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The Impact of the CCTB on the Effective Tax Burden of Corporations: results from the Tax Analyzer Model

Final report

Taxation and Customs Union

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FINAL REPORT

THE IMPACT OF THE CCTB ON THE EFFECTIVE TAX BURDEN OF CORPORATIONS: RESULTS FROM THE TAX ANALYZER MODEL

ON-DEMAND ECONOMIC ANALYSIS UNDER FRAMEWORK CONTRACT
TAXUD/2017/CC/147
FRAMEWORK CONTRACT FOR THE PROVISION OF EFFECTIVE TAX RATES AND RELATED SERVICES

SUBMISSION BY THE

CENTRE FOR EUROPEAN ECONOMIC RESEARCH (ZEW) GMBH

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Executive Summary

Motivation

To remove obstacles to cross-border business activities that stem from the parallel application of 28 different national tax systems within the EU, a harmonisation of corporate income taxation was first proposed in 2001. Building on that proposal, a draft Council Directive for a Common (Consolidated) Corporate Tax Base was launched in March 2011 and re-launched as a two-step process in October 2016. In general, the re-launched draft Council Directive builds on the original proposal. Additionally, it encompasses an Allowance for Growth and Investment (AGI) as a type of notional interest deduction (NID), a super-deduction for costs from research and development (R&D), a temporary cross-border loss offset and – in line with the Anti-Tax Avoidance Directive (ATAD) – several measures to tackle aggressive tax planning.

The aim of this study is to evaluate the impact of the introduction of the CCTB draft Council Directive from October 2016 on the effective corporate tax burdens in the 28 EU Member States and to assess the relative importance of single elements of the harmonised tax base. Furthermore, the impact of the CCTB introduction is estimated for R&D corporations and the tax effects of the 2016 CCTB draft Council Directive and the original draft Council Directive as of 2011 are compared.

Comparison of the CCTB draft Council Directive and current national tax law in the EU Member States (Section 2)

In a first step, selected provisions of the CCTB draft Council Directive are introduced and compared to the current national tax rules of the 28 EU Member States. The overall aim is to identify a potential need for adjustment across Member States in order to comply with the rules of the directive. In particular, we consider depreciation rules, inventory valuation, R&D tax incentives, the deductibility of provisions for legal obligations and pensions, the avoidance of double taxation of inter-company dividends, interest deduction limitation rules, rules for inter-temporal and cross-border loss relief as well as NID regimes.

After an individual review of Member States' current tax practice (i.e. legal status as of 2017), it is evident that adjustment requirements are highest with regard to NID rules, loss relief and R&D tax incentives (as indicated by the red bars in the figure below). Although a few Member States offer a NID regime, the respective design is considerably different from the AGI set out in the CCTB draft Council Directive. With regard to the treatment of losses, major adjustment needs particularly stem from the unrestricted carry-forward of excess unrelieved losses as well as the availability of cross-border loss relief under the CCTB. No further need for adjustment arises for pension provisions due to the availability of several options under the CCTB draft Council Directive. As regards the valuation of inventory, the CCTB proposal also foresees several methods, but leaves the decision of which method to use to the taxpayers' instead of to the Member States' discretion. Hence, a need for adjustment arises in those Member States that currently do not provide for all three methods of inventory valuation as prescribed in the proposal. Since interest deduction limitation rules have to be harmonised by the ATAD until the end of 2018, the introduction of the CCTB draft Council Directive would not induce any further adjustment requirements. The comparison of current national depreciation rules and the CCTB provisions reveals that although the depreciation methods are currently largely in line with the CCTB draft Council Directive except for the pool depreciation method used for

short-life fixed assets, there are remarkable differences with regard to the underlying depreciation rates or categorisation of assets.

Selected issues of the CCTB draft Council Directive and need for adjustment in EU Member States

Selected issues of the CCTB draft Council Directive	Article	Need for adjustment in EU Member States
		Major Minor
Depreciation		
Commercial and office buildings	Article 33 (1) a)	
Industrial buildings	Article 33 (1) b)	
Long-life fixed tangible assets (useful life ≥ 15 years)	Article 33 (1) c)	
Medium-life fixed tangible assets (useful life ≥ 8 years and < 15 years)	Article 33 (1) d)	
Asset pool (useful life < 8 years)	Article 37	
Fixed intangible assets	Article 33 (1) e)	
Valuation of inventory	Article 19	
Tax incentives for R&D	Article 9 (3)	
Provisions for legal obligations	Article 23	
Provisions for pensions	Article 24	
Avoidance of double taxation of dividends	Article 8 d)	
Domestic dividends		
Foreign (non-EU) dividends		
Interest deduction limitation rules	Article 13	
Loss relief		
Inter-temporal	Article 41	
Cross-border	Article 42	
Notional interest deduction schemes	Article 11	

Impact of the CCTB introduction on effective corporate tax burdens – Methodology (Section 3) and main findings (Sections 4-7)

The impact of the introduction of a CCTB on effective corporate tax burdens in the 28 EU Member States is quantified based on the model framework of the European Tax Analyzer. The European Tax Analyzer is a model firm approach for the calculation and comparison of country-specific effective tax burdens based on the development of a corporation over a ten-year simulation period. To ensure cross-country comparability, the model firm uses identical pre-tax data to cancel out any country- or industry-specific effects. For the implemented country-specific tax data, we consider the legal status as of fiscal year 2017. The analysis does not include any behavioural effects.

Changes in the effective tax burdens under a CCTB compared to the application of national tax base provisions

