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Cost and uptake of income-based tax incentives for R&D and innovation

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Despite the increasing adoption of income-based tax incentives for R&D and innovation in the OECD area and beyond, evidence on the availability, design, generosity and actual cost of these incentives remains scarce. This report helps fill this gap by documenting government efforts to provide preferential tax treatment of economic outputs of innovation activities. Drawing on the responses of national contact points to the OECD KNOWINTAX surveys carried out in 2020 and 2021, it presents new evidence on the cost (foregone tax revenues) and uptake of income-based-tax incentives by businesses in 2019, and tracks their distribution by firm size and industry and their evolution over the 2000-2019 period.

Keywords: Research and development, innovation, tax incentives

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Executive summary

Governments worldwide increasingly rely on tax incentives to promote business R&D and encourage innovation and economic growth. Preferential tax relief provisions may apply to R&D inputs (expenditure-based R&D tax incentives, e.g., R&D tax credits) or to the outcome of R&D and related efforts (income-based tax incentives). Income-based tax incentives provide relief in form of a reduced tax rate or tax exemption on revenues connected with outputs of the innovation activity of the firm. They 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.

In contrast to expenditure-based R&D tax incentives, there is relatively little systematic evidence on the availability, design, generosity and cost of income-based tax incentives across OECD and other major economies. The OECD KNOWINTAX project, a joint undertaking of the Directorate of Science, Technology and Innovation (STI) and the Centre for Tax Policy and Administration (CTPA) with support from the EU H2020 programme, aims to close this evidence gap. Of particular interest to the project is a better understanding of how the adoption of the Base Erosion and Profit Shifting (BEPS) Action 5 minimum standard has affected the generosity, uptake and cost of income-based tax incentives. BEPS Action 5, one of the four minimum standards introduced by the OECD/G20 BEPS project, seeks 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.

This document represents one in a set of three interconnected OECD working papers that present the initial findings from this project, drawing on the responses of national contact points to the first two KNOWINTAX surveys carried out in 2020 and 2021. Complementing the two companion publications, which deal with the design and modelling of income based tax incentives, this report provides evidence on the cost (forgone tax revenue) of income-based tax incentives and their uptake by firms in 2019 (or latest year) and trends in the cost and uptake of income-based tax relief over the 2000-2019 period.

The main findings in this report help address a number of important policy questions:

- **How widespread are income-based tax incentives for R&D and innovation?** Income-based tax incentives have become increasingly common. In 2021, 22 out of 38 OECD countries and 17 out of 27 EU countries offered such incentives, often in combination with expenditure-based tax incentives. 21 OECD and 15 EU countries offered both forms of tax support in 2021.
- **What is the cost of income-based tax relief to governments in terms of forgone tax revenue?** The report provides preliminary estimates of the cost of income-based tax relief for 2019 (or latest year) for 23 out of 29 countries offering such support during the 2000-21 period. Overall, the magnitude of this support appears very small, amounting to less than 0.01% of GDP in 12 out of 23 countries. Belgium (0.34% of GDP), the Netherlands (0.23% of GDP) and Israel (0.20% of GDP) provided the largest amount of income-based tax relief as a percentage of GDP.
- **How large is the uptake of income-based tax incentives by businesses within countries?** Income-based tax benefits tend to accrue to a subset of companies, with

less than 250 firms in 2019 (or latest) benefitting from this support in half of all countries for which data are available. The United States (~3900), Netherlands (~3270) and Italy (~2160), reported the largest number of recipients.

- **What type of firms use and benefit most from income-based tax support within countries?** Eight (seven) out of 23 countries were able to report data on the cost and uptake of income-based tax incentives by firm size (industry). Among those, SMEs typically accounted for the majority of income-based tax relief recipients in 2019 (or latest). However, the distribution of income-based tax benefits is largely tilted towards large firms, which may be a reflection of the concentration of IP among a small number of large corporations. By contrast, no clear pattern emerges regarding the distribution of income-based tax support across industries.
- **Which countries provide on average the largest subsidy per beneficiary?** Preliminary figures point to a substantial variation in average income-based tax subsidies across countries, ranging from more than USD 1 million in Belgium, France, Israel, Luxembourg, and the United States to less than USD 100 000 in Cyprus, Lithuania, Korea, Poland and Portugal. This variation can be attributed to several factors such as differences in the number, size and production intensity of beneficiaries and the generosity of income-based tax incentives across countries.
- **How has the adoption, cost and uptake of income-based tax incentives evolved over time?** The number of OECD (EU) countries offering income-based tax incentives has steadily grown, from five OECD (three EU) countries in 2000 to 22 (17) countries in 2021. Their cost and uptake have been rising in most countries for which data are available.
- **Is it possible to assess the impact of BEPS Action 5 on the cost and uptake of income-based tax incentives within countries?** There are significant measurement challenges and data limitations that prevent an analysis of the impact of BEPS Action 5. In most cases, this is driven by the inability of countries to report separate data for compliant vs non-compliant regimes. This calls for care when interpreting trends in the cost and uptake over the 2000-2019 period. For countries that can separately report on legacy and new schemes, some changes in cost and uptake can be observed after the introduction of BEPS Action 5.

Follow-on OECD work seeks to assess the scope for linking expenditure- and income-based tax relief statistics, with a view to developing an integrated view of the role of expenditure- and income-based tax incentives in the OECD area and beyond.

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1. Introduction

R&D tax incentives have become a major tool in the business innovation support policy mix of countries in the OECD area and beyond. R&D tax incentives may entail a preferential tax treatment of R&D inputs (expenditure-based R&D tax incentives, e.g. R&D tax credits) or outputs, i.e. the business income attributed to R&D and related efforts (i.e., income-based tax incentives). Income-based tax incentives that fall within the scope of this report comprise two broad categories: intellectual property (IP) regimes that offer a preferential tax treatment to the income derived from certain IP assets (e.g. patent boxes) and ‘dual category’ regimes that extend tax relief to the entirety of business income (i.e. not necessarily IP-based) but which are restricted to eligible businesses deemed to be engaged in R&D or other innovation related activities (e.g. tax holidays for businesses with a minimum level of R&D investment in relation to their turnover). As of 2021, 34¹ of the 38 OECD countries, 22² of 27 EU countries and a number of other major economies offer tax relief for R&D expenditure at the central or subnational government level. In 2021, income-based tax incentives were available in 22 OECD countries and 17 EU countries, either alone or in combination with expenditure-based tax incentives.

At this stage, comprehensive and systematic evidence on the availability, design, expected generosity and actual cost (to governments) of income-based tax incentives across OECD countries and other major economies is relatively scarce (Appelt et al., 2016^[1]; Hall, 2019^[2]), especially on a time-series basis. This paper represents one in a bundle of three interconnected OECD working papers that showcase the first findings from the OECD KNOWINTAX project³, which aims to improve the existing evidence on income-based tax incentives and provide a more complete picture of government efforts to support R&D and innovation. This paper complements the two companion publications, which deal with the design (González Cabral, Appelt and Hanappi, forthcoming^[3]) and modelling (González Cabral, Appelt and Hanappi, forthcoming^[4]) of income-based tax incentive provisions. It provides new evidence on the cost and uptake of income-based tax relief provisions in OECD member countries and other major economies, and their distribution by firm size and industry. Preliminary OECD estimates of forgone tax revenue illustrate the actual financial effort made by governments when providing this form of tax relief. This value depends not only on how generous tax relief provisions are, but also on how much uptake there is on the part of businesses. This study provides recent estimates for 2019 (or closest year) but also gives some initial insights into the evolution of the cost of income-based tax incentives and their uptake by firms over the 2000-2019 period.

Income-based tax incentives may fall within the scope of the preferential tax regimes covered by the BEPS Action 5 final report on Countering Harmful Tax Practices (“the Action 5 report”) which was released as part of the OECD/G20 Base Erosion and Profit Shifting (BEPS) project (OECD, 2015^[5]). BEPS Action 5, one of the four minimum standards introduced by the BEPS project, seeks 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. However, the KNOWINTAX project captures income-based tax incentives for R&D and innovation activities, regardless of whether they are within the scope of Action 5. Insofar as Action 5 has affected the design, calculation of forgone revenues, uptake and cost of income-based tax incentives, these changes are discussed in this report. However, this paper does not include evidence on the effectiveness⁴ of income-based tax incentives or evaluate the use of these provisions or their compliance with the BEPS Action 5 minimum standard.

The report provides evidence on the revenue forgone and uptake by firms of income-based tax incentives. The report is organised as follows: Section 2. provides some background information on the availability of income-based tax incentives in the OECD area and beyond, including key design features that may impact the actual cost of these provisions. Section 3. presents the common methodology established as part of the KNOWINTAX project to derive internationally comparable estimates of the cost of income-based tax support based on a framework for tracking the uptake of income-based tax relief by firms. Section 4. begins with an outline of the status of data availability and measurement challenges to continue with a presentation of the first project outputs. This includes new evidence on the cost and uptake of income-based tax incentives in 2019 (or latest), including their distribution by firm size and main economic activity as well as trends in the cost and uptake of income-based tax incentives over the 2000-2019 period. Section 5. concludes with some final remarks and outlines the next steps in the OECD's measurement work in this area.

2. Availability of income-based tax incentives in the OECD area and beyond

The OECD KNOWINTAX project covers a total of 49 countries (Table A.1), which includes all OECD countries and EU economies plus six other major economies (Table 1). Income-based tax incentives that fall within the scope of the KNOWINTAX project comprise two broad categories of incentives: **intellectual property (IP) regimes** that offer a preferential tax treatment to the income derived from certain IP assets (e.g. patent boxes) and **‘dual category’ regimes that extend tax relief to the entirety of business income (i.e. not necessarily IP-based)** but which are restricted to eligible businesses deemed to be engaged in R&D or other innovation related activities (e.g. tax holidays for businesses with a minimum level of R&D investment in relation to their turnover). However, there may still be a potential mismatch between qualifying and innovation income, in particular if income-based tax incentives apply to the entirety of business income.

Table 1. Tax incentives for R&D and innovation, 2021

Type of tax support	OECD	Non-OECD EU	Other economies
(I) Income-based and expenditure-based	Belgium, Canada ⁽ⁱ⁾ , Czech Republic, France, Greece, Hungary, Ireland, Israel, Italy, 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	Luxembourg	Cyprus	
(III) Expenditure-based only	Australia, Austria, Chile, Colombia, Germany, Denmark, Finland, Iceland, Mexico, Norway, New Zealand, Slovenia, Sweden	Croatia	Brazil, the Russian Federation, ^(iv) South Africa
None	Costa Rica, Estonia, Latvia	Bulgaria	Argentina ⁽ⁱⁱⁱ⁾

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. The new measures implementing the digital ‘knowledge’ economy regime (Disposición 11/2021 of 18 February 2021) are not captured in this report as such measures were not in place at the time of analysis. ^(iv) The report is based on data and information that pre-date the start of Russia’s war of aggression against Ukraine in February 2022.. Country coverage refers to the 49 countries covered in the study, including OECD and EU countries and selected economies and refers to tax incentives available as of July 2021.

Source: OECD.

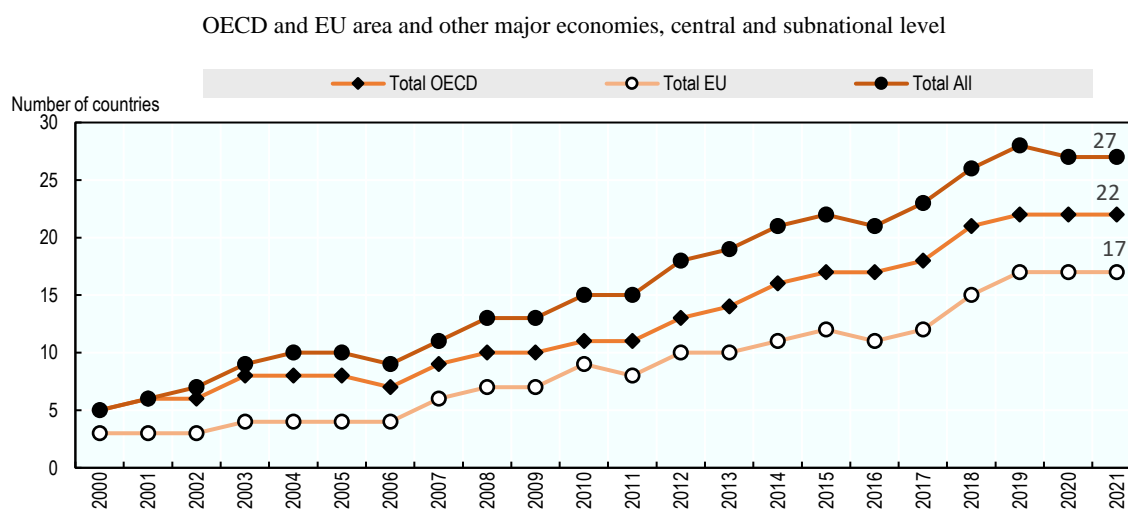
The strength of the link between the activities benefiting from tax relief and innovation may depend on several design factors such as the type of IP assets and type of income that qualify for income-based tax relief. Patent boxes for instance indirectly incentivise investment in developing (or acquiring) knowledge worthy of patent protection. Incentives that provide relief to other forms of IP, such as trademarks, may incentivise other types of business activity with potential links to non R&D-based forms of innovation, but in some cases, the link with innovation may be rather weak. In the case of dual regimes, it will also depend on the composition of the taxpayer’s income. The redefinition of qualifying IP assets and income and the introduction of substantive innovation activity (nexus) requirements through the adoption of the BEPS Action 5 minimum standard (OECD, 2015_[5]), contribute to strengthening the link between income-based tax incentives

and R&D and innovation, while making income-based tax incentives more likely to comply with domestic and international state aid rules. A companion paper to this one (González Cabral, Appelt and Hanappi, forthcoming^[3]) describes the main design features of income-based tax incentives in OECD countries and other selected economies in 2021 and outlines the key design changes introduced by the BEPS Action 5 minimum standard. At the time of the introduction of the minimum standard, many existing regimes were not compliant with it and were subsequently amended.

Among the 49 countries under consideration, a total of 27⁵ countries offered income-based tax incentives at central and/or subnational government level in 2021 (Table 1). The majority of OECD and EU countries (21 OECD and 15 EU countries) offered both expenditure- and income-based tax incentives, while a few countries (Luxembourg and Cyprus) offered income-based tax relief in isolation.

