

Effective tax rates for R&D: Modelling notes

Explanatory Annex to Corporate Tax Statistics 2024 Income-based tax incentives for R&D and innovation

Income-based tax incentives for R&D and innovation (income-based tax incentives) provide for reduced taxation of the outcomes from R&D and innovation related activity, such as the profits arising from intangible assets (e.g., patents or other forms of intellectual property (IP)). The benefit of these incentives is only received ex-post, i.e., once the innovation process is successful, as opposed to expenditure-based tax incentives, such as R&D tax credits, which are granted independent of the success of the investment. Income-based tax incentives can include both IP regimes and dual category regimes. IP regimes such as patent boxes provide relief to the income derived from certain IP assets. Dual category regimes, such as tax holidays for businesses, extend relief to other non-IP income of the firm if offered to businesses doing R&D or innovation related activities.

The design of income-based tax incentives differs significantly across countries, which affects the tax benefits provided to firms (Figure 2 in González Cabral et al. (2023_[1])). The way in which the firm acquires, protects and commercialises the R&D intangible asset affects the access to income-based tax incentives (González Cabral et al., 2023_[2]). Over time, the introduction of Action 5 of the G20/OECD Base Erosion and Profit Shifting project has significantly shaped the design of income-based tax incentives (González Cabral et al., 2023_[3]).

To compare the effect of income-based tax incentives across and within countries, this edition of Corporate Tax Statistics uses indicators based on forward-looking effective tax rates. Indicators based on forward-looking effective tax rates capture in a synthetic manner the effect of taxation on firms' R&D investment decisions. Indicators of the effective average tax rate (EATR) and the cost of capital for R&D intangible assets are useful to analyse decisions at the extensive margin (e.g., whether or where to invest in R&D intangibles) and at the intensive margin (e.g., how much to invest in R&D intangibles), respectively.

The impact of expenditure-based R&D tax incentives is captured in a companion series of indicators in Chapter 5 of Corporate Tax Statistics (González Cabral, Appelt and Hanappi, 2021_[1]). Estimates of both data series are at present not directly comparable and should not be combined as they assume a different cost structure and life cycle for the R&D investment.

Methodology and calibration

The methodology to calculate effective tax rates (effective average and marginal tax rates and cost of capital) for R&D intangible assets including income-based tax incentives follows González Cabral et al. (2023_[2]). The model distinguishes between the R&D phase and the commercialisation phase of an R&D

intangible. In the first phase no income-based tax support is available. In the second (commercialisation) phase, the income-based tax incentives can be obtained. The model also considers the existence of a gestation lag between the time when R&D is conducted, and the time when it starts generating profits. Finally, the model accounts for the decay of the R&D intangible asset over time. The empirical calibration and additional modelling assumptions are as described in the aforementioned paper.

Tax incentives modelled and design parameters

Annex A contains a list of all income-based tax incentives modelled.

Data on the design of R&D tax incentives are collected as part of the annual OECD IPTAX survey, (formerly KNOWINTAX). The survey is conducted by the Centre of Tax Policy and Administration and the Directorate of Science Technology and Innovation in collaboration with a network of experts on R&D and innovation tax incentives. The network is composed of members of Working Party No.2 on Tax Policy and Statistics, of the Forum on Harmful Tax Practices and the Working Party of National Experts on Science, Technology and Innovation.

Four key design parameters, contributed by countries as part of the OECD KNOWINTAX survey, are used in the modelling: the preferential tax rates, the treatment of ongoing associated IP expenses, the treatment of past associated IP expenses and the application of nexus conditions. For the particular case modelled, the R&D investment is assumed to be fully developed by the firm, implying a nexus ratio of one.