Country	Ten-year tax burden in m. EUR					Deviation		
	National without R&D tax incentives [A]	National with R&D tax incentives [B]	CCTB without AGI and R&D super-deduction [C]	CCTB with AGI, without R&D super-deduction [D]	CCTB with AGI and R&D super-deduction [E]	[C] vs. [A]	[D] vs. [A]	[E] vs. [B]
AT	51.10	48.69	51.11	47.92	45.57	0.0%	-6.2%	-6.4%
BE	57.99	56.82	58.05	54.82	51.60	0.1%	-5.5%	-9.2%
BG	17.02	17.02	17.05	15.23	14.31	0.2%	-10.5%	-15.9%
CY	19.81	19.81	19.41	21.55	20.39	-2.0%	8.8%	2.9%
CZ	31.53	26.57	31.61	28.57	26.79	0.2%	-9.4%	0.8%
DE	53.64	53.64	53.59	49.83	46.87	-0.1%	-7.1%	-12.6%
DK	39.10	39.10	39.02	36.07	34.01	-0.2%	-7.7%	-13.0%
EE	32.96	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%
EL	49.89	47.06	49.49	46.01	43.28	-0.8%	-7.8%	-8.0%
ES	50.80	48.37	50.95	48.01	45.67	0.3%	-5.5%	-5.6%
FI	34.79	34.66	34.70	31.90	30.03	-0.2%	-8.3%	-13.3%
FR	76.27	71.98	76.37	73.09	69.82	0.1%	-4.2%	-3.0%
HR	29.21	24.73	29.77	26.73	25.05	1.9%	-8.5%	1.3%
HU	53.15	53.15	53.50	52.50	51.66	0.7%	-1.2%	-2.8%
IE	21.01	14.92	20.96	18.97	17.81	-0.2%	-9.7%	19.4%
IT	45.03	44.61	45.49	43.95	41.69	1.0%	-2.4%	-6.5%
LT	28.23	22.77	28.38	26.15	24.76	0.5%	-7.4%	8.7%
LU	47.62	47.38	47.67	43.80	41.31	0.1%	-8.0%	-12.8%
LV	27.29	24.00	27.40	25.15	23.75	0.4%	-7.8%	-1.0%
MT	40.99	39.28	42.10	52.99	49.67	2.7%	29.3%	26.5%
NL	41.46	40.00	41.55	37.81	35.46	0.2%	-8.8%	-11.4%
PL	32.85	31.40	32.75	30.04	28.27	-0.3%	-8.5%	-10.0%
PT	41.23	35.64	41.32	39.94	37.35	0.2%	-3.1%	4.8%
RO	27.31	25.83	27.46	24.81	23.32	0.6%	-9.2%	-9.7%
SE	36.86	36.86	36.95	33.64	31.58	0.3%	-8.7%	-14.3%
SI	31.32	27.39	31.23	28.47	26.70	-0.3%	-9.1%	-2.5%
SK	35.97	34.64	35.99	33.09	31.12	0.1%	-8.0%	-10.2%
UK	35.34	32.14	35.27	32.63	30.85	-0.2%	-7.7%	-4.0%
Average	**38.92**	**36.84**	**39.00**	**37.02**	**35.06**	**0.2%**	**-5.1%**	**-3.9%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017, without R&D tax incentives). [B]: status quo incl. R&D tax incentives. [C]: CCTB without AGI and CCTB R&D super-deduction. [D]: CCTB incl. AGI, without CCTB R&D super-deduction. [E]: CCTB incl. AGI and CCTB R&D super-deduction. Deviation for individual countries: comparison of unrounded tax burdens. [C] vs. [A]: percentage deviation between [A] and [C], defined as ([C]-[A])/[A]. [D] vs. [A] and [E] vs. [B] calculated as ([D]-[A])/[A] and ([E]-[B])/[B]. Average is the simple arithmetic average.

For the analysis of the impact of the 2016 CCTB draft Council Directive on the effective corporate tax burdens, we proceed as follows: First, we simulate the effective corporate tax burdens under national tax provisions. Second, we replace the national rules by the respective provisions of the CCTB to analyse both the overall impact of the CCTB and the impact of selected elements of the CCTB in isolation. In both scenarios, neither national R&D tax incentives nor the R&D super-deduction foreseen in the CCTB draft Council Directive are considered. The impact of national R&D tax incentives and the R&D super-deduction is assessed in a specifically modelled R&D scenario. Finally, we contrast the impact of the 2016 CCTB draft Council Directive and the original draft Council Directive as of 2011. The results of the analyses are supported by various robustness checks.

Our main findings can be summarized as follows (see also table above): When replacing the national rules for the computation of the tax base by the respective provisions of the CCTB, but without taking into consideration the AGI and the R&D incentives, the average change in effective tax burdens as compared to the baseline scenario amounts to an increase of 0.2% (i.e. a slight widening of the tax base). The implementation of the CCTB including the AGI would, in turn, result in a substantial decrease in the effective tax burden by 5.1% on average. We conclude that the AGI is the key driver of the change in tax burdens upon the introduction of the CCTB as it leads to a tax base narrowing. We consider a newly founded, profitable and growing company which benefits especially from the new AGI provision. Moreover, the effect of the AGI over a ten-year period is considered. If the CCTB was introduced without implementing the AGI, e.g. similar to the original proposal of 2011, the effect would be only marginal.

In case national R&D tax incentives apply and are replaced by the CCTB R&D super-deduction, the full implementation of the CCTB, i.e. including both the AGI and the R&D super-deduction, would reduce the effective tax burden by 3.9% on average. The replacement of national R&D tax incentives by the CCTB R&D super-deduction would – on average – result in an increase in the effective tax burden (i.e. current R&D incentives are on average more generous than the R&D super-deduction contained in the CCTB). The simultaneous implementation of the AGI overcompensates the tax burden increasing effect of the R&D super-deduction, such that the direction of the overall effect of the CCTB remains unchanged. Still, the effect of the R&D super-deduction is very heterogeneous across Member States and depends on the exact design of current national R&D tax incentives.

The following sections provide a more detailed summary of our main results.

Impact of the CCTB introduction on effective corporate tax burdens (Section 4)

Before the introduction of the CCTB (status quo), effective corporate tax burdens are quite heterogeneous across Member States. Over the simulation period of ten years, the accumulated tax burdens range from EUR 17.02 million in Bulgaria to EUR 76.27 million in France under national tax provisions (EU-28 average: EUR 38.92 million, see table above). Effective tax burdens are mainly driven by the corporate income tax, but also by other local profit or non-profit taxes.

For the simulation of the CCTB, we consider a harmonisation of the rules for depreciation, inventory valuation, provisions for legal obligations, treatment of inter-company dividends, interest deduction limitation rules, inter-temporal loss relief as well as NID regimes in terms of the AGI. Upon the introduction of the CCTB, the effective tax burden decreases in all Member States except for Cyprus and Malta (average decrease: 5.1%). The decrease in this reference scenario is especially strong

in Member States with low corporate income tax rates whereas it is less pronounced in high-tax Member States or Member States that levy important other taxes besides the corporate income tax. Still, remarkable differences in effective tax burdens persist, which indicates that corporate income tax rates seem to be the most important determinant of effective corporate tax burdens. The tax burden increase in Cyprus and Malta is a result of the replacement of existing NID regimes by the (comparatively unfavourable) AGI upon the introduction of the CCTB. In Estonia, the introduction of a CCTB has no effect since corporate income tax is only due on distributed profits.