Over the last two decades, the number of OECD and EU countries offering income-based tax incentives has steadily grown (Figure 1). In 2021, 22 out of 38 OECD countries offered such incentives at central or subnational level, up from five OECD countries (France, Ireland, Israel, Korea and Spain -subnational level)⁶ in 2000. A similar trend is observable in the EU area, where the number of countries offering these incentives has increased from three to 17 over the last two decades. This increasing trend accelerated from 2017 to 2019 with the introduction of income-based tax incentives in the Slovak Republic and Poland and the reintroduction of this support in Malta and Luxembourg (previously repealed in 2015 and 2016, respectively). In the OECD area in turn, the United States (in 2018) and Canada (in 2017 at the subnational level)⁷ introduced income-based support within the scope of this study for the first time during this period. This upward trend in the adoption of income-based tax incentives seems to have slowed in more recent years.

Figure 1. Number of countries offering income-based tax support for R&D and innovation



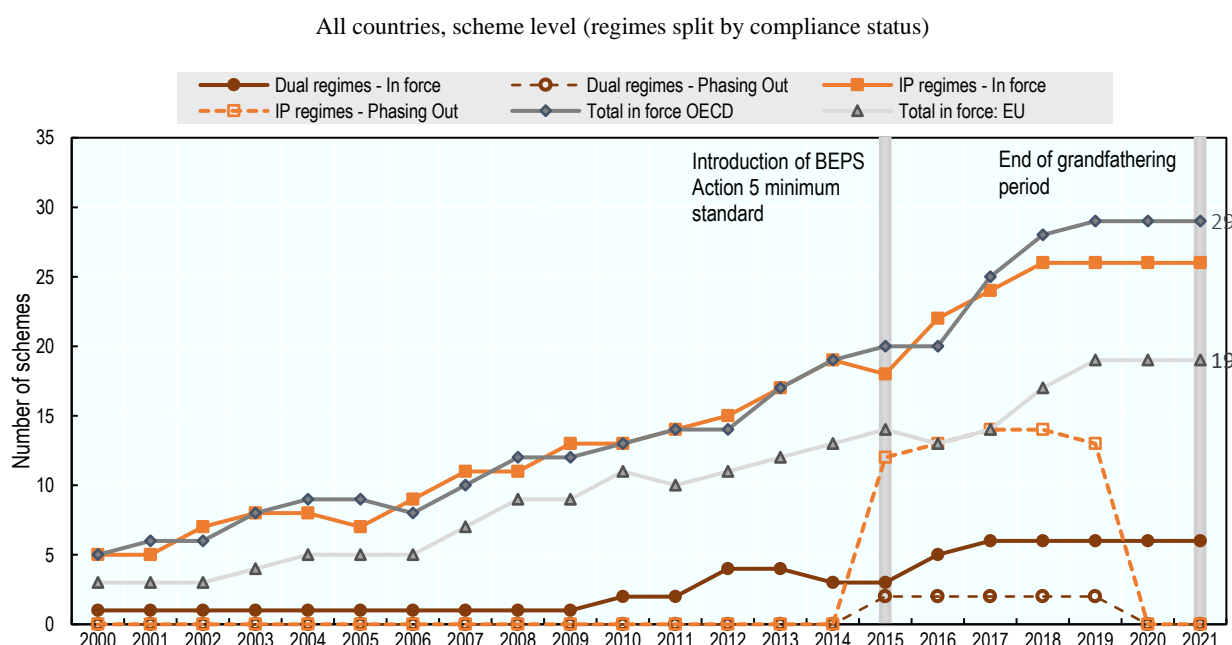
Note: OECD and EU membership is defined as of October 2021 and kept constant over time for comparability. Source: OECD, KNOWINTAX survey based on FHTP peer review questionnaires and public sources.

The adoption of the BEPS Action 5 minimum standard in 2015 (OECD, 2015^[5]) **introduced more stringent substantial activity requirements.** This led to significant changes in the design of many income-based tax incentives and the way in which tax benefits are calculated (González Cabral, Appelt and Hanappi, forthcoming^[3]). In order to capture the effect of the introduction of the minimum standard, this paper **divides regimes that were amended into two separate schemes.** A first “pre-nexus” scheme that

operated before the regime was made compliant with the BEPS Action 5 minimum standard and was closed-off to new entrants (taxpayers and new assets/activities from existing taxpayers) thereafter. A second “post-nexus” scheme can be considered to commence from the moment the compliant version of the regime came into force.⁸ At this stage, the project captures a total of 52 regimes and 70 schemes (Table A.3).

The number of income-based tax incentives, both IP regimes and dual category regimes, has swiftly increased over time. Figure 2 shows how the number of income-based tax incentives that fall within the scope of the project has evolved since 2000, distinguishing between the type (IP vs dual category regime) and status (in force, phasing out) of schemes. Regimes are classified as ‘phasing out’ if BEPS Action 5 transitional measures were in place. Such provisions could extend no longer than 30 June 2021 as shown by the respective lines collapsing to zero in 2021.

Figure 2. Income-based incentives over time, by type, status and impact of BEPS Action 5



Note: Total in force includes the total count of income-based tax incentives (IP regimes and dual category regimes) available to firms in the OECD and EU (central and subnational level) at each point in time, excluding those phasing out as they are closed to new entrants. Regimes are marked as ‘phasing out’ during the period when BEPS Action 5 transitional measures. Such provisions could extend no longer than 30 June 2021 (hence the respective lines plummeting to zero in 2021). The count is performed at the scheme level to separate pre-nexus provisions that are phasing out from post-nexus provisions that are in force. The number of regimes in force aligns with the number of schemes in force. Based on current data, over time only three countries offer subnational regimes: Canada (province of Quebec and Saskatchewan from 2017), Spain (Navarra and the Basque Country) and Switzerland (Canton of Nidwalden from 2011 to 19; and all Swiss cantons since 2020). The Swiss regime in 2020 enters the count as a single regime as its introduction is compulsory for all cantons. This graph builds upon historical information on the availability of income-based incentives provided in Table B.1. Source: OECD, KNOWINTAX surveys based on FHTP peer review questionnaires and public sources.

Similar to the pattern observed at country level (Figure 1), the total number of income-based tax incentive schemes increased steadily over the 2000-21 period, only interrupted by a short-term drop in 2016 following the introduction of the BEPS Action 5 standard. IP regimes that offer a preferential tax treatment to the income derived from certain IP assets (e.g. patent boxes) represent the most prominent form of income-based tax relief throughout this period, with 26 IP regimes and 11 dual category regimes in force in 2021. Figure B.1 (5. Annex B) presents the corresponding figures for OECD and EU countries.

3. Measuring the cost and uptake of income-based tax incentives

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 of their uptake by businesses. The KNOWINTAX project extends the OECD measurement work on expenditure-based R&D tax incentives, building a new data infrastructure for income-based tax incentives in collaboration with OECD and EU countries and other major 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 highlights how internationally comparable indicators of the cost of income-based tax relief can be derived and the uptake of income-based tax incentives by firms can be recorded.

3.1. Forgone revenues: Developing a common estimation methodology

Measuring the extent to which governments support R&D and innovation through income-based tax incentives involves a number of conceptual and practical challenges, especially when attempting to do so in an internationally comparable fashion. Measuring the cost of income-based tax incentives requires agreement on what represents the baseline tax treatment of R&D and innovation income (e.g. IP income). As tax expenditures are deviations from a benchmark tax system (OECD, 2010^[6]), establishing a common benchmark is the first requirement for comparability. As has been the case for expenditure-based tax incentives (OECD, 2015^[7]), the project aims to develop a common methodology for deriving internationally comparable estimates of foregone tax revenue for income-based tax incentives.

Estimates of foregone tax revenue can be derived by comparing the taxation of IP profits under IP regimes to the standard taxation that these profits would face in the absence of preferential treatment. The standard taxation of business revenue within the country acts as the benchmark and the preferential tax treatment would be given as a deviation from this benchmark. Table 2 highlights the general formula for estimating foregone tax revenues for income-based tax incentives accounting for two key design features: (i) the form of tax relief (reduced tax rate vs. tax exemption), and (ii) the tax treatment of ongoing associated IP expenditures. The latter may be deducted at the statutory rate (gross approach) or the preferential tax rate (net approach) in the calculation of IP profits (González Cabral, Appelt and Hanappi, forthcoming^[3]). As IP regimes represent the most common form of income-based tax relief (Figure 2), Table 2 focuses on the taxation of IP profits as one relevant case that can be adapted to other forms of R&D and innovation income.⁹

Table 2. Estimating foregone tax revenues for income-based tax relief provisions

Indicative outline of key formula

	Net approach (nexus requirement)	Gross approach (without nexus requirement)
Preferential tax rate	$\theta (Y^{IP} - X^{IP}) (\tau - \tau^*)$	$Y^{IP} (\tau - \tau^*)$
Income tax exemption	$\theta (Y^{IP} - X^{IP}) E^*$	$Y^{IP} E^*$
Notation	$Y^{IP} = IP \text{ income}; X^{IP} = IP \text{ expenditure}; Y^{IP} - X^{IP} = IP \text{ profits};$ $\tau = \text{Statutory tax rate}; \tau^* = \text{Preferential tax rate};$ $\tau^* = (1 - E^*) * \tau; E^* = \text{rate of income exemption};$ $\theta = \text{Nexus ratio: } 0 \leq \theta \leq 1 \text{ (if nexus applies), else } \theta = 1$	

There are two approaches to the treatment of current associated IP expenses (net or gross), which affect the calculation of foregone tax revenues. Under the first approach, current associated IP expenses are deducted from qualifying IP income prior to the application of IP benefits. This approach is known as the net approach. The second approach is known as the gross approach. Under the gross approach, IP expenditure is deducted at the statutory rate similar to the benchmark case (i.e. in the case of an absence of preferential tax treatment). As a result, the deviation from the benchmark tax system (foregone tax revenue) is different in these two cases. In the case of the gross approach, it reflects the difference in the taxation of qualifying income under the IP regime compared to the statutory tax rate. In the case of the net approach, it reflects the difference in taxation of qualifying profits (i.e. income less deductible expenses) under the IP regime compared to the statutory tax rate. The gross approach effectively creates a tax benefit for the firm in two forms: first through a lower taxation of IP income (through the reduced regime rate), and second through a larger deduction of IP expenditures (at the statutory rate). This implies a more generous tax treatment under the gross approach vis-à-vis the net approach in the form of a larger deduction of IP expenditures.

Estimates of foregone tax revenue increase with the difference between the statutory tax rate and regime rate, the scope of qualifying income and the definition of qualifying profits. This can be seen in the formula for deriving estimates of forgone tax revenue for income-based tax incentives under the gross and net approach.¹⁰ Countries differ in the types of qualifying income (González Cabral, Appelt and Hanappi, forthcoming_[3]). Income-based tax relief may apply to the income from the own use of the IP within the firm, licensing or assignment of the IP asset (sale and transfer) and the rate of preferential tax treatment vis-à-vis the benchmark taxation system. The preferential tax treatment may also vary across these strategies. In addition, tax relief may be available to different types of taxpayers, e.g. self-employed or businesses. In the case of an income tax exemption instead of a reduced tax rate, the preferential tax treatment is directly given by the product of the exemption rate (E^*) and qualifying profits (income) in the case of the net (gross) approach.

It is worthwhile noting that the derivation for the preferential tax treatment and cost of income-based tax support presented above is stylised but captures most country cases. Specifically, it does not cover other elements that affect the calculation of the tax base such as the treatment of past expenses or the interaction with expenditure-based incentives. The calculation shown above is not influenced by the provision of expenditure-based R&D tax incentives as long as (i) their use is not compatible with income-based tax support or, if compatible, (ii) they can be used cumulatively with income-based tax support, i.e. without any adjustment in the level of qualifying income. In the case where qualifying IP income is adjusted by countries as expenditure-based and income-based tax support are

used for the same investment, the formula presented in Table 2 would require an adjustment to account for two factors. First, it would have to account for the deduction of IP expenditures at the statutory rate (gross approach) or the regime rate (net approach) and second, for any enhanced R&D tax deductions (or credits) that may apply. The initial metadata collected as part of the 2021 KNOWINTAX survey suggest that it is possible to abstract from this scenario. This is because in the vast majority of countries that reported such data and offer both expenditure- and income-based tax relief, these instruments can either be combined cumulatively or are incompatible in their use. The formulae presented also aim to capture the general calculation of foregone tax revenues, abstracting from one-off events such as the recapturing of past R&D expenses, which in certain cases, firms need to deduct from qualifying profits when applying for IP regimes.

3.2. Statistics on the number of income-based tax relief beneficiaries

In addition to statistics on forgone revenue, the KNOWINTAX project also aims to compile statistics on the number of firms receiving income-based tax relief for R&D and innovation. Different tax systems provide income-based tax relief using different reporting systems and milestones in the administration process that impact the available indicators of taxpayer demand for, and use of, income-based tax support. Table 3 proposes an indicative schema for understanding differences in reported figures. This schema accounts for the fact that taxpayers – in line with the nexus approach adopted as part of BEPS Action 5 – are required to link qualifying income to IP assets or suitably defined products or product families (OECD, 2015^[5]). It also accounts for the use of certification and pre-approval mechanisms in some of the countries under consideration (González Cabral, Appelt and Hanappi, forthcoming^[3]), which in turn require taxpayers to submit an IP asset or firm specific application to obtain access to income-based relief. A single firm or enterprise group may put forward one or more applications in a given year.

Table 3. Indicative schema for statistics on the number of income-based tax relief beneficiaries

Status	Submission of request for income-based tax support (certification, pre-approval)	Entitlement to income-based tax support	Realisation of income-based tax support
Entity			
IP assets / products (product families)	Applications (Can be IP asset or firm specific)	Claims (Can be part of tax returns, a company may submit more than one claim)	Realised claims
Firms (enterprises or groups)	Applicants (A company may submit more than one application per year)	Claimants (Claims can be kept separate or combined within a firm)	Tax support recipients (beneficiaries)
Link to tax expenditure measurement	N/A	Accruals basis	Cash basis (Yet in some cases the value will only be realised in future periods)

Different units of analysis (e.g. enterprise or enterprise group) may be adopted for reporting purposes. The term “claims” is used here 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. The KNOWINTAX survey asks respondent jurisdictions to flag whether they report data on applicants (applications), or claimants (claims) instead of beneficiaries (i.e. recipients) but not all of these differences may be fully captured in this survey and flagged in this report.

4. Results from the 2020-21 OECD KNOWINTAX surveys

This section presents the first set of income-based tax relief statistics produced by the KNOWINTAX project. These indicators provide new insights into the cost and uptake of income-based tax incentives by businesses over the 2000-19 period in the OECD area and beyond, and their distribution by firm size and industry sector. Before presenting the results, the section first provides an outline of the current status of data availability and reporting by countries and measurement challenges encountered as part of the KNOWINTAX surveys carried out in 2020 and 2021.