Annex A. Modelled income-based tax incentives

Table A.1. Income-based tax incentives for R&D and innovation modelled, 2000-23

ISO3	Country-level ID	Regime name	Central govt. level	Introduction date	Close-off date
ARG	ARG	Software Promotional Regime	x	07/09/04	31/12/19
ARG	ARG	Regime to promote the knowledge-based economy	x	01/01/20	31/12/29
BEL	BEL	Deduction for patent income	x	18/05/07	30/06/16
BEL	BEL	Deduction for innovation income	x	01/07/16	
CAN	CAN_Q	Déduction pour sociétés manufacturières innovantes (DSI) (Québec)		01/01/17	31/12/20
CAN	CAN_Q	Déduction incitative pour la commercialisation des innovations (DICI) (Québec)		01/01/21	
CAN	CAN_S	Saskatchewan Commercial Innovation Incentive (SCII)		01/01/17	30/06/24
CHE	CHE_N	License box (Canton of Nidwalden)		01/01/11	31/12/19 ¹
CHE	CHE_Z	IP box		01/01/20	
CHN	CHN1	Reduced rate for high & new tech enterprises (HNTE)	x	01/01/08	
CHN	CHN2	Tech-based SMEs (TSMEs)	x	10/05/17	
COL	COL	Tax exemption on new software with high scientific content	x	01/01/03	31/12/17
CYP	CYP	IP Box regime	x	01/01/12	30/06/16
CYP	CYP	IP Box regime (new regime)	x	01/07/16	30/06/16
CZE	CZE	Investment incentives for R&D centres	x	07/12/12	
ESP	ESP_C	Partial exemption for income from certain intangible assets (Federal regime)	x	05/03/04	30/06/16
ESP	ESP_B	Partial exemption for income from certain intangible assets (Basque country)		01/01/08	30/06/16
ESP	ESP_N	Partial exemption for income from certain intangible assets (Navarra)		01/01/97	30/06/16
FRA	FRA	Reduced rate for long term capital gains and profits from the licensing of IP rights	x	12/07/65	30/12/18
FRA	FRA	Reduced corporation tax rate on IP income	x	01/01/19	
GBR	GBR	Patent Box	x	01/04/13	30/06/16
GRC	GRC	Tax patent incentives	x	01/01/10	31/12/21
HUN	HUN	IP regime for royalties and capital gains	x	01/01/03	16/07/16
IRL	IRL	Knowledge development box (first regime)	x	06/04/73	24/11/10
IRL	IRL	Knowledge development box (second regime)	x	01/01/16	
ISR	ISR1	Preferred enterprise regime	x	01/01/11	30/06/16
ISR	ISR2	Special Preferred enterprise regime	x	01/01/11	30/06/16
ISR	ISR3	Preferred technology enterprise regime	x	01/01/17	
ISR	ISR4	Special preferred technology enterprise regime	x	01/01/17	

ISO3	Country-level ID	Regime name	Central govt. level	Introduction date	Close-off date
ITA	ITA	Taxation of income from intangible assets	x	01/01/15	21/10/21
JPN	JPN	Tax deduction for MNEs conducting R&D	x	01/11/12	31/03/15
JPN	JPN	Tax incentive for specified business in the National Strategic Zones	x	01/09/16	
KOR	KOR	Tax reduction for transfer or leases of technology (first regime)	x	01/01/83	31/12/05
KOR	KOR	Tax reduction for transfer or leases of technology (second regime)	x	01/01/14	
LTU	LTU	IP taxation regime	x	01/01/18	
LUX	LUX	Partial exemption for income/gains derived from certain IP rights	x	01/01/08	30/06/16
LUX	LUX	IP regime	x	01/01/18	
MLT	MLT	Exemption on royalties derived from patent rules	x	01/01/10	31/12/15
MLT	MLT	Patent Box regime	x	01/01/19	
NLD	NLD	Innovation box	x	01/01/07	30/06/16
POL	POL	IP box	x	01/01/19	
PRT	PRT	Partial exemption for income from certain intangible property	x	01/01/14	30/06/16
ROU	ROU	Exemption for taxpayers engaged in R&D and innovation	x	01/01/17	
SVK	SVK	Patent Box	x	01/01/18	
THA	THA1	International business centre	x	02/05/19	
THA	THA2	Activity-based tax incentive	x	01/12/02	
THA	THA3	Merit-based tax incentive	x	01/01/15	
TUR	TUR1	Technology development zones regime	x	06/07/01	19/10/17
TUR	TUR2	5/B regime	x	01/01/15	
USA	USA	Foreign derived intangible income (FDII)	x	01/01/18	

Note: ¹ As per 1 January 2020, Switzerland introduced an IP regime at cantonal level. This regime, which is mandatory for all of the Swiss cantons, replaced the previous Canton of Nidwalden license box regime. Given the federal scope of the new IP regime available since 2020 (mandatory in all cantons, according to the Direct Taxation Harmonisation Act, the effect on ETRs of the new IP regime is captured in code CHE_Z (CHE_Z*) that refers to an investment in the city of Zurich.

Source: OECD.

References

- González Cabral, A., S. Appelt and T. Hanappi (2021), “Corporate Effectives Tax Rates for R&D: The case of expenditure-based tax incentives”, *OECD Taxation Working Papers*, No. 54, OECD Publishing, Paris, <https://doi.org/10.1787/ff9a104f-en>. [4]
- González Cabral, A. et al. (2023), “A time series perspective on income-based tax support for R&D and innovation”, *OECD Taxation Working Papers*, No. 62, OECD Publishing, Paris, <https://doi.org/10.1787/dae3cd5c-en>. [3]
- González Cabral, A. et al. (2023), “Effective tax rates for R&D intangibles”, *OECD Taxation Working Papers*, No. 63, OECD Publishing, Paris, <https://doi.org/10.1787/191dad43-en>. [2]
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