Next, to identify the main determinants of the overall changes in effective tax burdens and to assess the impact of certain tax base elements, the single elements of the CCTB are considered in isolation. We apply a two-step procedure and first simulate a scenario where a specific national rule is replaced by the corresponding CCTB rule whereas the applicability of all other national tax provisions remains unchanged. Second, we simulate the reverse case where the element under consideration is replaced by the national rule in the CCTB scenario. Doing so, we identify the AGI as the main driver of changes in the effective tax burden induced by the harmonisation of corporate taxation. For Member States that currently do not offer a NID, the AGI narrows the corporate income tax base and hence reduces the effective tax burden. In turn, if a NID is already available, the effect depends on the current NID rate and base and its favourability compared to the AGI. To get a deeper understanding of the effects of the AGI, we conduct additional analyses where we vary the AGI rate as well as the horizon of the rolling AGI base year for selected Member States. It turns out that the tax advantages of the AGI are less pronounced if the characteristics of the AGI are less favourable.

In the reference scenario with a profitable model corporation, all other elements only have a minor effect or – for interest deduction limitation and loss compensation rules – even no impact at all. To analyse the isolated effect of interest deduction limitation and loss compensation rules, we modify the economic setting to account for a crisis and a loss scenario, respectively. In the specifically modelled scenarios, the impact of loss compensation rules is comparatively strong whereas interest deduction limitation rules only have a minor effect.

Isolated effects of single elements of the CCTB on the effective tax burdens (average across EU Member States)

Element	Ten-year tax burden in m. EUR				Average deviation			
	National [A]	CCTB [B]	National with isolated CCTB element [C]	CCTB with isolated national element [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AGI	38.92	37.02	37.09	39.00	-5.1%	-4.9%	0.2%	-5.3%
Depreciation	38.92	37.02	39.06	37.18	-5.1%	0.4%	-4.6%	-0.5%
Inventory valuation	38.92	37.02	38.90	36.99	-5.1%	-0.1%	-5.2%	0.1%
Provisions for legal obligations (warranty provisions)	38.92	37.02	38.87	36.94	-5.1%	-0.2%	-5.3%	0.3%
Inter-company dividends	38.92	37.02	38.83	37.11	-5.1%	-0.3%	-4.8%	-0.2%
Interest deduction limitation rules	38.92	37.02	38.92	37.02	-5.1%	0.0%	-5.1%	0.0%
Loss relief	38.92	37.02	38.92	37.02	-5.1%	0.0%	-5.1%	0.0%

Note: Average effective tax burden across the EU Member States under different scenarios and corresponding deviations. Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: element considered according to CCTB, other elements according to current national rules. [D]: element considered according to current national rules, other elements according to CCTB. Average deviation: Simple average of national percentage changes to tax burden under each comparison, as reported in Tables 12 for AGI; 16 for depreciation; 17 for inventory valuation; 18 for warranty provisions; 19 for inter-company dividends; 20 for interest limitation rules; and 21 for inter-temporal loss relief.

Sensitivity analysis: Variations in financial characteristics and industries (Section 5)

We conduct two sensitivity analyses to verify the robustness of the results. First, we vary the financial characteristics of the underlying model firm in isolation (capital intensity, equity ratio, profitability). Subsequently, we consider industry-specific corporations (commerce, construction, manufacturing, energy) that differ in several financial ratios.

Changes in the effective tax burden induced by certain isolated modifications to the model firm's financial characteristics are – on average – in the same direction and of similar magnitude under current national tax provisions and under the CCTB. The effective tax burden under the CCTB (including the AGI) is lower than the effective tax burden under national tax provisions throughout all specifications, i.e. for firms with different financial characteristics and in different industries. Small differences in the magnitude of the effect upon the introduction of the CCTB are mainly due to interaction effects with the AGI. This confirms the robustness of the results of the main analysis.

Impact of the CCTB introduction (incl. R&D super-deduction) for R&D companies (Section 6)

Among others, the re-launched CCTB draft Council Directive includes a super-deduction for R&D, which allows deducting 150% of R&D costs for R&D expenditure up to EUR 20 million. The effect of this R&D super-deduction is analysed in a specifically modelled R&D scenario. The effective tax burden when simulating the CCTB introduction is compared to the effective tax burden under national tax provisions including existing R&D tax incentives in the Member States. For R&D companies, the impact of the CCTB introduction turns out to be very heterogeneous across Member States. If Member States do not offer any R&D tax incentives under current domestic rules or if the impact of such R&D tax incentives is only minor, the inclusion of the R&D super-deduction reinforces the overall base narrowing effect of the CCTB. If, in turn, very generous R&D tax incentives are available in a Member State, the effect from replacing existing R&D tax incentives by the (comparatively less generous) CCTB R&D super-deduction reduces the general base narrowing effect from the introduction of the CCTB. As a whole, the CCTB introduction would induce a broader base in the Member States concerned.

Comparison of the effects of the 2011 and 2016 C(C)CTB draft Council Directives (Section 7)

Since the re-launched CCTB draft Council Directive includes several key changes with regard to the original proposal, we compare the economic effects of both drafts in a final step (albeit with no consideration of R&D tax incentives). On average, the effective tax burden would increase upon the introduction of the 2011 C(C)CTB draft Council Directive. The overall effect, however, is comparatively small with an average increase of 2.8%. For the 2016 CCTB draft Council Directive, the effective tax burden would decrease on average by 5.1%, when we include the AGI. This confirms our prior finding with respect to the AGI as the main driver of changes to the effective tax burden upon the introduction of the 2016 CCTB draft Council Directive: Since the 2011 C(C)CTB draft Council Directive does not include such a provision and is otherwise largely similar to the 2016 proposal, its impact on effective corporate tax burdens is rather small.