4.1. Data availability and measurement challenges

29 out of the 49 countries covered in the first KNOWINTAX survey have offered income-based tax incentives for R&D and innovation over the 2000-2021 period, but the degree of data availability and coverage varies. Table 4 displays the level of data availability and reporting at country level, drawing on the 2020 and 2021 KNOWINTAX surveys. Overall, 28 out of 29 countries offering income-based tax relief during the 2000-21 period contributed to the data collection. The 2021 KNOWINTAX survey extended the geographical scope of the 2020 pilot survey from a total of 28 to 49 countries, cross-validating the status of income-based tax relief during the 2000-21 period among a broader group of countries (Table A.1). Furthermore, the 2021 KNOWINTAX survey collected additional and more comprehensive metadata to support the interpretation of cost and beneficiary figures over time.

The survey collects metadata on estimation and data reporting methodologies to enable flagging differences and establishing comparable indicators across countries. Several kinds of metadata are collected. These include information on the estimation approach adopted in deriving tax expenditure estimates, including baseline tax treatment (benchmark) against which cost estimates are produced. They also include changes in the estimation method due to the introduction of the BEPS Action 5 minimum standard. For the compilation and interpretation of beneficiary statistics, metadata are collected relating to the additivity of beneficiary figures, i.e. whether the number of beneficiaries reported for individual schemes can be added across schemes to derive a national total or whether this could result in double counting. Moreover, metadata are collected to infer whether figures refer to claimants (claims) instead of tax relief beneficiaries (Table 3) and to appropriately flag such cases.

Table A.3 in Annex B provides complementary information on the status of data availability for the 70 schemes that were covered by the KNOWINTAX surveys. Overall, relevant data are currently only available for a subset of countries and often do not necessarily capture all regimes within a country. To date, 23 out 29 countries offering income-based tax incentives during the 2000-2021 period were able to provide some data on the cost and number of beneficiaries for income-based tax incentives, with over half of them providing only partial data, covering a subset of schemes or only certain years of data (Table A.2 in Annex A, Table A.3 in Annex A).

Table 4. Availability of data on the cost of income-based tax support and number of beneficiaries

2020-2021 OECD KNOWINTAX surveys: status of data reporting by country

	KNOWINTAX cost questionnaire	Cost				Beneficiary			
		Total	Size	Industry	Metadata	Total	Size	Industry	Metadata
ARG	2020	yes	-	-	-	-	-	-	-
BEL	2021	yes	yes	yes	-	yes	yes	yes	-
CAN	2020	yes	-	-	-	-	-	-	-
CHE	2021	-	-	-	-	-	-	-	-
CHN		-	-	-	-	-	-	-	-
COL	2021	yes	yes	yes	yes	yes	yes	yes	-
CYP	2021	yes	-	-	-	yes	-	-	-
CZE	2021	-	-	-	-	-	-	-	-
ESP	2021	yes	-	-	yes	yes	-	-	-
FRA	2021	yes	-	-	-	yes	-	-	-
GBR	2021	yes	yes	yes	-	yes	yes	yes	-
GRC	2021	yes	-	-	-	yes	-	-	-
HUN	2021	yes	yes	yes	-	yes	yes	yes	-
IRL	2021	yes	-	-	yes	yes	-	-	yes
ISR	2021	yes	-	-	-	yes	-	-	-
ITA	2021	yes	yes	yes	yes	yes	yes	yes	yes
JPN	2021	yes	-	-	-	yes	-	-	-
KOR	2020	yes	yes	-	-	yes	yes	-	-
LTU	2021	yes	yes	yes	yes	yes	yes	yes	-
LUX	2021	yes	-	-	-	yes	-	-	-
MLT	2020	yes	-	-	-	yes	-	-	-
NLD	2021	yes	yes	-	yes	yes	yes	-	-
POL	2021	yes	-	-	-	yes	-	-	-
PRT	2021	yes	-	-	-	yes	-	-	-
ROU	2021	-	-	-	-	-	-	-	-
SVK	2021	yes	-	-	-	yes	-	-	-
THA	2020	-	-	-	-	-	-	-	-
TUR	2021	-	-	-	-	-	-	-	-
USA	2021	yes	-	yes	Yes	yes	-	-	yes
Total	28 out of 29	23	8	7	7	21	8	6	3

Note: Some countries were not in a position to address the 2021 KNOWINTAX data request due to data confidentiality restrictions (e.g. Czech Republic) or lack of relevant data at the time of reporting (e.g. Romania, Switzerland, Thailand, Türkiye) . Cells marked with a short dash indicate non-response. This report presents the data collected as part of the 2020 KNOWINTAX survey, where available (2020 instead of 2021 is listed as survey reference year). The data for Argentina are based on national sources and pending validation.

Source: OECD KNOWINTAX project, July 2022.

The KNOWINTAX surveys have pointed to some data limitations and measurement challenges:

- Restrictions concerning **national confidentiality rules** due to the limited number of tax relief recipients, considering total amounts (the Czech Republic) or breakdowns (Colombia).
- The two-to-three year **time lag with which relevant and reliable data** can be reported by countries, in particular in the case of regimes recently introduced (e.g. United States).

- The **difficulty of reporting separate cost estimates for pre-nexus and post-nexus regimes** (Section 2. , Table A.3). Several countries reported either combined estimates (Cyprus, Greece, the Netherlands, the United Kingdom) or created an artificial breakdown for pre- vs. post-nexus regimes based on the year of nexus compliance (Hungary, Italy, Spain). Across countries, these changes may take effect at different moments in time, i.e. as new national legislation is enacted.
- Existing **differences in the reporting of recipient figures**, i.e. reporting of claimants (e.g. Ireland) or claims vis-à-vis the number of actual beneficiaries, may not yet be fully flagged as is the case for expenditure-based R&D tax incentives (OECD, 2022^[8]).
- **The non-additive nature of the beneficiary figures due to challenges in uniquely identifying tax relief recipients** when firms claim support for different IP assets under different IP regimes available in a country or when income-based regimes have different components. For example, in the case of Italy, the number of tax relief beneficiaries is the sum of firms that benefit from the (i) income tax exemption with pre-ruling procedure, (ii) income tax exemption without pre-ruling procedure and (iii) capital gains tax exemption; the total might be slightly overestimated if the same firm benefits from more than one of the three existing forms or modalities of income tax exemption.
- **Different enterprise concepts** exist and may be adopted by countries in the computation of R&D tax benefits at the firm level. Across countries, a range of definitions can be used, such as enterprise units, plants and establishments or enterprise groups. This has implications for the comparability of indicators collected as part of the KNOWINTAX survey.¹¹
- **The overall lack of metadata limits the interpretability and comparability of the tax expenditure-based estimates for income-based tax incentives at the moment.** In particular, only seven countries reported complete or partial information on estimation approaches and three countries provided details on the beneficiary figures reported. These limits make it impossible to assess whether the reporting fully aligns with the guidelines of the KNOWINTAX survey. Examples where discrepancies may arise include instances where the eligible tax base may be confused with the cost of the income-based tax relief, i.e. difference in the preferential and standard tax treatment.
- **These limitations call for extreme caution when attempting to interpret and compare these figures across countries, or with available statistics on expenditure-based R&D tax relief.** As Table 4 and Table A.3 highlighted, relevant data are currently only available for a subset of countries and often do not capture all regimes within each country. This, coupled with the lack of information on countries' estimation approaches, largely limits the informative value and international comparability of the preliminary indicators at this stage. Continued engagement with delegates and future data collections will see the refinement of the methodology and extent of data reporting.

4.2. Preliminary evidence on the cost and uptake of income-based tax relief

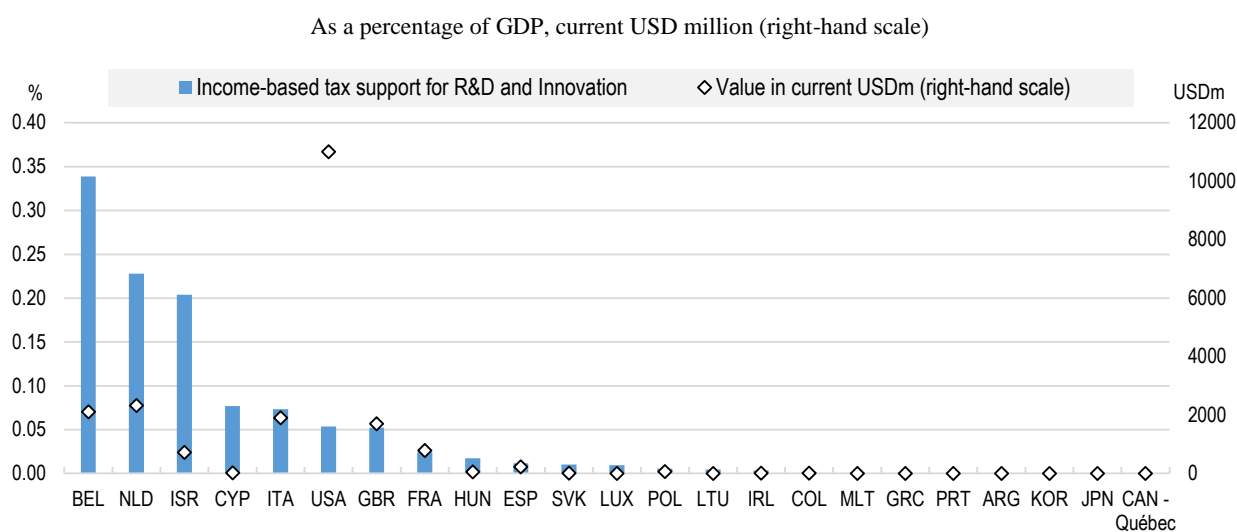
This section presents the first set of income-based tax relief statistics produced by the project, drawing on the first two KNOWINTAX surveys carried out in 2020 and 2021. These indicators provide new insights into the cost and uptake of income-based tax incentives by businesses over the 2000-19 period in the OECD area and beyond, including

the average subsidy received by beneficiaries and the distribution of tax benefits and the number of beneficiaries by firm size and industry sector.

4.2.1. Income-based tax relief for R&D and innovation - 2019 snapshot

The cost of income-based tax support varies across jurisdictions. Figure 3 reports estimates of the cost of income-based tax support in 2019 (or latest year) for 23 countries for which relevant data are available at the time of reporting. The cost of this support is very small (below 0.01% of GDP) in 12 out of 23 countries¹² but appears to reach a more sizeable magnitude among the other half of countries. The estimates suggest that Belgium, the Netherlands and Israel provided the largest amounts of income-based tax relief as a percentage of GDP in 2019 (or closest year). In absolute amounts (current USD million), the data suggest that support is the largest in the United States (~USD million 11 020), followed by the Netherlands (~USD million 2330) and Belgium (~USD million 2110). It is important to keep in mind that absolute subsidy amounts are prone to be high for large countries such as the United States. Furthermore, while these first estimates suggest that income-based tax incentives play a comparatively smaller role than other tax or direct R&D support measures in most of the countries concerned, it would be premature to make such comparisons, benchmark countries against one another or draw any firm policy conclusions based on the first set of income-based tax relief statistics produced by the OECD KNOWINTAX project. These statistics are still partial and preliminary in nature.

Figure 3. Income-based tax support for R&D and Innovation, 2019



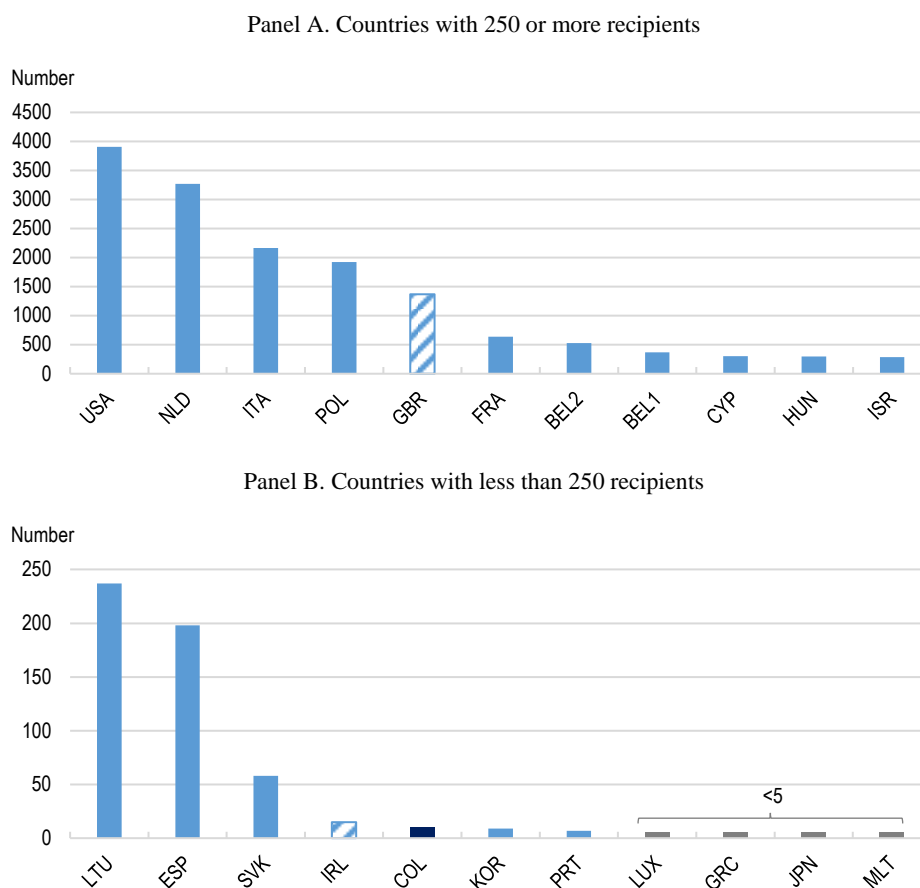
Note: This indicator is preliminary and may only provide an incomplete picture of the overall magnitude of income-based tax support for R&D and innovation. For a number of countries, estimates are currently either not available (China, the Czech Republic, Switzerland, Türkiye and Thailand) or cover only a subset of regimes (see Table 4 and Table A.3). For Cyprus, Hungary Israel, Italy, Korea and the United States, figures refer to 2018 instead of 2019. Provisional figures are reported for the Netherlands and the United Kingdom. Estimates are reported by Lithuania, the Netherlands, the Slovak Republic, and the United States. Greece, Hungary, Italy, the Netherlands and the United Kingdom report combined estimates for pre- and post-nexus regimes.

Source: OECD based on 2021 KNOWINTAX survey, July 2022.

