TUR2	5/B regime	2015							
USA	USA1	Foreign derived intangible income (FDII)	2018		P		P	P		

Note: C: Complete, P: Partial. This table provides information on the status of data reporting at regime level. For Hungary and Korea, different scheme components (provisions for different types of qualifying income) are treated as separate regimes. The table covers income-based tax incentives for R&D and innovation income available during the 2000-22 period. *With effect of 1 January 2022, Greece amended its provision for Tax patent incentives for it to be in compliance with the BEPS Action 5 minimum standard. The pre-nexus version of this regime was closed off on 31-12-2021. ** In 2022, the regime in Italy has been repealed and changed for an expenditure-based tax incentive.
Source: OECD, KNOWINTAX project, January 2023.