1 Introduction

The parallel application and administration of 28 different national tax systems within the European Union (EU) represents an important obstacle to cross-border business activity: Corporations with business activities in more than one Member State might be confronted with up to 28 different tax systems leading to high administrative and compliance costs. Furthermore, there is an enhanced risk of international double taxation due to conflicting taxing rights, limitations to cross-border loss relief, qualification conflicts or transfer pricing issues.[1] To overcome such obstacles, the European Commission proposed an EU-wide harmonisation of corporate taxation for the first time in 2001.[2] Building on this proposal, a draft Council Directive for the introduction of a Common Consolidated Corporate Tax Base (CCCTB) was published in March 2011.[3] Especially due to unresolved issues regarding tax consolidation, the proposal has not been adopted yet.[4]

Increasingly globalised, mobile and digital business models and corporate structures have enhanced the scope for corporate tax planning activities and continue to challenge the uncoordinated coexistence of national tax systems.[5] In line with the OECD's efforts in the "Base Erosion and Profit Shifting" (BEPS) project, the European Commission takes an active role in the fight against aggressive tax planning. Among others, five key areas for improving the efficiency and fairness of the international tax system were identified and published in an action plan in June 2015.[6]

In this context, the proposal for a Council Directive for the introduction of a Common (Consolidated) Corporate Tax Base (C(C)CTB) has been re-launched on 25 October 2016 as a two-step process: Similar to the 2011 draft Council Directive, as a first step, a single and common set of tax accounting rules across Member States would replace the current existing national rules for the determination of taxable income.[7] Corporate income tax rates, in contrast, would not be harmonised. As a second step, the individual group members' tax bases shall be consolidated to a common corporate tax base and allocated to the group members based on a three-part formula with equal weights on assets, labour and sales (CCCTB).[8]

Besides the staged introduction, the re-launched proposal for a C(C)CTB draft Council Directive includes additional features like an Allowance for Growth and Investment (AGI), a super-deduction for costs from research and development (R&D), and a temporary cross-border loss offset. Furthermore, in accordance with the motivation of the C(C)CTB as an instrument against aggressive tax planning, the CCTB encloses the provisions set out in the Anti-Tax Avoidance Directive (ATAD) that was adopted in June 2016,[9] such as an interest deduction limitation rule, rules against hybrid mismatches, or a controlled foreign company (CFC) rule. In general, the application of the CCTB draft Council Directive would be mandatory for accounting groups with a

[1] See European Commission (2001a), pp. 10 f.; European Commission (2001b), p. 223; European Commission (2015), p. 2.
[2] See European Commission (2001a), p. 15.
[3] See European Commission (2011).
[4] See European Commission (2016a), p. 3; henceforth CCCTB draft Council Directive.
[5] See European Commission (2015), p. 2.
[6] See European Commission (2015), pp. 7-14.
[7] See European Commission (2016b); henceforth CCTB draft Council Directive.
[8] See CCCTB draft Council Directive.
[9] Council Directive (EU) 2016/1164 of 12 July 2016 laying down rules against tax avoidance practices that directly affect the functioning of the internal market (OJ L 193, 19.7.2016, pp. 1-14), henceforth ATAD.

consolidated group revenue exceeding EUR 750 million.[10] The underlying provisions of the CCTB draft Council Directive shall be adopted into the national laws of the Member States by 31 December 2018[11] whereas the CCCTB draft Council Directive shall apply as of 1 January 2021[12].

The aim of this study is to assess and evaluate the economic consequences for the tax bill of the introduction of a harmonised set of tax accounting rules as proposed by the CCTB draft Council Directive from 25 October 2016. Therefore, the report will analyse and quantify the effects of the recent CCTB draft Council Directive on the size of the corporate tax burden of corporations situated in the EU based on firm-level data using the model "European Tax Analyzer". In this regard, we will consider the following elements of tax base determination: a) depreciation of intangibles, machinery and equipment, as well as buildings, b) valuation of inventory, c) tax incentives for R&D, d) provisions for legal obligations (in particular warranty claims), e) provisions for future pension payments, f) avoidance of double taxation of inter-company dividends, g) interest deduction limitation rules, h) loss relief, and i) notional interest deductions (NID). Although the idea of a CCTB is based on the simultaneous application of all tax base elements,[13] the effect of each element is further isolated in a separate analysis. Various sensitivity analyses with respect to the financial characteristics and the industry of the model firm will further support the results. We will also consider a separate R&D scenario to distinguish the impact of the CCTB introduction including the newly introduced R&D super-deduction for corporations that conduct R&D activities and can currently make use of national R&D tax incentives. In addition, the report will provide a comparison of the total effects identified from the C(C)CTB proposal as of 2011 with the impact of the re-launched C(C)CTB proposal as of 2016. The effect of the introduction of a harmonised set of tax accounting rules on the effective tax burden of corporations situated in the EU-28 Member States has already been investigated in previous studies in the context of the C(C)CTB proposal as of 2011.[14]

This study proceeds as follows. Section 2 compares specific provisions of the CCTB draft Council Directive to the current country practice in the 28 Member States of the EU. Section 3 outlines the "European Tax Analyzer" model applied in this study and describes the methodology for the calculation of effective tax burdens as well as the underlying economic assumptions of the model and the incorporated tax parameters. In Section 4, the impact of the CCTB provisions on the effective tax burden in the EU Member States is quantified based on the European Tax Analyzer. Apart from the quantification of the overall impact that would result from the full introduction of the CCTB, the isolated effect of specific provisions of the CCTB draft Council Directive is estimated. In Section 5, a sensitivity analysis is conducted that estimates and compares the effects of the overall CCTB introduction for model corporations with varying financial characteristics and of different industries. Section 6 establishes a distinct R&D scenario to analyse the impact of the CCTB introduction for corporations that conduct R&D activities. Section 7 compares the effects of the 2016 CCTB draft Council Directive and the original CCTB draft Council Directive released in March 2011. Section 8 concludes.

[10] Article 2 (1) c) CCTB draft Council Directive.
[11] Article 70 (1) CCTB draft Council Directive.
[12] Article 80 (1) CCCTB draft Council Directive.
[13] See Spengel et al. (2008), p. 4.
[14] See Spengel et al. (2008); Spengel et al. (2012); Spengel/Zöllkau (2012).

2 Comparison of Specific Provisions of the CCTB Proposal and Current Practice in the EU Member States

In this section, specific provisions of the 2016 CCTB draft Council Directive are compared to the current practice in the EU Member States as of 2017. This comparison shall help to identify potential similarities between national tax codes and the CCTB provisions. Based on this comparison, the need for future modifications in order to comply with the CCTB standard is derived. The comparison follows a study by Spengel/Zöllkau (2012) on the 2011 C(C)CTB proposal. However, in light of the subsequent quantitative analysis of the impact on the effective tax burden of corporations of moving from the national corporate tax system to the provisions of the current CCTB draft Council Directive, only those provisions that can be modelled in the European Tax Analyzer[15] are considered here. In particular, the following elements for the computation of the tax base are included:

- Depreciation (Art. 33, 37 CCTB draft Council Directive),
- Valuation of inventory (Art. 19 CCTB draft Council Directive),
- Tax incentives for R&D (Art. 9 (3) CCTB draft Council Directive),
- Provisions for legal obligations (Art. 23 CCTB draft Council Directive),
- Provisions for pensions (Art. 24 CCTB draft Council Directive),
- Avoidance of double taxation of dividends (Art. 8 d) CCTB draft Council Directive),
- Interest deduction limitation rules (Art. 13 CCTB draft Council Directive),
- Inter-temporal and cross-border loss relief (Art. 41, 42 CCTB draft Council Directive), and
- Notional interest deduction schemes (Art. 11 CCTB draft Council Directive).