The number of beneficiaries provides a measure of the uptake of such provisions across jurisdictions. Figure 4 provides complementary information on the number of income-based tax relief recipients in 2019 (or the latest available year), with separate figures being 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. Bars are shaded

in dashed blue (dark blue) when figures refer to claimants (applicants) instead of beneficiaries. In 11 out of 21 countries (Panel B), where relevant data were available at the time of reporting, less than 250 firms benefitted from income-based tax relief in that year, with 15 recipients in Ireland and close to 200 recipients in Spain, for instance. In the case of the other 10 countries (Panel A), more than 250 firms received income-based tax support for R&D and innovation, the most recipients being reported by the United States (~3900), followed by the Netherlands (~3270) and Italy (~2160).

Figure 4. Number of income-based tax relief recipients, 2019



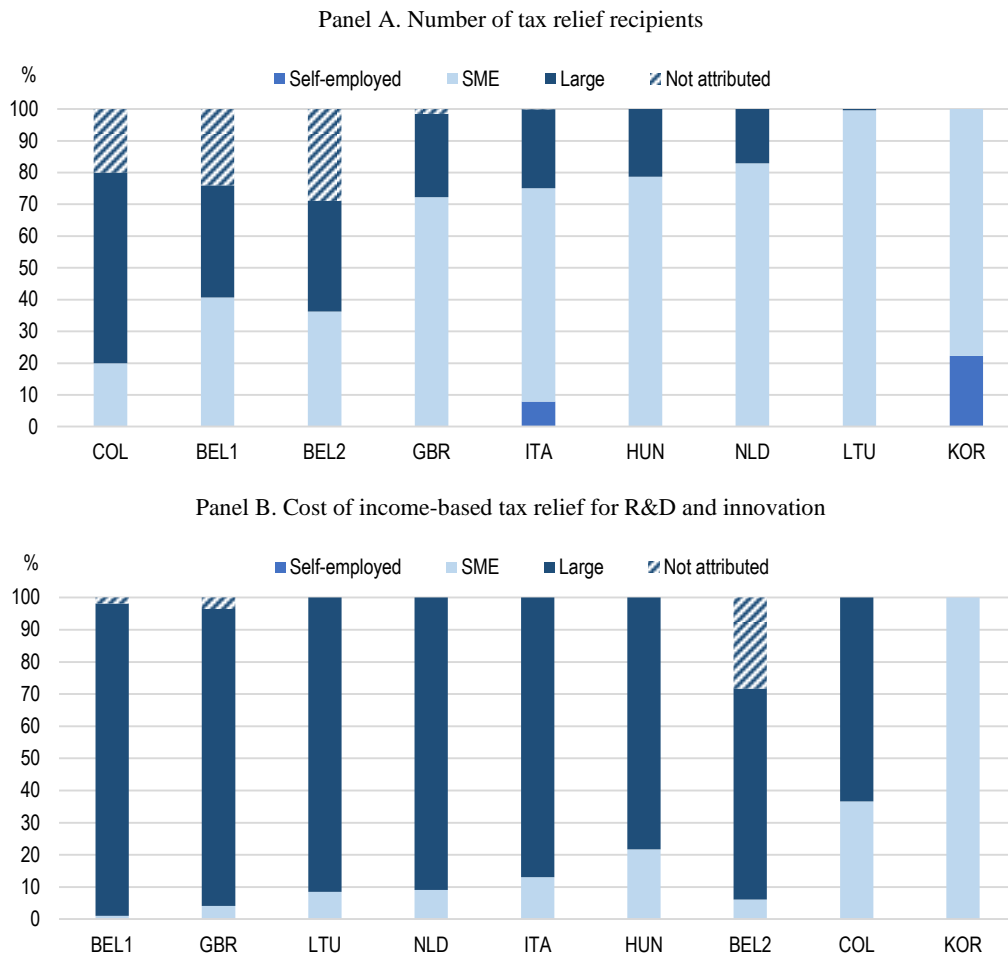
Note: This indicator is preliminary and may only provide an incomplete picture of the overall uptake of income-based tax support for R&D and innovation. For a number of countries, beneficiary figures are currently either not available (Argentina, Canada – Québec, China, Czech Republic, Israel, Romania, Switzerland, Türkiye and Thailand) or cover only a subset of regimes (see Table 4 and Table A.3). 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. For France, figures refer to 2020 instead of 2019 as relevant data are not available for 2016-19. For Colombia, Cyprus, Hungary, Israel, Italy, Korea, the Netherlands, and the United States, figures refer to 2018 instead of 2019. Provisional figures are reported for the Netherlands and the United Kingdom. BEL1 refers to the Deduction for patent income (pre-nexus regime) and BEL2 refers to the Deduction for innovation income (post-nexus regime); beneficiary figures are not additive. For Italy, the total number of beneficiaries – sum of three non-additive scheme components – might be slightly overestimated (see Section 4.1). In the case of four countries (Luxembourg, Greece, Japan and Malta) with less than five recipients (Panel B), data are not included in this chart for confidentiality reasons.

Source: OECD based on 2021 KNOWINTAX survey, July 2022.

The uptake of income-based tax incentives varies across firm sizes and industries. Figure 5 and Figure 6 provide preliminary insights into which types of firms claim and

receive income-based tax support for R&D and innovation and how these tax benefits are distributed across different types of firms. Relevant data are currently available for six to eight countries, depending on the breakdown under consideration, with separate figures being reported for the two income-based tax incentives in Belgium due the non-additive nature of beneficiary figures. **Figure 5 shows how the number of income-based tax relief recipients (Panel A) and the cost of income-based tax support (Panel B) were distributed across firms of different sizes in 2019 (or the latest year).** Among the eight countries under consideration, SMEs typically accounted for the majority of income-based tax relief recipients in that year. Self-employed workers were also among the income-based tax relief recipients in Italy and Korea.

Figure 5. Distribution of income-based tax relief by firm size, 2019



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 4 and Table A.3). 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. For Colombia, Hungary, Italy, Korea, and the Netherlands figures refer to 2018 instead of 2019. Hungary, Italy, the Netherlands and the United Kingdom report combined estimates for pre- and post-nexus regimes. BEL1 refers to the Deduction for patent income (pre-nexus regime) and BEL2 refers to the Deduction for innovation income (Post-nexus regime) beneficiary figures are not additive.

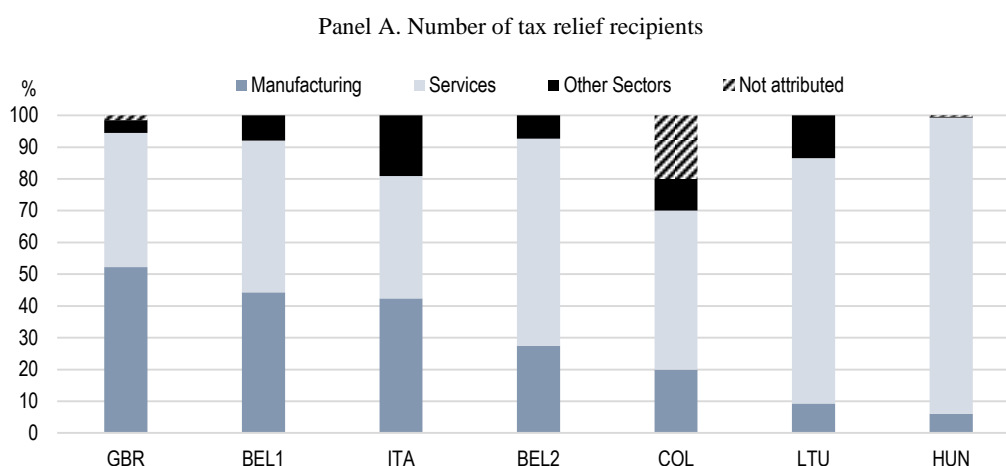
Source: OECD based on 2021 KNOWINTAX survey, July 2022.

The distribution of income-based tax benefits is in turn largely tilted towards large firms. The share of income-based tax benefits going to large companies in Hungary, the Netherlands, Lithuania, the United Kingdom and Belgium (deduction for patent income – pre-nexus regime) is 80% or more. This distribution of income-based tax support may be a reflection of the fact that patents are found to be largely concentrated among a small number of large, typically multinational, corporations that generate the bulk of IP income (Dernis et al., 2019^[8]; Appelt et al., 2016^[9]). One notable exception is Korea where income-based tax relief is exclusively available to SMEs and all income-based tax incentive benefits thus accrue to these firms.

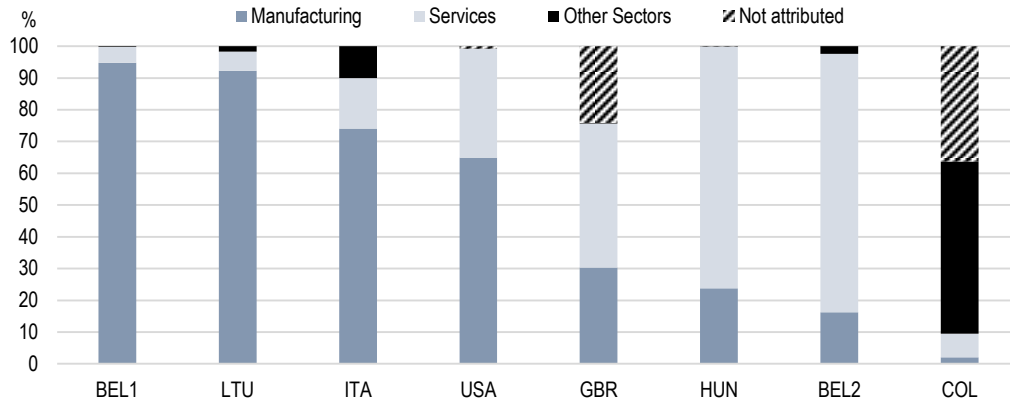
There is significant heterogeneity in the take-up and cost of income-based tax support by industry. Figure 6 shows how the number of income-based tax relief recipients (Panel A) and cost of income-based tax support (Panel B) were distributed across firms in different industry groups in 2019 (or the latest available year), distinguishing between manufacturing, services and other sectors. While firms in manufacturing and services appear to account for a fairly similar share in the population of income-based tax relief recipients in Belgium (deduction for patent income – pre-nexus regime), Italy and the United Kingdom, firms in services account for the largest share in the population of income-based tax relief recipients in Belgium (deduction for innovation income – post-nexus regime), Colombia, Hungary and Lithuania. Overall, no clear-cut pattern seems to emerge (Panel A) looking at the six economies for which relevant data are available. In this context, it is important to note that differences in the classification of the IP holding beneficiary across countries could also have an impact on these results.

Similarly, no clear cut pattern emerges from the distribution of income-based tax benefits (Panel B) across firms in different industry groups. Firms in manufacturing account for the bulk of income-based tax benefits in four out of eight cases (Belgium – BEL1: deduction for patent income, Italy, Lithuania, the United States), reflecting the typically high R&D intensity and IP filing activity among manufacturing firms. However, the R&D and IP filing activity of different industry patterns varies across countries, and so does the scope of qualifying income under different income-based tax incentives. In the case of Belgium (BEL2: deduction for innovation income), Hungary and the United Kingdom, most income-based tax benefits accrue to firms in services, suggesting that those generate the bulk of qualifying income.

Figure 6. Distribution of income-based tax support by industry, 2019



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

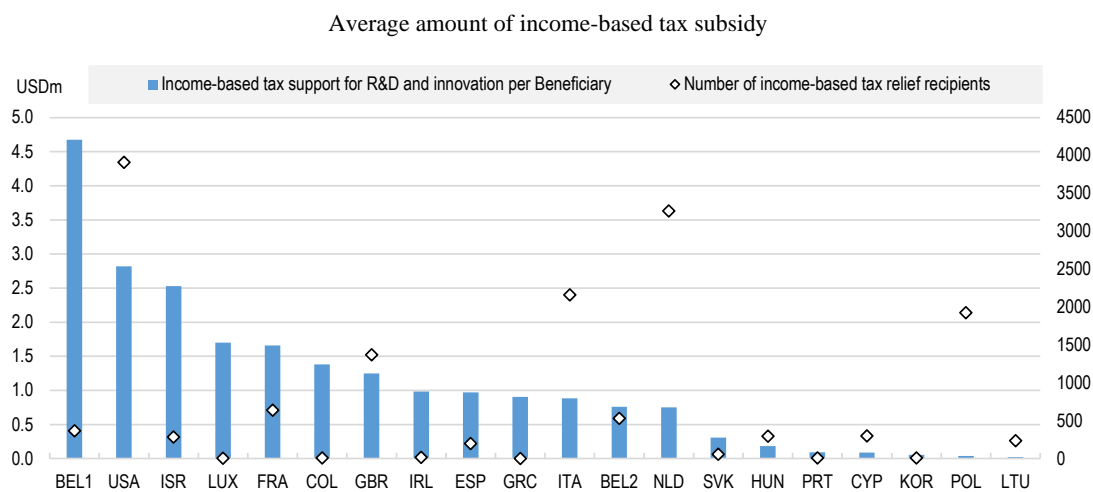


Note: This indicator is preliminary and may only provide an incomplete picture of the distribution of the uptake (Panel A) and cost (Panel B) of income-based tax support for R&D and innovation by industry. For a number of countries, such granular data are currently either not available or cover only a subset of regimes (see Table 4 and Table A.3). In the case of the United Kingdom, figures refer to claimants instead of beneficiaries, and in the case of Colombia, they refer to applicants. For Colombia, Hungary, Italy, the United States figures refer to 2018 instead of 2019. Hungary, Italy, and the United Kingdom report combined estimates for pre- and post-nexus regimes. BEL1 refers to the Deduction for patent income (pre-nexus regime) and BEL2 refers to the Deduction for innovation income (Post-nexus regime); beneficiary figures are not additive. Source: OECD based on 2021 KNOWINTAX survey, July 2022.

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 7 reports the average amount of income-tax relief (in current USD million) that beneficiaries received across countries in 2019 (or latest year). In 13 out of 21 cases, firms received on average less than USD 1 million in income-based tax relief. This amount is largest in Belgium (deduction for patent income), the United States and Israel, followed by Luxembourg and France, and it reaches less than USD 100 000 in Portugal, Cyprus, Korea, Poland and Lithuania. 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 implied subsidy can be a function of several factors.

The observed variation in average subsidy amounts per beneficiary can be attributed to a number of factors such as differences in the number, size and production intensity of beneficiaries and the generosity of income-based tax relief across countries. A comparison of actual average tax subsidies with theoretical implied tax subsidies in 2019 would provide valuable insights into the extent to which differences in average subsidy amounts are linked to differences in the design and generosity of income-based tax relief. These could be measured by the difference in effective tax rates (ETRs) under the scenario of a preferential versus standard tax treatment of IP income. At the time of reporting, such estimates are available only for 2021 (González Cabral, Appelt and Hanappi, forthcoming^[4]), which are not directly comparable with the actual average subsidy amounts in 2019 due to possible changes in the design of income-based incentives in these two years. As the project advances and historic design information and systematic information about changes in design features of IP regimes become available, it may be possible to examine such linkages in more detail.

Figure 7. Average amount of income-based tax support per beneficiary, 2019



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, Czech Republic, Switzerland, Türkiye, and Thailand) or cover only a subset of regimes (see Table 4 and Table A.3). In the case of Ireland and the United Kingdom, figures are based on claimants instead of beneficiaries, and in the case of Colombia, they refer to applicants. For Colombia, Cyprus, Hungary, Israel, Italy, Korea, the Netherlands, and the United States refer to 2018 instead of 2019, and those for France refer to 2020 instead of 2019 as relevant data are not available for 2016-19. Greece, Hungary, Italy, the Netherlands and the United Kingdom report combined estimates for pre- and post-nexus regimes. BEL1 refers to the Deduction for patent income (pre-nexus regime) and BEL2 refers to the Deduction for innovation income (Post-nexus regime); beneficiary figures are not additive. 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. Data for countries with less than five recipients are not included in this chart for confidentiality reasons.

Source: OECD based on 2021 KNOWINTAX survey, July 2022.

4.2.2. Trends in income-based tax relief for R&D and innovation, 2000-2019

This section aims to provide some first insights into the evolution of the cost and uptake of income-based tax incentives by firms over the 2000-2019 period, drawing on the preliminary and partial time-series estimates (see Table 4 and Table A.3) collected as part of the KNOWINTAX project. For the moment, it remains challenging to accurately explain trends in the number of tax relief recipients or the cost of income-based tax support over time, as comprehensive metadata on estimation approaches and information on changes in the design of income-based tax relief provisions are lacking.

Few countries have published income-based tax relief statistics that would depict trends in uptake and forgone revenues. An exception is the United Kingdom (HMRC, 2021_[10]). In addition, few countries (Belgium, France and Ireland) are currently in a position to report separate estimates for pre-nexus vs. post nexus regimes. This means that it is challenging to disentangle the extent to which more recent changes in the number of recipients or the cost of income-based support are driven by pre- vs. post-nexus regimes, i.e. by the introduction of the BEPS Action 5 minimum standard. This is particularly the case where BEPS Action 5 transitional measures were in place.¹³ (OECD, 2015_[5]; González Cabral, Appelt and Hanappi, forthcoming_[3]).

This project enables building trends in uptake and cost for a wider set of jurisdictions. Figure 8 shows how the cost of income-based tax support and the number of income-based tax relief beneficiaries have evolved over time in thirteen countries (Argentina, Belgium,

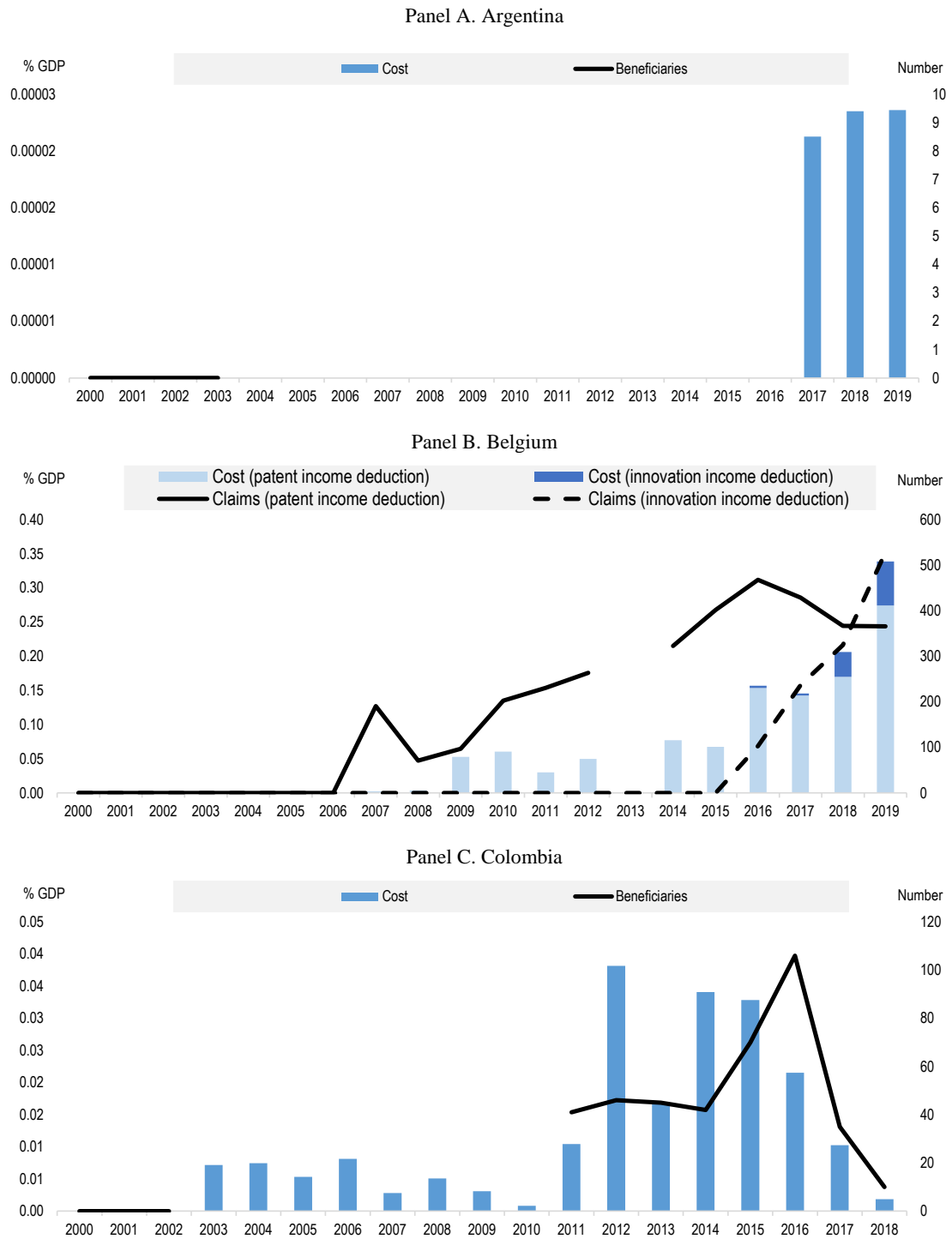
Colombia, Cyprus, France, Greece, Hungary, Ireland, Italy, Korea, the Netherlands, Portugal and the United Kingdom). The countries included are those for which relevant cost and/or beneficiary figures are available for a minimum period of three years and where income-based tax incentives are available to at least three beneficiaries.¹⁴

An increase in the cost and uptake of income-based tax relief can be observed in nearly all countries concerned over the 2000-2019 period, with the exception of France and Ireland. In the United Kingdom (Panel M), for instance, 830 companies benefited from the UK patent box in 2013, the year in which this IP regime was introduced, and this number increased to around 1150 in 2014, following which it remained stable until 2017 when the number of recipients rose to around 1300. The cost of income-based tax support similarly increased from 2013 (0.02% of GDP) to 2019 (0.05% of GDP), with some notable jumps in 2014 and 2016 when the cost of the patent box increased by around 80% and 40% respectively. In the Netherlands (Panel K), the cost of income-based tax relief increased steadily from 2010 (0.06% of GDP) to 2015 (0.23% of GDP) and oscillated around its 2015 level from 2016-19. The number of income-based tax relief beneficiaries reached a peak of 3650 firms in 2016 to slightly decline thereafter. Likewise, a strong increase in the cost of income-based tax relief after the launch of an IP regime is noticeable in Italy (Panel I), where the cost of income-based tax relief rose from 0.01% of GDP in 2015, the year in which Italy introduced a preferential taxation of income from intangible assets, to 0.07% of GDP in 2018. The number of income-based tax relief beneficiaries in Italy more than doubled over this period, from approximately 890 firms in 2015 to 2160 firms in 2018.

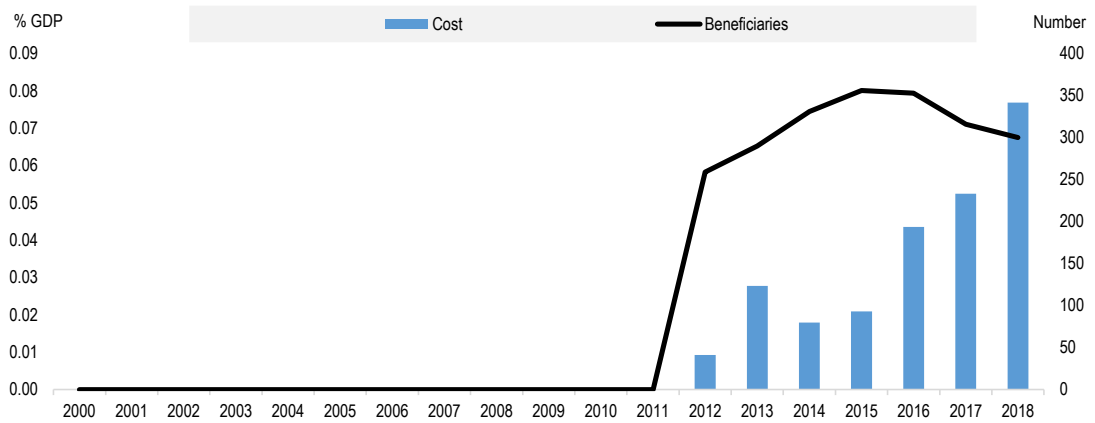
Some fluctuations are observable around the time of BEPS Action 5 implementation. Figure 8 also points to some fluctuations in the run up to the introduction of the BEPS Action 5 minimum standard, such as the short-term spike in Hungary (2015) and Korea (2015) as well as the decline in the cost of income-based tax relief in France in the years prior to BEPS (to increase again thereafter) or in Ireland in the years following the introduction of BEPS Action 5.

Apart from these abrupt and sometimes only short-term fluctuations observable in a few 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. This is likely due to two factors: (i) the co-existence of nexus compliant and non-nexus compliant regimes (albeit closed to new entrants) due to the existence of BEPS Action 5 transitional measures¹⁵; 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-nexus 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.

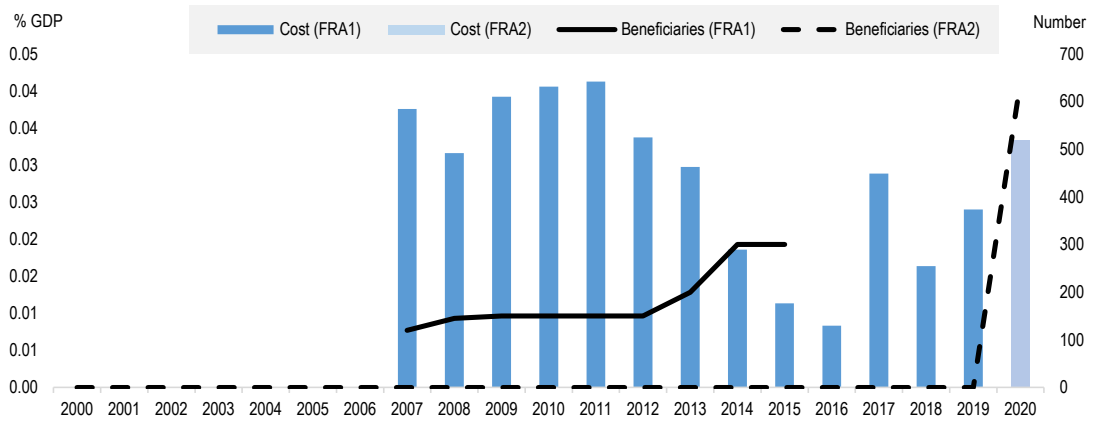
Figure 8. Trends in the cost and uptake of income-based tax relief, 2000-2019