For each of the elements considered, the respective proposals according to the CCTB draft Council Directive are presented and subsequently put in relation to the current practice in the EU Member States. If national tax law offers multiple options for treatment among which the taxpayer can choose, only the most favourable, i.e. tax minimizing, option for the corporation is considered. Information on national legislation is based on information provided by the International Bureau for Fiscal Documentations (IBFD).[16] We consider the latest Country Analyses update available for the fiscal year 2017. If necessary, this information is complemented by additional data sources, such as the annual update on effective tax levels in the EU[17] as well as tax guides provided by tax consulting companies (i.e. EY, Deloitte, KPMG, PricewaterhouseCoopers).

Corporations in Estonia are only subject to a flat tax on distributed profits including transactions considered as hidden profit distributions. The majority of tax base provisions discussed in the following are therefore not relevant with regard to the current Estonian tax system. Therefore, Estonia is only included into the following qualitative analysis where appropriate.[18]

[15] For all following references to the European Tax Analyzer, see Section 3 for a detailed description of the model.
[16] www.ibfd.org.
[17] See Spengel et al. (2018) for the latest update.
[18] See also Spengel/Zöllkau (2012), p. 21 for a similar approach.

2.1 Depreciation

For the depreciation of fixed assets, several methods are available.[19] The straight-line method is characterised by an annual write-down of the acquisition costs in equal instalments over the useful life of the asset. The declining-balance as well as the accelerated depreciation method, in turn, result in higher depreciation charges at the beginning of the asset's useful life and hence in positive interest and liquidity effects compared to the straight-line method. Under the declining-balance method, the depreciation rate is applied to the current residual book value of the asset. Usually, the declining-balance method induces a switch to the straight-line method once the latter results in higher depreciation charges.

According to Article 4 (19) of the CCTB draft Council Directive, fixed assets that are subject to depreciation[20] are generally defined as

- acquired or self-created tangible assets and
- acquired intangible assets that are capable of being valued independently and that are used in the business for producing, maintaining or securing income for more than twelve months.

For purposes of depreciation, the re-launched as well as the original C(C)CTB draft Council Directive do not follow current country practice of most Member States to classify tangible fixed assets by categories like machinery or equipment. Instead, the depreciation rules are specified according to the assets' useful lives. Depending on their useful lives, fixed assets qualify for depreciation on an individual basis or as one asset pool.

Tangible fixed assets with a useful life of at least 15 years are classified as long-life assets (Art. 33 (1) c), Art. 4 (22)). In contrast to the original proposal, the re-launched draft includes the classification of medium-life fixed tangible assets with useful lives between eight and 15 years (Art. 33 (1) d), Art. 4 (23)). Both groups of assets shall be depreciated individually on a straight-line basis over their useful lives (Art. 33 (1)). Other fixed tangible assets with a useful life of less than eight years shall be depreciated in an asset pool at an annual rate of 25% of the depreciation base (Art. 37 (1)).

Exceptional depreciation is limited to non-depreciable assets that have permanently decreased in value (Art. 39 (1)). The value of a fixed asset "that is […] damaged to an extent that it can no longer be used for the business […] shall be deducted from the tax base in the year of the disposal or damage" (Art. 34 (2)). Another write-down to the lower fair market value is prohibited. For subsequent increases in value, the respective amount shall be added back to the tax base up to the previously deducted amount (Art. 39 (2)).

In the model framework of the European Tax Analyzer, depreciable assets include buildings, machinery and equipment as well as intangible assets. Therefore, Member States' depreciation rules for these asset categories are considered in the following subchapter.

2.1.1 Buildings

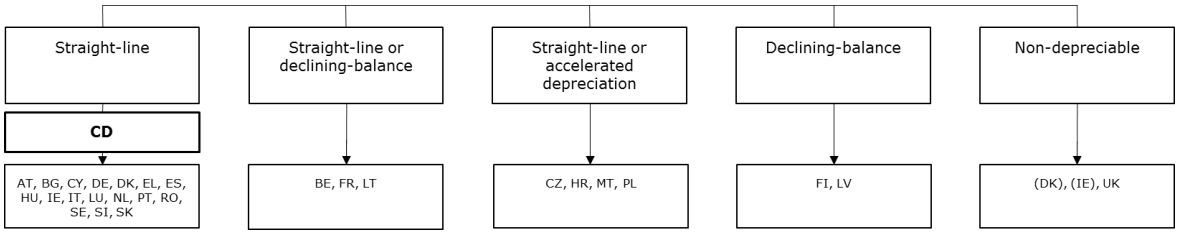
According to Article 33 (1) of the CCTB draft Council Directive, buildings shall be depreciated individually over their useful lives on a straight-line basis. In contrast to

[19] See also Endres/Spengel (2015), pp. 153-156; Bräutigam/Spengel/Stutzenberger (2017), p. 6 for a similar discussion on the characteristics and advantageousness of different depreciation methods.
[20] The acquisition or construction costs have to be at least EUR 1,000.

the original proposal released in 2011, the re-launched proposal distinguishes between the useful life of industrial and office buildings. In that regard, office buildings shall be depreciated over a period of 40 years whereas a period of 25 years applies to industrial buildings (Art. 33 (1) a), b)).

As evident from Figure 1, the cross-country comparison reveals a wide variety of depreciation methods that are in use for the depreciation of industrial and office buildings.[21] Across Member States, the straight-line method is most widely used and currently employed by 17 Member States. In certain Member States, however, taxpayers can choose among several methods: Besides the straight-line method, the declining-balance method may be used by taxpayers in Belgium, France and Lithuania. Similarly, the accelerated depreciation method can also be used for the depreciation of industrial and office buildings in the Czech Republic, Croatia, Malta and Poland. Finland and Latvia exclusively stipulate the depreciation of buildings according to the declining-balance method. While buildings are in general non-depreciable in the United Kingdom, only industrial buildings qualify for depreciation in Denmark and Ireland.

Figure 1: Depreciation of industrial and office buildings (method)



Apart from the depreciation method used, important differences between the CCTB draft Council Directive and current tax accounting practice in the EU Member States may arise from different depreciation rates as illustrated in Table 1.