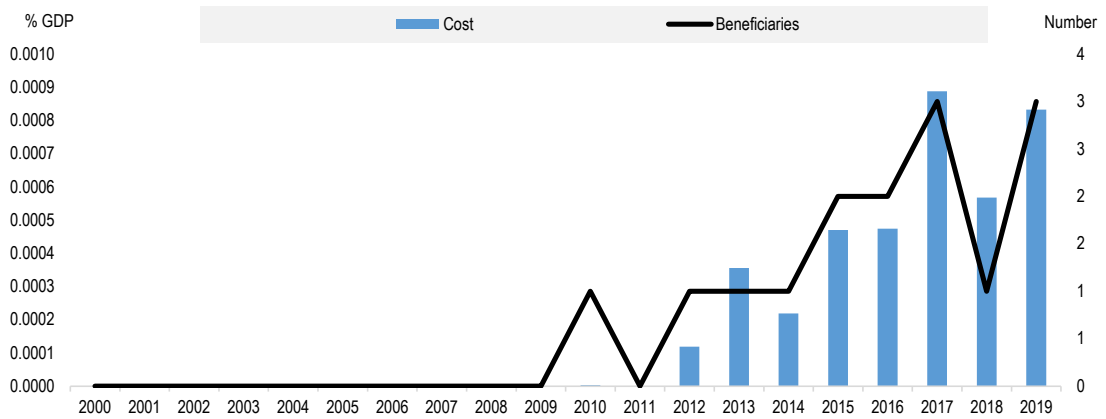
Panel D. Cyprus



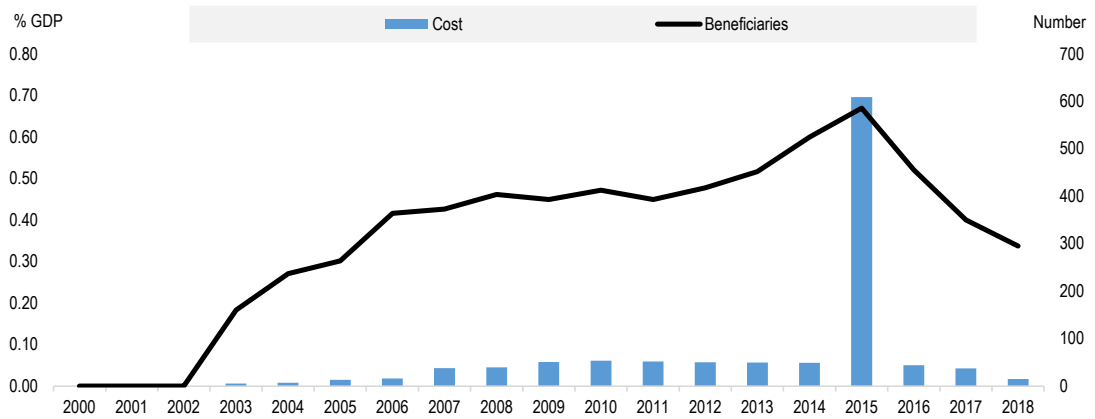
Panel E. France



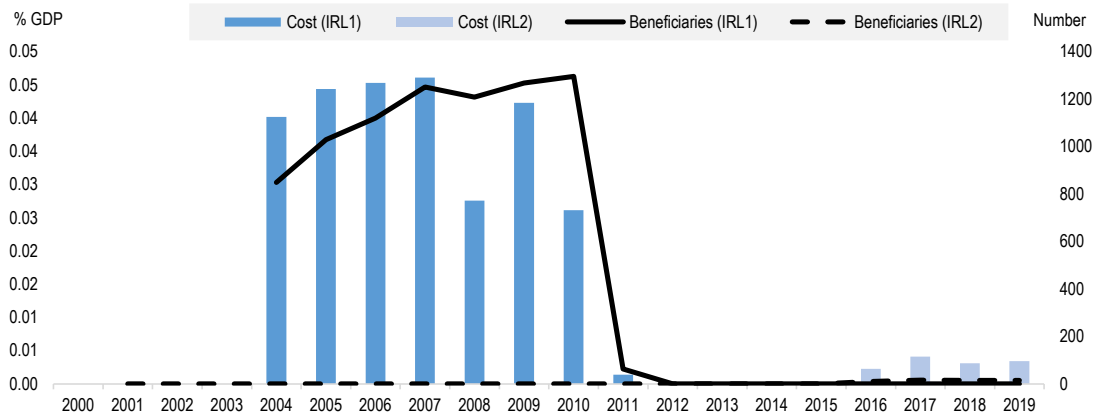
Panel F. Greece



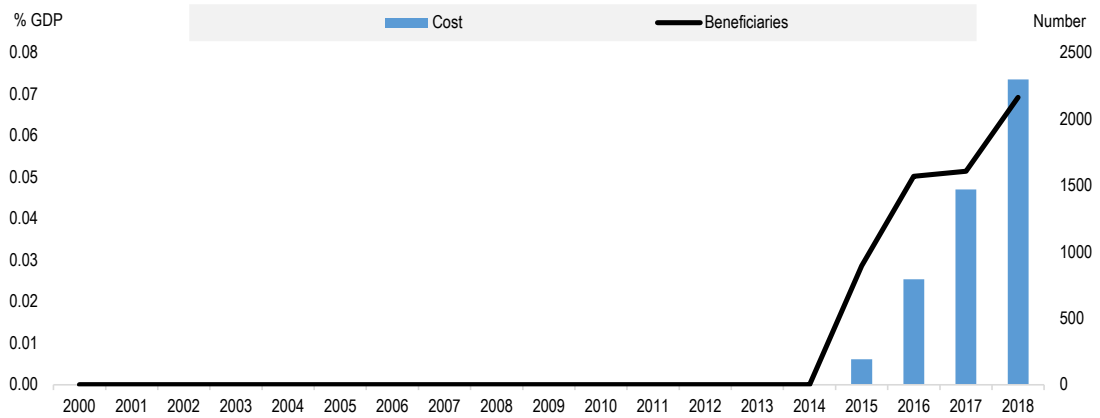
Panel G. Hungary



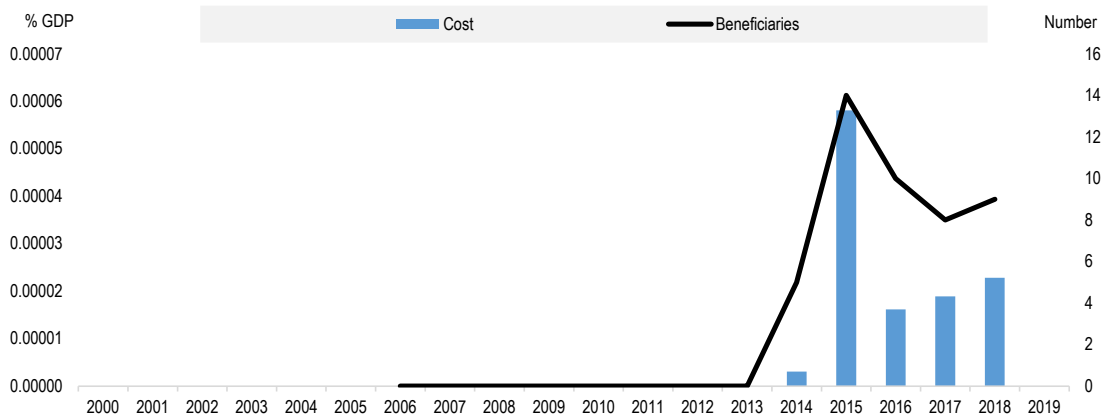
Panel H. Ireland



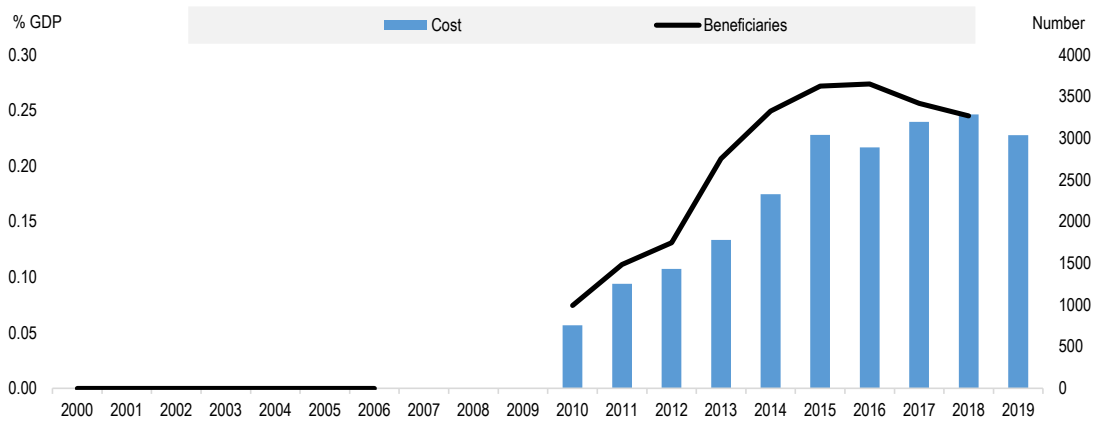
Panel I. Italy



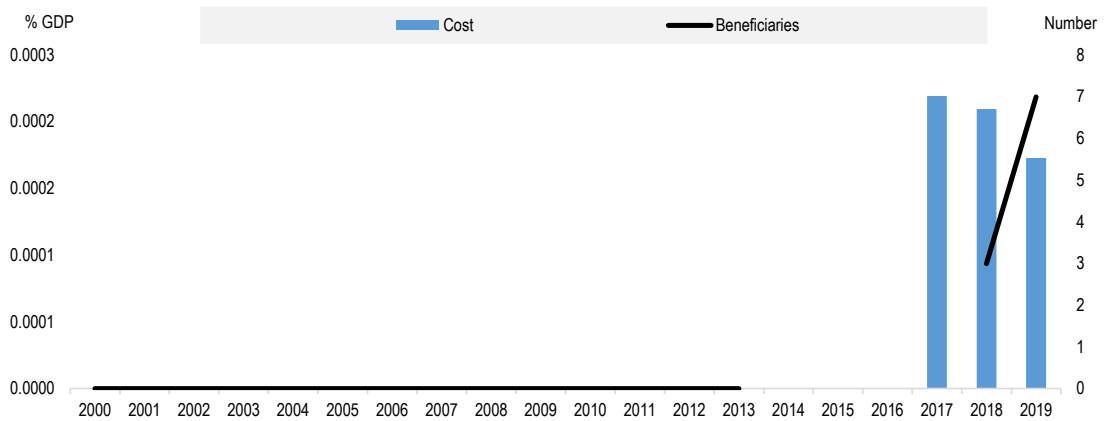
Panel J. Korea



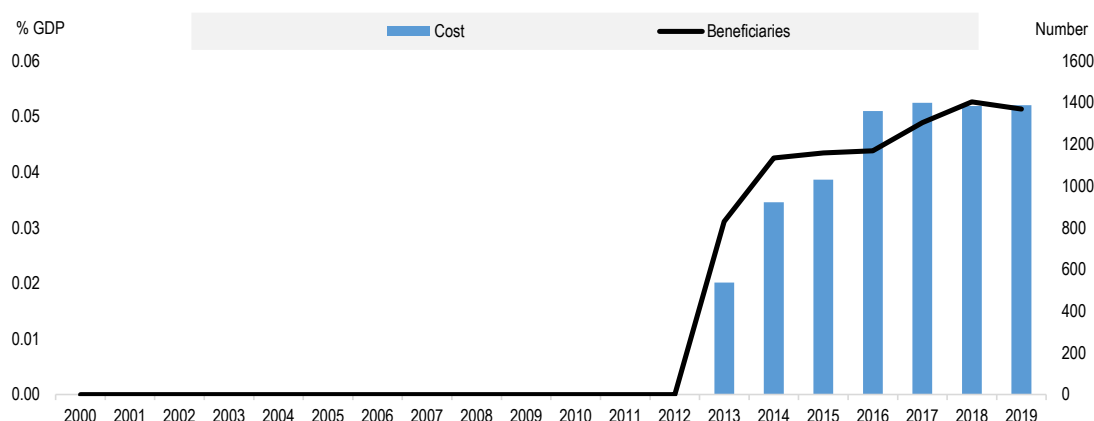
Panel K. Netherlands



Panel L. Portugal



Panel M. United Kingdom



Note: This figure presents data (schemes and years of data coverage in brackets) for Argentina (Software Promotional Regime, 2017-19), Belgium (BEL1: deduction for patent income - pre-nexus regime, 2007-19; BEL2: deduction for innovation income - post-nexus regime, 2016-19), Colombia (Tax exemption on new software with high scientific content), Cyprus (IP Box regime, 2012-18), France (FRA1: Reduced corporation tax rate on IP income - pre-nexus, 2007-19; FRA2: Reduced corporation tax rate on IP income - pre-nexus, 2020), Greece (Tax patent incentives - first regime, 2010-19), Hungary (IP regime for royalties and capital gains - pre-nexus, 2003-19; IP regime for royalties and capital gains - post-nexus, 2016-19); Ireland (Knowledge development box - first regime, 2004-11; Knowledge development box - second regime, 2016-19), Italy (Taxation of income from intangible assets - pre-nexus, 2015-18; Taxation of income from intangible assets - post-nexus, 2017-18), Korea (Special taxation for transfer, acquisition, etc. of technology: Tax reduction for transfer of technology - second regime, 2014-18, estimates for the first regime, available until 2005 are currently not available; Special taxation for transfer, acquisition, etc. of technology: Tax reduction for leases of technology - second regime; 2015-18, estimates for the first regime, available until 2005 are currently not available), the Netherlands (Patent box, 2007-09; Innovation Box, 2010-19), Portugal (Partial exemption for income from certain intangible property - pre-nexus, no data are currently available; Partial exemption for income from certain intangible property - post-nexus, 2017-19), and the United Kingdom (Patent Box - pre-nexus, 2013-19; Patent Box - post-nexus, 2016-19). With the exception of Belgium, France and Ireland, combined figures are reported for pre- and post-nexus regimes. Data for countries with less than five recipients are not included in this chart for confidentiality reasons. For Argentina, beneficiary figures are currently not available. 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.

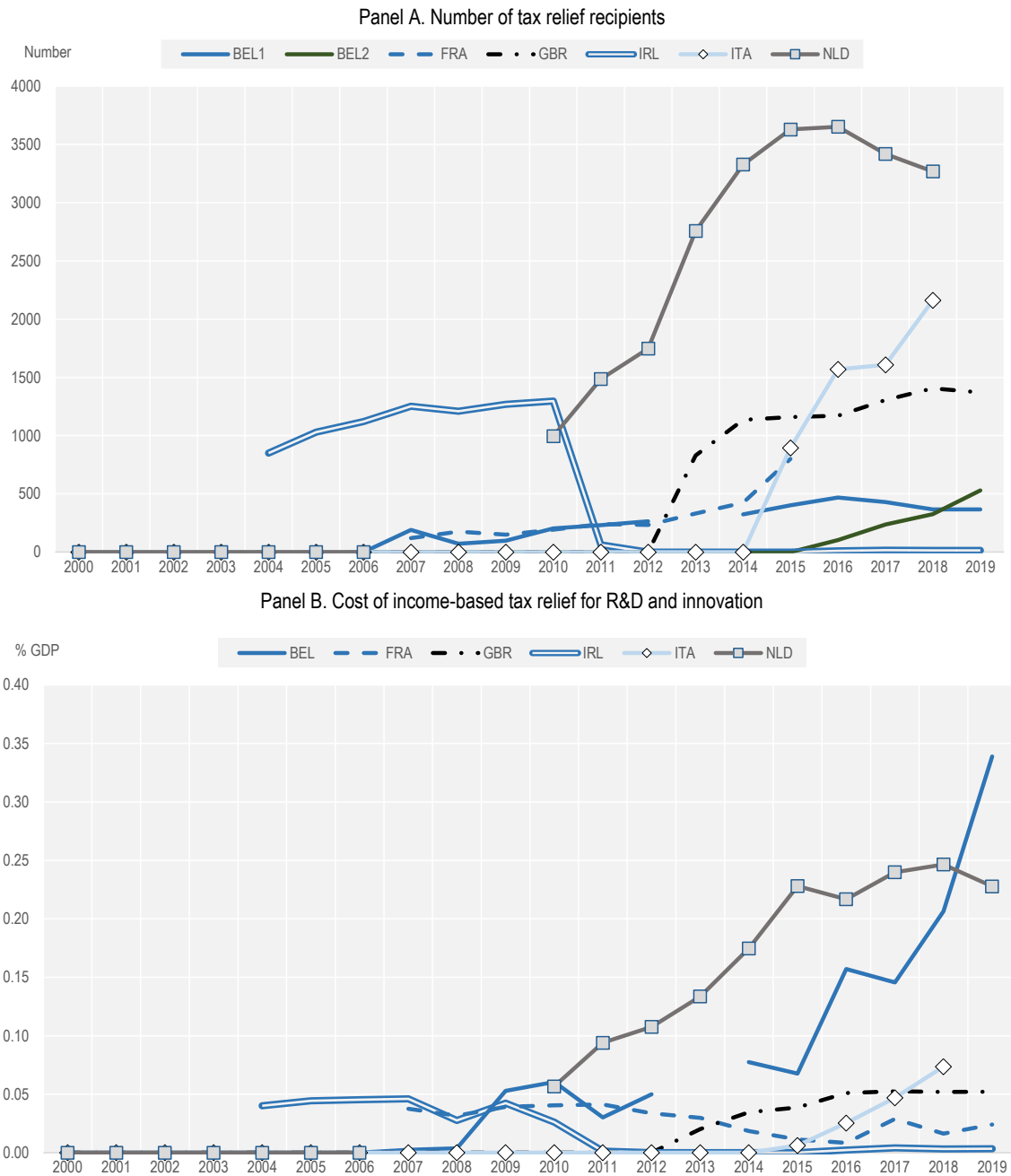
Source: OECD based on 2021 KNOWINTAX survey, July 2022.

For some countries, differences between the pre- and post-nexus regimes can be more easily ascertained. This is the case of Belgium, France¹⁶ and Ireland, which are in a position to report separate data for pre- vs. post-nexus regimes. In these cases, some first insights can be gained about the possible impact of BEPS Action 5. France did not introduce any transitional measures, which allows for a clean reporting between the pre- and post-nexus regimes. The decline in the cost of income-based tax support prior to BEPS implementation is attributable to its pre-nexus IP regime (Panel E). In more recent years, the cost of this scheme is comparable in its magnitude to its post-nexus counterpart, i.e. no significant difference between pre- and post-nexus regimes seems to emerge, at least in the very short period under consideration. In 2016, Ireland introduced a new IP regime that was already compliant with the BEPS Action 5 minimum standard. Another earlier regime was available up until 2010. The post-nexus regimes in Ireland accounts for a fraction of the cost generated by their pre-nexus predecessors. A similar pattern is observed in Belgium.¹⁷ The uptake of the post-nexus regime by firms is also much smaller in the case of Ireland, while the opposite holds true for Belgium (Panel B) and France (Panel E).

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 9 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 2000-19 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.

Figure 9. Cross-country trends in income-based tax relief, selected OECD countries, 2000-2019



Note: This indicator is preliminary. This figure presents data (schemes and years of data coverage in brackets) for Belgium (BEL1: deduction for patent income - pre-nexus regime, 2007-19; BEL2: deduction for innovation income - post-nexus regime, 2016-19), France (Reduced corporation tax rate on IP income - pre-nexus, 2007-19; Innovative new company status - Tax exemption, 2004 - beneficiary only, 2005, 2007-08, 2010-19), Ireland (Knowledge development box - first regime, 2004-11; Knowledge development box - second regime, 2016-19), Italy (Taxation of income from intangible assets - pre-nexus, 2015-18; Taxation of income from intangible assets - post-nexus, 2017-18), and the Netherlands (Patent box, 2007-09; Innovation Box, 2010-19 and the United Kingdom (Patent Box - pre-nexus, 2013-19; Patent Box - post-nexus, 2016-19). With the exception of Belgium (Panel A), combined figures are reported for pre- and post-nexus regimes. In the case of Ireland and the United Kingdom, figures refer to claimants instead of beneficiaries.

Source: OECD based on 2021 KNOWINTAX survey, July 2022.

Ongoing work on the design and generosity of tax incentives, as well as extensions in data coverage, would allow a more detailed analysis of country trends. Overall, there is currently little information available that would help explain and facilitate a comparison of the country-specific trends depicted in Figure 8 or Figure 9 in more detail. As additional estimates, historic design information and metadata become available with countries' participation in follow-up KNOWINTAX surveys, it will be possible to more fully describe and compare trends in the uptake and cost of income-based tax relief for R&D and innovation for a broader group of OECD countries and other major economies.

5. Conclusion and next steps

This document represents a first major output of the OECD KNOWINTAX project – one component of a broader OECD project on Mapping Business Innovation Support (MABIS) carried out with support from the European Union’s Horizon 2020 Programme. KNOWINTAX - a joint project of the OECD Directorate for Science, Technology and Innovation (STI) and OECD Centre for Tax Policy and Administration (CTPA) - has extended the existing OECD work from expenditure-based R&D tax incentives (<https://oe.cd/rntax>) to income-based tax incentives for R&D and innovation. The first surveys carried out in 2020 and 2021 in collaboration with a multidisciplinary network of experts from 49 countries, which includes all OECD countries and EU countries and a number of selected economies (Table 1) have delivered new and unique evidence on the availability, design, cost and uptake of income-based tax incentives in OECD and EU countries and other major economies.

This publication – one in a bundle of three interconnected OECD working papers – presents a measurement framework for income-based tax incentives and provides new evidence on the cost and uptake of these incentives in the OECD area and beyond, including their distribution by firm size and industry sector and evolution over time. With this evidence on the uptake and cost of income-based tax relief provision, it complements the two companion publications, which deal with the design features of income-based tax incentives (González Cabral, Appelt and Hanappi, forthcoming^[3]) and the estimation of implied tax subsidies (González Cabral, Appelt and Hanappi, forthcoming^[4]) based on effective tax rates for this class of tax instruments.

Preliminary estimates of the cost of income-based tax relief in 2019 (or latest year) are currently available for 23 out of 29 countries offering such form of tax support during the 2000-21 period. The estimates point to a substantial variation in the magnitude of income-based tax support, ranging from less than 0.01% of GDP in 12 out of the 23 countries to 0.20% of GDP or more in Israel (0.20%), the Netherlands (0.23%) and Belgium (0.35%). Income-based tax benefits tend to accrue to a subsample of the business population. In 2019 (or latest year), less than 250 firms benefitted from this support in 11 out of the 21 countries for which relevant data are available. While SMEs accounted for the majority of income-based tax relief recipients in 2019, most income-based tax benefits were received by large firms. For the distribution of the number of income-based tax relief beneficiaries or value of income-based tax benefits by industry sector, however, no clear cut pattern emerges among the countries under consideration.

The report also sheds light on how the cost and uptake of income-based tax relief has evolved in thirteen countries over the 2000-2019 period, showing an upward trend in the cost and uptake of income-based tax relief in most countries for which relevant data are available. It points to some fluctuations (e.g. Hungary, Korea) in the run up to introduction of the BEPS Action 5 minimum standard. Apart from these abrupt and sometimes only short-term fluctuations observable in a few 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. Care should be exercised when interpreting these initial figures due to the inability in most cases to separately report information for regimes that are compliant with the BEPS Action 5 minimum standard and for regimes that, even though closed to new entrants, still maintain the pre-nexus design for taxpayers already benefitting from the relief during the transitional period (see (OECD, 2015^[5]) and Box 1 in

González Cabral et al. (forthcoming^[3]). This measurement challenge precludes the interpretation of the policy change introduced by BEPS Action 5.

The methodology for deriving internationally comparable estimates of foregone tax revenue and estimates of the cost and uptake of income-based tax incentives, as presented in this report, are preliminary at this stage. Continued engagement with delegates and future data collection will see the refinement of the methodology and extent of data reporting. This concerns the reporting of metadata and breakdowns as well as the reporting of separate cost and beneficiary figures for nexus compliant and non-nexus compliant regimes where available. The latter would facilitate policy-relevant analysis of the impact of the substance requirements introduced as part of BEPS Action 5. More granular data on the cost and uptake of income-based tax relief by firm size, industry and economic ownership for a broader group of countries would be key to deriving additional, more broad-based insights into the distribution of income-based tax support across OECD countries and other major economies. The reporting of more detailed metadata would in turn contribute to a further enhancement of the cross-country comparability of the cost and beneficiary figures collected for this class of tax instruments.

Future OECD work will also explore the scope for linking expenditure- and income-based tax relief statistics. This will be carried out in close collaboration with national officials in the OECD R&D tax incentives expert network and will seek to develop an integrated view of the cost and uptake of expenditure- and income-based R&D and innovation tax incentives in the OECD area and beyond.

Endnotes

¹ In 2021, the exceptions are Costa Rica, Estonia, Latvia and Luxembourg. Switzerland offers an optional R&D tax allowance at the cantonal level.

² In 2021, the exceptions are Bulgaria, Cyprus, Estonia, Latvia and Luxembourg.

Endnote 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 recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Türkiye shall preserve its position concerning the "Cyprus issue".

Endnote 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.

³ 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, 2022_[12]) and the Corporate Tax Statistics database, including the new indicator on effective tax rates for R&D (OECD, 2022_[13]). 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.

⁴ A number of recent studies explore the effect of income-based tax incentives on various outcomes of policy interest, including R&D and innovation activity, patent applications, patent location and trade. Hall (2019_[2]) provides a comprehensive survey of the literature on tax policy for innovation, including income-based tax incentives (“patent boxes”). Bloom, Van Reenen and Williams (2019_[14]) discuss income-based tax incentives as part of a broader review of the various policies for boosting business innovation.

⁵ Argentina and Colombia offered income-based tax support from 2005 to 2019 and 2013 to 2017 respectively. Argentina recently implemented a digital ‘knowledge’ economy regime (Disposición 11/2021 of 18 February 2021), which is available to beneficiaries from the Software Enterprise regime (Law 25.922) retroactively from 1 January 2020 (suspended for some months in the year) and for new beneficiaries from 18 February 2021. Such regime is currently not captured in this report as such measures were not in place at the time of analysis. This would elevate the count to 28 countries offering income-based tax incentives in 2021.

⁶ In Spain, there is a partial exemption on the income from certain intangible assets in the region of Navarra.

⁷ The provinces of Québec and Saskatchewan introduced income-based tax support for R&D and innovation in 2017.

⁸ BEPS Action 5 introduced transitional arrangements for pre-nexus regimes to facilitate compliance with the minimum standard (hereafter ‘BEPS Action 5 transitional measures’). Regimes subject to such transitional measures were closed off to new entrants but permitted taxpayers already benefiting from an existing regime to continue to enjoy these benefits until no later than 30 June 2021. During this transitional phase, in some jurisdictions pre-nexus regimes, even though closed to

new entrants, coexisted with nexus-compliant regimes. The distinction between pre- and post-nexus schemes facilitates the economic analysis of the cost of income-based tax incentives, especially where BEPS Action 5 transitional measures were in place. Splitting regimes in this manner enables a more targeted analysis of regimes according to their design independent of the type of legislative change (abolition and introduction of a new regime vs modification of an existing regime) through which the minimum standards were implemented.

⁹ In the case of dual category regimes, the formulae would need to be extended to capture forgone revenues arising from qualifying non-IP related income, see Table B.1.

¹⁰ This can include the breadth of IP assets and IP commercialisation strategies that are eligible for a preferential tax treatment.

¹¹ Further work aims to investigate this issue in more detail. This includes the collection of additional metadata and review of the existing firm size definitions, including guidance on independence.

¹² In addition to the jurisdictions, one province (Québec) in Canada provides this type of support in 2019.

¹³ See endnote 8 for a description of the transitional measures.

¹⁴ Based on these restrictions, overall ten countries (Canada, Colombia, Israel, Japan, Lithuania, Malta, Poland, the Slovak Republic, Spain, the United States) are not included in the trend overview. Many of these introduced income-based incentives only in recent years (e.g. Canada, the Slovak Republic, and the United States).

¹⁵ See endnote 8 for a description of the transitional measures.

¹⁶ The first estimate of the cost of the post-nexus regime introduced by France in 2019 refers to 2020 as cost figures are reported on a cash basis.

¹⁷ Belgium can report separate claims under the old and the new regime.

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Annex A. KNOWINTAX surveys and data availability

Table A.1. 2020-2021 KNOWINTAX surveys: status of country responses

Country	Availability	KNOWINTAX surveys		
		2020	2021	
		Cost	Cost	Design
Status of income-based tax relief (2000-21) confirmed as part of 2020 survey				
ARG	yes	-	-	n.a.
BEL	yes	yes	yes	yes
CAN	yes	yes	-	yes
CHE	yes	-	yes	yes
CHN	yes	-	-	-
COL	yes	yes	yes	yes
CYP	yes	yes	yes	yes
CZE	yes	-	-	yes
ESP	yes	yes	yes	yes
FRA	yes	yes	yes	yes
GBR	yes	yes	yes	yes
GRC	yes	yes	yes	yes
HUN	yes	yes	yes	yes
IRL	yes	yes	yes	yes
ISR	yes	yes	yes	yes
ITA	yes	yes	yes	yes
KOR	yes	yes	-	yes
LTU	yes	yes	yes	yes
LUX	yes	-	yes	yes
MLT	yes	yes	-	yes
NLD	yes	yes	yes	yes
POL	yes	yes	yes	yes
PRT	yes	-	yes	yes
RUS	no	n.a.	n.a.	n.a.
SVK	yes	yes	yes	yes
THA	yes	-	-	-
TUR	yes	-	yes	yes
USA	yes	-	yes	yes
Status of income-based tax relief (2000-21) confirmed as part of 2021 survey				
AUS	no	n.a.	n.a.	n.a.
AUT	no	n.a.	n.a.	n.a.
BGR	no	n.a.	n.a.	n.a.
BRA	no	n.a.	n.a.	n.a.
CHL	no	n.a.	n.a.	n.a.
CRI	no	n.a.	n.a.	n.a.
DEU	no	n.a.	n.a.	n.a.
DNK	no	n.a.	n.a.	n.a.

		KNOWINTAX surveys		
		2020	2021	
Country	Availability	Cost	Cost	Design
EST	no	n.a.	n.a.	n.a.
FIN	no	n.a.	n.a.	n.a.
HRV	no	n.a.	n.a.	n.a.
ISL	no	n.a.	n.a.	n.a.
JPN	yes	n.a.	yes	yes
LVA	no	n.a.	n.a.	n.a.
MEX	no	n.a.	n.a.	n.a.
NOR	no	n.a.	n.a.	n.a.
NZL	no	n.a.	n.a.	n.a.
ROU	yes	n.a.	-	-
SVN	no	n.a.	n.a.	n.a.
SWE	no	n.a.	n.a.	n.a.
ZAF	no	n.a.	n.a.	n.a.
Total	29	18	18	20
Survey coverage		28	49	

Note: The status of information reported in this table is preliminary and subject to change in the course of subsequent OECD KNOWINTAX surveys. The table covers income-based tax incentives for R&D and innovation income available during the 2000-21 period. The Russian Federation offer an income-based tax incentive that applies exclusively to individual entrepreneurs in the Simplified Tax System (STS) which is not reflected in the table above as it does not apply to businesses more broadly. For information on the status of data reporting at scheme level, see Table A.3.