First of all, eleven of the EU-28 Member States apply different depreciation rates for industrial and office buildings. For industrial buildings, the straight-line depreciation period varies from eight years in Lithuania up to 68 years in Spain. However, most Member States prescribe a depreciation period between 20 and 33.33 years. For office buildings, the longest depreciation period is at 100 years in Spain. Similarly, the usual depreciation period is longer than for industrial buildings and varies between 33.33 years and 50 years. In general, straight-line rates are higher in countries where taxpayers can also choose declining-balance or accelerated depreciation. A double declining-balance method can be used in Lithuania and Belgium (only for industrial buildings) or in terms of an accelerated depreciation in Croatia. In France, declining-balance depreciation is available at 2.25 times the straight-line rate. Whereas in these Member States, a multiplier of the straight-line rate is used to define the depreciation rate under the declining-balance method, a different approach is adopted in Finland and Latvia. Here, declining-balance rates are fixed at 7%/4% in Finland and at 10% in Latvia.

[21] See also Spengel/Zöllkau (2012), pp. 60-62 for a similar analysis with regard to the 2011 proposal.

Table 1: Depreciation of industrial and office buildings (rates)[22]

Country	Straight-line (years)		Declining-balance		Accelerated	
	Industrial	Office	Industrial	Office	Industrial	Office
Council Directive	25	40	-	-	-	-
AT	40	40	-	-	-	-
BE	min. 20	min 33.33	2 x SLR	-	-	-
BG	min. 25	min. 25	-	-	-	-
CY	25	33	-	-	-	-
CZ	30	50	-	-	applicable[23]	applicable
DE	33	33	-	-	-	-
DK	25	prohibited	-	-	-	-
EL	25	25	-	-	-	-
ES	33.33-68	50-100	-	-	-	-
FI	-	-	7%	4%	-	-
FR	20	25	2.25 x SLR	-	-	-
HR	20	20	-	-	2 x SLR	2 x SLR
HU	50	50	-	-	-	-
IE	25	prohibited	-	-	-	-
IT	20-33.33	20-33.33	-	-	-	-
LT	8-15	8-15	2 x SLR	2 x SLR	-	-
LU	20-25	33.33-50	-	-	-	-
LV	-	-	10%	10%	-	-
MT	50	50	-	-	10% (initial allowance)	10% (initial allowance)
NL	25-50 (fair value restriction)	25-50 (fair value restriction)	-	-	-	-
PL	10-40	10-40	-	-	1.2-1.4 x SLR	1.2-1.4 x SLR
PT	20	50	-	-	-	-
RO	40-60	40-60	-	-	-	-
SE	25	50	-	-	-	-
SI	min. 33.33	min 33.33	-	-	-	-
SK	20	40	-	-	-	-
UK	prohibited	prohibited	-	-	-	-

[22] SLR refers to the straight-line rate of depreciation.

[23] Under the accelerated depreciation method, the depreciation charge in the first year is determined as a fraction of the acquisition cost and the coefficient stated in the national tax accounting rules. In subsequent years, depreciation charges are calculated by dividing the double amount of the residual value by a specific coefficient. Hence, in effect, this is similar to a declining-balance method as the same useful life as for the straight-line method is used. See also Spengel/Zöllkau (2012), p. 62.

2.1.2 Machinery and equipment (office/business)

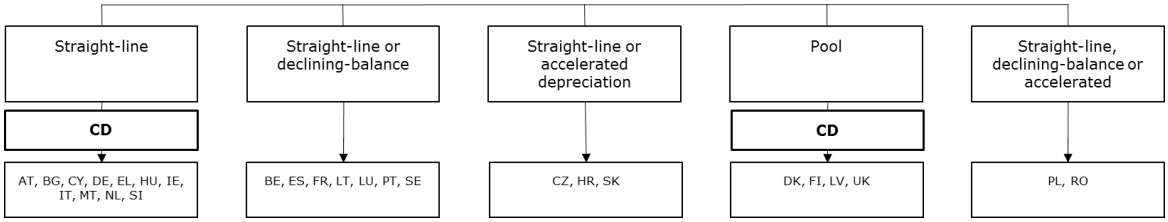
This subsection focuses on long-life[24] as well as medium-life fixed assets as described above. As individually depreciable assets, machinery and equipment are subject to straight-line depreciation over their useful lives (Art. 33 (1)). Furthermore, fixed assets with a useful life of less than eight years are under consideration as well. Such assets shall be depreciated together in one asset pool at an annual rate of 25% of the depreciation base (Art. 37 (1)).

In the following, the focus is on machinery and office and business equipment as only these assets are modelled in the European Tax Analyzer and hence enter the subsequent quantitative analysis. In particular, this is relevant for countries which classify tangible fixed assets in different categories, e.g. Malta with about 14 different categories.

The country practice for the depreciation of machinery and equipment is illustrated in Figure 2.[25] In line with the rules for long- and medium-life fixed assets established by the CCTB draft Council Directive, machinery and equipment are depreciated individually on a straight-line basis in the majority of Member States. In addition to the straight-line method, the declining balance or accelerated depreciation methods can be used in seven (three) Member States. In Poland and Romania, taxpayers can choose among all three depreciation methods.[26]

By contrast, machinery and equipment have to be depreciated in an asset pool in Denmark, Finland, Latvia and the United Kingdom. Under the pool method, the depreciable bases of all affected assets are added up such that the depreciation charge is determined as an overall figure.[27] In general, only one asset pool is recognised. In Latvia, by contrast, several asset pools exist that further differ in the applicable depreciation rates. Those Member States that currently stipulate pool depreciation usually do so only for specific groups of fixed assets. Under the CCTB draft Council Directive, however, the applicability of the pool method is tied to the assets' useful life.

Figure 2: Depreciation of machinery and equipment (method)



[24] Assets depicted in Art. 33 (1) a), b), e.g. industrial and office buildings, are not included in this classification; see Scheffler/Köstler (2017), pp. 48 f.
[25] See also Spengel/Zöllkau (2012), pp. 63 f. for a similar analysis with regard to the 2011 proposal.
[26] In general, all methods are available in Poland. However, there are restrictions for specific types of assets of the category machinery and equipment.
[27] See Spengel/Zöllkau (2012), p. 63.

Table 2: Depreciation of machinery and equipment (rates)

Country	Straight-line (years)	Declining-balance	Accelerated	Pool
Council Directive	8-15	-	-	25%
AT	4-10	-	-	-
BE	3-10	2 x SLR	-	-
BG	2-6.67	-	max. 50%	
CY	5-10	-	-	-
CZ	3-10	-	applicable[28]	-
DE	3-16.67	-	-	-
DK	-	-	-	max. 25%
EL	5-10	-	-	-
ES	4-20	1.5-2.5 x SLR	-	-
FI	-	-	-	max. 25%
FR	5-10	1.25-2.25 x SLR	-	-
HR	2-4	-	2 x SLR	-
HU	2-7	-	-	-
IE	8	-	-	-
IT	2.5-10[29]	-	-	-
LT	3-8	2 x SLR	-	-
LU	5-16	max. 3 x SLR (limited to 30%)	-	-
LV	-	-	-	20-70%
MT	4-10	-	-	-
NL	min. 5	-	-	-
PL	3.33-10	2 x SLR	1.2-2 x SLR	-
PT	3-8	1.5-2.5 x SLR	-	-
RO	useful life	1.5-2.5 x SLR	50% (initial allowance)	-
SE	5	max. 30%	-	-
SI	2-5	-	-	-
SK	4-12	-	applicable[30]	-
UK	-	-	-	18%

[28] Under the accelerated depreciation method, the depreciation charge in the first year is determined as a fraction of the acquisition cost and the coefficient stated in the national tax accounting rules. In subsequent years, depreciation charges are calculated by dividing the double amount of the residual value by a specific coefficient. Hence, in effect, this is similar to a declining-balance method as the same useful life as for the straight-line method is used. See also Spengel/Zöllkau (2012), p. 62.

[29] Italy provides for an enhanced depreciation for machinery and equipment that allows to increase the acquisition costs by 40% for depreciation purposes.

[30] For the depreciation charge during the first year, the acquisition price of the asset is divided by a specific coefficient. In subsequent periods, the double amount of the residual value is divided by a coefficient that is reduced by the number of years for which the asset has already been depreciated. See also Spengel/Zöllkau (2012), p. 62.

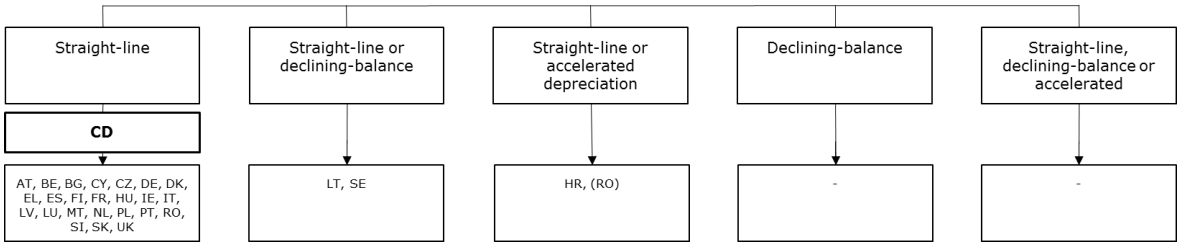
In Table 2, the depreciation rates for machinery and equipment are illustrated for the EU Member States. Again, it is evident that the applicable depreciation rates are very heterogeneous across Member States. The general difficulty of a sound cross-country comparison is further enhanced as many Member States split the generic group of "machinery and equipment" into additional sub-categories. In Germany, for instance, rates are set out in officially recommended tables published by the Federal Ministry of Finance. Therefore, a universal cross-country comparison is difficult and might provide misleading results.[31]

2.1.3 Intangible assets

Similar to long- and medium-life assets, acquired intangible assets are subject to individual depreciation on a straight-line basis over their useful life under the re-launched CCTB draft Council Directive (Art. 33 (1) e)).[32] The useful life of an intangible asset is defined as the period for which the intangible enjoys legal protection or for which the right is granted. If this period cannot be determined, the depreciation period covers 15 years. As such, the regulations of the re-launched CCTB draft Council Directive for the depreciation of acquired intangibles are in line with the original proposal released in 2011.

As displayed in Figure 3, acquired intangibles are depreciated individually in all Member States.[33] With the exception of Lithuania, Sweden, Croatia and Romania, only straight-line depreciation is available for intangibles. In Lithuania and Sweden (Croatia and Romania[34]), taxpayers can choose between the straight-line and declining-balance (accelerated depreciation) method.

Figure 3: Depreciation of acquired intangibles (method)



[31] See also Spengel/Zöllkau (2012), p. 64.
[32] We do not further consider the treatment of internally developed intangible assets since they are not capitalised within the model framework of the European Tax Analyzer. Hence, they are not part of the quantitative analysis conducted in Section 4.
[33] See also Spengel/Zöllkau (2012), pp. 66 f. for a similar analysis with regard to the 2011 proposal.
[34] In Romania, accelerated depreciation is only available for patents.

Table 3: Depreciation of acquired intangibles (rates)

Country	Straight-line (years)	Declining-balance	Accelerated
Council Directive	useful life	-	-
AT	useful life	-	-
BE	min. 5 / 3 (R&D)	-	-
BG	min. 3	-	-
CY	useful life (max. 20)	-	-
CZ	useful life / 6[35]	-	-
DE	useful life	-	-
DK	7[36]	-	-
EL	10 or useful life[37]	-	-
ES	min. 20	-	-
FI	max. 10	-	-
FR	min. 5	-	-
HR	4	-	2 x SLR
HU	useful life	-	-
IE	max. 17	-	-
IT	2-18	-	-
LT	3 or 4	2 x SLR	-
LU	useful life	-	-
LV	5	-	-
MT	useful life (min. 3)	-	-
NL	useful life (min. 5)	-	-
PL	2-5[38]	-	-
PT	useful life	-	-
RO	useful life[39]	-	-
SE	5	max. 30%	-
SI	min. 10	-	-
SK	useful life (max. 5)	-	-
UK	25	-	-

[35] In the Czech Republic, the depreciation period under the straight-line method depends on the underlying license contract. If the contract term is fixed, the depreciation period corresponds to the useful life. For a license contract where the contract term has not been fixed, the depreciation period covers six years.
[36] A patent may be immediately depreciated if acquired in connection with the purchaser's business.
[37] For trademarks and patents, the general annual depreciation rate is 10% unless the economic life of the asset is more or less than ten years.
[38] Trademarks and patents are subject to depreciation at a standard annual rate of 20%. A minimum depreciation period of two years is stipulated for intellectual property rights as well as for licenses for film, television and radio broadcasting.
[39] For patents, also the accelerated or declining-balance method can be used.

Table 3 provides an overview of the depreciation periods for acquired intangible assets among Member States. In general, a vast majority of the EU-28 Member States relates the depreciation periods and resulting rates for acquired intangible assets to the useful life of the asset and abstains from a specification of fixed rates. Such rates are only determined in seven Member States and range from three years in Lithuania up to 25 years in the United Kingdom. Several Member States differentiate different classes of intangible assets. The underlying depreciation periods vary between two years in Poland for film, TV or radio licenses and 18 years for trademarks in Italy.