Source: OECD KNOWINTAX project, July 2022.

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

Availability of cost and beneficiary information at scheme and country level

		Scheme level			Country level		
		Total	Firm size	Industry	Total	Firm size	Industry
Cost							
Count	None	36	53	55	6	21	22
	Partial	19	11	9	18	7	6
	Complete	15	6	6	5	1	1
Percentage	None	51%	76%	79%	21%	72%	76%
	Partial	27%	16%	13%	62%	24%	21%
	Complete	21%	9%	9%	17%	3%	3%
Number of beneficiaries							
Count	None	39	53	56	8	21	23
	Partial	19	11	8	18	7	5
	Complete	12	6	6	3	1	1
Percentage	None	56%	76%	80%	28%	72%	79%
	Partial	27%	16%	11%	62%	24%	17%
	Complete	17%	9%	9%	10%	3%	3%

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 2019 or year of abolishment, if smaller). The status of information reported in this table is preliminary and subject to change in the course of subsequent OECD KNOWINTAX surveys. Figures are based on a total of 29 countries offering income-based tax relief during the 2000-21 period, and a total of 70 schemes covered as part of the 2020 and/or 2021 KNOWINTAX surveys. For information on the status of data reporting at scheme level, see Table A.3.

Source: OECD KNOWINTAX project, July 2022.

Table A.3. Data on the cost of income-based tax support and number of beneficiaries at scheme level, 2000-2019

ISO code	Scheme code	Scheme name		Availability		Cost			Beneficiary		
				Start year	End year (transitional period)	Total	Firm Size	Industry	Total	Firm Size	Industry
ARG	ARG1	Software Promotional Regime		2004	2019	P					
BEL	BEL1	Deduction for patent income	pre-nexus	2007	2016 (2021)	C	P	P	P	P	P
	BEL2	Deduction for innovation income	post-nexus	2016		C	C	C	C	C	C
CAN	CAN1	Québec - Patent Box: Déduction pour sociétés manufacturières innovantes (DSI)		2017	2020	P					
	CAN2	Saskatchewan Commercial Innovation Incentive (SCII)		2017	2024						
	CAN3	Déduction incitative pour la commercialisation des innovations (DICI)		2021							
CHE	CHE1	License box (Canton of Nidwalden)	pre-nexus	2011	2015 (2019)						
	CHE2		post-nexus	2016	2019						
	CHE3	IP box		2020							
CHN	CHN1	Reduced rate for high & new tech enterprises (HNTE)		2008							
	CHN2	Tech-based SMEs (TSMEs)		2017							
COL	COL1	Tax exemption on new software with high scientific content		2003	2017	C	P	P	P	P	P
CYP	CYP1	IP Box regime	pre-nexus	2012	2016 (2021)	P			P		
	CYP2	IP Box regime (new regime)	post-nexus	2016							

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ISO code	Scheme code	Scheme name		Availability		Cost			Beneficiary		
				Start year	End year (transitional period)	Total	Firm Size	Industry	Total	Firm Size	Industry
CZE	CZE1	Investment incentives for R&D centres - Tax holiday		2012							
ESP	ESP1	Partial exemption for income from certain intangible assets (Federal regime)	pre-nexus	2004	2016 (2021)						
			post-nexus	2016		P			P		
	ESP3	Partial exemption for income from certain intangible assets (Basque country)	pre-nexus	2008	2016 (2021)						
			post-nexus	2016		P					
	ESP5	Partial exemption for income from certain intangible assets (Navarra)	pre-nexus	1997	2016 (2021)						
			post-nexus	2016							
FRA	FRA1	Reduced rate for long term capital gains and profits from the licensing of IP rights	pre-nexus	1979	2018				P		
			post-nexus	2019		C			C		
GBR	GBR1	Patent Box	pre-nexus	2013	2016 (2021)	C	C	C	C	C	C
			post-nexus	2016							
GRC	GRC1	Tax patent incentives (first regime)		2010	2018	C			C		
	GRC2*	Tax patent incentives (second regime)		2018	2021						
HUN	HUN1	IP regime for royalties and capital gains (measure "s": Royalties)	pre-nexus	2003	2016 (2021)	P	P	P	P	P	P
			post-nexus	2016		C	C	C	C	C	C
	HUN3	IP regime for royalties and capital gains (measure "c": Sale)	pre-nexus	2012	2016 (2021)	P	P	P	P	P	P
			post-nexus	2016		C	C	C	C	C	C
	HUN5	IP regime for royalties and capital gains (measure "e": Sale over 1 year)	pre-nexus	2012	2016 (2021)	P	P	P	P	P	P
			post-nexus	2016		C	C	C	C	C	C
IRL	IRL1	Knowledge development box (first regime)		1996	2010	P			P		
	IRL2	Knowledge development box (second regime)		2016		C			C		

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ISO code	Scheme code	Scheme name	Availability		Cost			Beneficiary			
			Start year	End year (transitional period)	Total	Firm Size	Industry	Total	Firm Size	Industry	
ISR	ISR1	Approved Enterprise program		1958	2005						
	ISR2	Priority enterprise regime		2005	2011						
	ISR3	Preferred enterprise regime	pre-nexus	2011	2016 (2021)						
	ISR4		post-nexus	2017							
	ISR5	Special Preferred enterprise regime	pre-nexus	2011	2016 (2021)						
	ISR6		post-nexus	2017							
	ISR7	Preferred technology enterprise regime		2017		P			P		
	ISR8	Special preferred technology enterprise regime		2017							
ITA	ITA1	Taxation of income from intangible assets	pre-nexus	2015	2016 (2021)	P	P	P	P	P	P
	ITA2**		post-nexus	2017	2021	P	P	P	P	P	P
JPN	JPN1	Tax deduction for MNEs conducting R&D		2012	2015						
	JPN2	Tax incentive for specified business in the National Strategic Zones		2016		P			P		
KOR	KOR1	Special taxation for transfer, acquisition, etc. of technology: Tax reduction for transfer of technology (first regime: transfer of technology)		1983	2005						
	KOR2	Special taxation for transfer, acquisition, etc. of technology: Tax reduction for leases of technology (first regime: leases of technology)		1983	2005						
	KOR3	Special taxation for transfer, acquisition, etc. of technology: Tax reduction for transfer of technology (second regime: transfer of technology)		2014		P	P		P	P	
	KOR4	Special taxation for transfer, acquisition, etc. of technology: Tax reduction for 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	pre-nexus	2008	2016 (2021)						
	LUX2	IP regime	post-nexus	2018		C			C		
MLT	MLT1	Exemption on royalties derived from patent rules		2010	2015 (2021)	P	P	P	P	P	P
	MLT2	Patent box regime		2019							
NLD	NLD1	Innovation box	pre-nexus	2007	2016 (2021)	P	P		P	P	
	NLD2***		post-nexus	2017							

ISO code	Scheme code	Scheme name	Availability		Cost			Beneficiary		
			Start year	End year (transitional period)	Total	Firm Size	Industry	Total	Firm Size	Industry
POL	POL1	IP box		2019		C			C	
PRT	PRT1	Partial exemption for income from certain intangible property	pre-nexus	2014	2016 (2021)					
	PRT2		post-nexus	2016		C			P	
ROU	ROU1	Exemption for taxpayers engaged in R&D and innovation		2017						
SVK	SVK1	Patent Box		2018						
THA	THA1	International business centre		2019		C			C	
	THA2	Activity-based incentive: Tax holiday		2002						
	THA3	Merit-based incentive: Tax credit/credit account		2015						
TUR	TUR1	Technology development zones regime	pre-nexus	2001	2017 (2021)					
	TUR2		post-nexus	2017						
	TUR3	5/B regime		2015						
USA	USA1	Foreign derived intangible income (FDII)		2018						

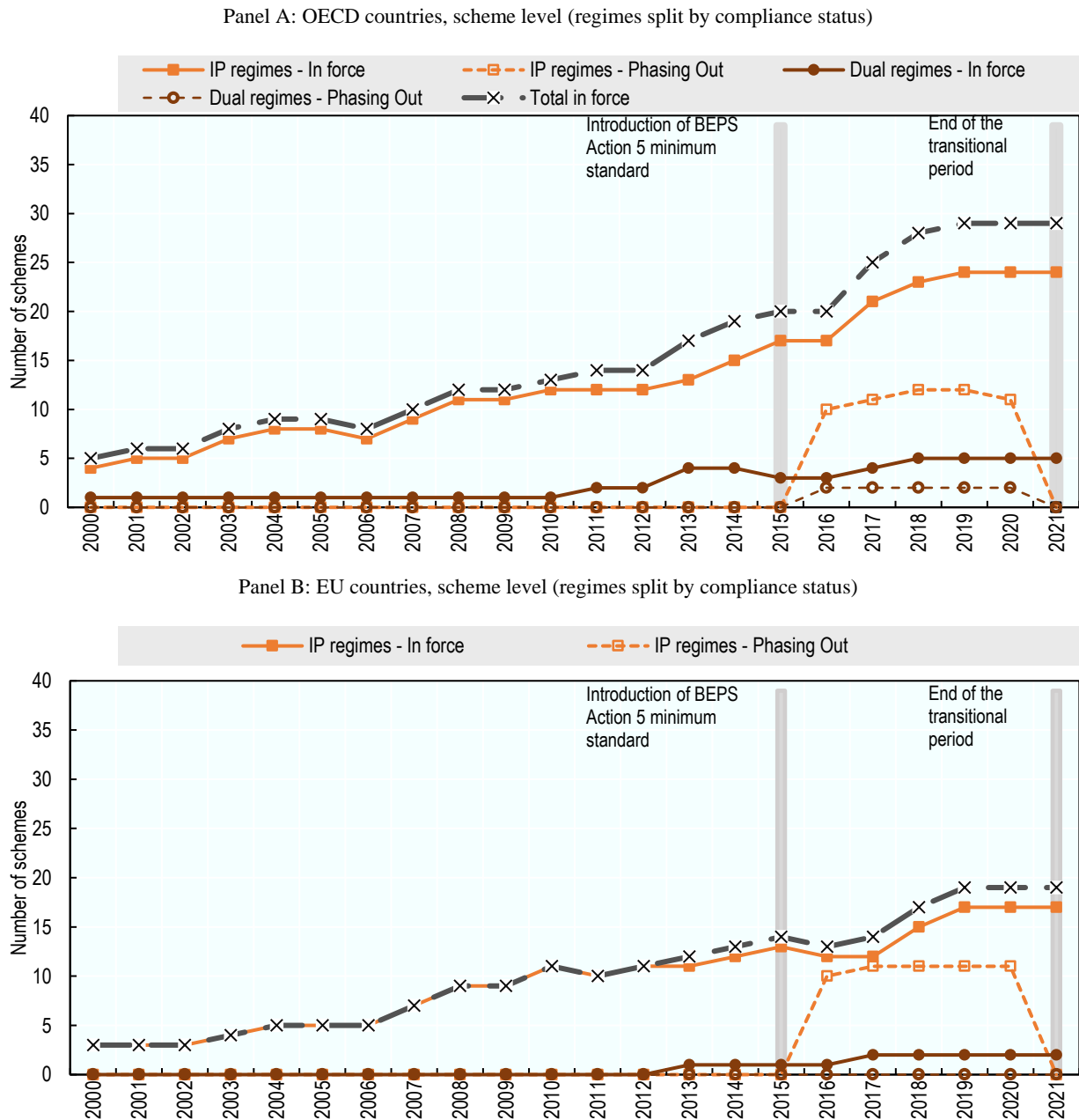
Note: C: Complete, P: Partial. In order to capture the effect of the introduction of BEPS Action 5, regimes that were amended to comply with the standard are divided into two separate schemes: a first scheme reflecting their design features up to the moment of compliance with the BEPS standard, i.e. until the regime was closed-off to new entrants (pre-nexus); and a second scheme from the moment the compliant regime came into force (post-nexus). Likewise, this table distinguishes between regimes that were repealed (pre-nexus) and replaced by a new regime (post-nexus) to be made compliant with BEPS Action 5 minimum standard. This facilitates a symmetric treatment between regimes independent of the type of legislative change that led to compliance with the minimum standard (abolishment and introduction of new regime vs modification of existing regime). Transitional period refers to the duration of time during which the rules that allowed taxpayers already benefiting from an existing regime to keep their entitlements were in place. Such period could span no longer than 30 June 2021 (OECD, 2015^[5]). Please note that this paper does not seek to evaluate the compliance of these provisions with the BEPS Action 5 minimum standard.

For Hungary and Korea, different scheme components (provisions for different types of qualifying income) are treated as separate schemes. The table covers income-based tax incentives for R&D and innovation income available during the 2000-21 period. In Argentina, the new measures implementing the digital ‘knowledge’ economy regime (Disposición 11/2021 of 18 February 2021) are not captured in this report as such measures were not in place at the time of analysis. *With effect of 1 January 2022, Greece amended its provision for Tax patent incentives (second regime) for it to be in compliance with the BEPS Action 5 minimum standard. This change is not yet captured in this paper. 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. *** The IP regime in the Netherlands was referred to as ‘Patent Box’ before its 2010 reform.

Source: OECD, KNOWINTAX project, July 2022.

Annex B. Additional results

Figure B.1. Income-based incentives over time, by type, status and impact of BEPS Action 5



Note: Total in force includes the total count of income-based tax incentives (IP regimes and dual category regimes) available to firms in the OECD and EU (central and subnational level) at each point in time, excluding those phasing out as they are closed to new entrants. Regimes are marked as ‘phasing out’ during the period when BEPS Action 5 transitional measures. Such provisions could extend no longer than 30 June 2021.
 Source: OECD, KNOWINTAX surveys based on FHTP peer review questionnaires and public sources.

Table B.1. Estimating foregone revenues for income-based tax incentives (dual category regimes)

Indicative outline of key formula

	Net approach (nexus requirement)	Gross approach (without nexus requirement)
Preferential tax rate	$[\theta(Y^{IP} - X^{IP}) + (Y^{NIP} - X^{NIP})](\tau - \tau^*)$	$[Y^{IP} + Y^{NIP}](\tau - \tau^*)$
Income tax exemption	$[\theta(Y^{IP} - X^{IP}) + (Y^{NIP} - X^{NIP})] E^*$	$[Y^{IP} + Y^{NIP}] E^*$
Notation	$IP = IP - related; NIP = Non - IP related;$ $Y = Income; Y - X = Profits; X = Expenditure;$ $\tau^* = Preferential tax rate; \tau^* = (1 - E^*)\tau; E^* = Exemption rate;$ $\theta = Nexus ratio: 0 \leq \theta \leq 1$ (if nexus applies), else $\theta = 1$	