2.2 Valuation of inventory

Article 4 (27) of the CCTB draft Council Directive defines inventory and work-in-progress as

- assets for sale or
- assets in the process of production for sale or
- assets used as raw materials, auxiliaries or supplies to be consumed in the production process or in the delivery of services.

The costs attributed to these assets shall be measured by using the first-in first-out method (FiFo), the last-in first-out method (LiFo) or the weighted-average cost method (Art. 19 (2)). Under the original proposal for a C(C)CTB draft Council Directive released in 2011, the LiFo method was not available (Art. 29 (1) of the 2011 C(C)CTB draft Council Directive).

If a taxpayer applies the FiFo method, inventory that was produced or purchased first has to be consumed or sold first.[40] Hence, assets that remain at the end of the tax year have been produced or purchased most recently. The LiFo method follows in principle the FiFo method, however the assets that were produced or purchased latest have to be consumed or sold first. Under the weighted-average cost method, the value of the inventory is approximated by the weighted-average of the costs of similar assets at the beginning of the tax year and the costs of similar assets produced or purchased during the tax year.

Figure 4: Valuation of inventory (method)

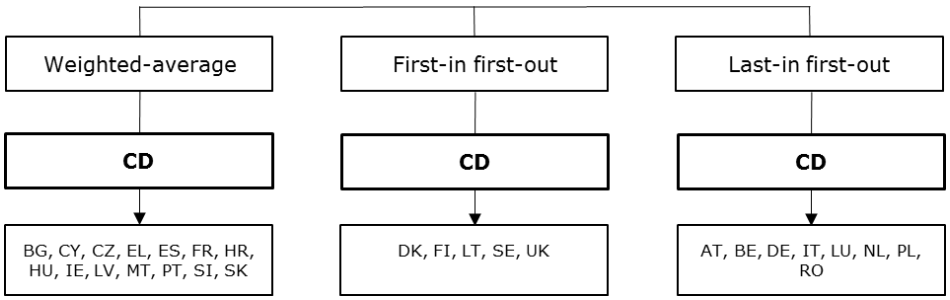


Figure 4 gives an overview of the inventory valuation methods that are applicable in the EU-28 Member States.[41] If several options are available according to national tax law, only the most tax-favourable provision is considered.

[40] See Spengel/Zöllkau (2012), pp. 46 f., for the description of different methods for the valuation of inventory.
[41] See Spengel/Zöllkau (2012), pp. 46 f. for a similar analysis with regard to the 2011 proposal.

In 14 out of the 28 Member States, the weighted-average cost method is the most favourable one for taxpayers. In eight countries under consideration, the LiFo method is currently the most favourable available method, whereas FiFo is the most favourable method available to taxpayers in five EU Member States. Since under the CCTB draft Council Directive, all of the above-mentioned methods are in principle available, taxpayers would presumably choose the LiFo method as the most tax-favourable option. This expectation is based on the underlying assumption of a consistent increase of asset prices in the future. Accordingly, taxpayers in 19 of the EU-28 Member States could change their valuation method for inventories upon the introduction of the CCTB. However, no strict harmonisation of tax bases will be achieved due to the above-mentioned availability of several valuation methods.

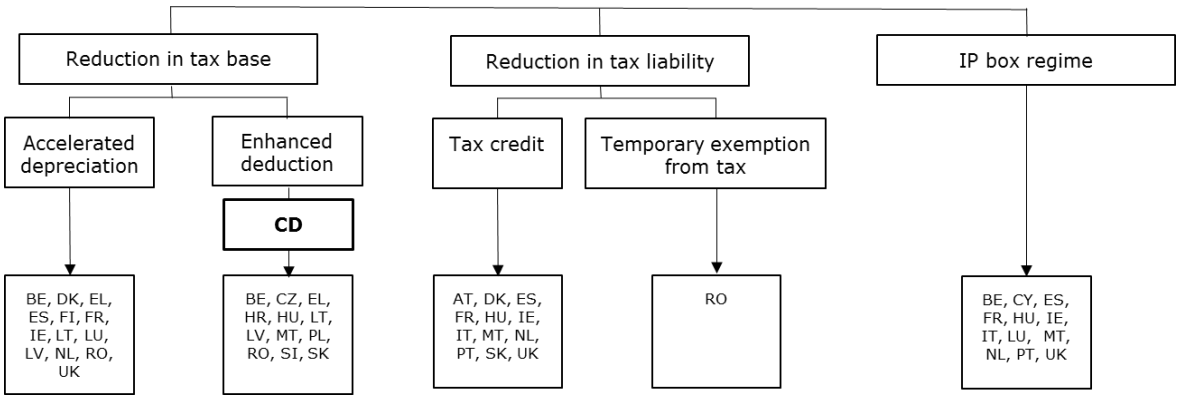
2.3 Tax incentives for R&D

In general, costs incurred in the conduct of basic and applied research as well as experimental development are immediately deductible under the CCTB draft Council Directive (Art. 9 (2), Art. 4 No. 11). In addition, an R&D input tax incentive designed as an enhanced deduction is available depending on the overall research expenditure: For R&D expenditure up to EUR 20 million, an additional deduction of 50% is granted leading to an overall deduction of 150% of the actual R&D costs incurred (Art. 9 (3) first sentence). Any R&D expenditure that exceeds this threshold, however, is only deductible at 125% of the actual costs (Art. 9 (3) second sentence). This so-called R&D super-deduction is not available for costs related to movable tangible fixed assets and is thus generally available for personnel expenses, costs related to the acquisition of current assets as well as other miscellaneous costs.[42] For enterprises with less than 50 employees and an annual turnover or balance sheet total of less than EUR 10 million, the first EUR 20 million of R&D expenditure are deductible at 200% provided that these enterprises have not been listed on a stock exchange for at least the five preceding years, do not have any associated enterprises and have not been formed through a merger (Art. 9 (3) third sentence). In line with a general tax policy objective of the European Union,[43] this measure intends to stimulate and enhance innovation in the economy.[44] Under the 2011 proposal for a C(C)CTB, immediate deduction of R&D costs in the year incurred was also available (Art. 12 C(C)CTB draft Council Directive 2011) whereas the additional enhanced deductibility of R&D expenses is one of the new elements of the re-launched CCTB draft Council Directive.

In principle, several types of R&D tax incentives can be distinguished and classified into different categories.[45] On the one hand, input-based incentives provide relief based on the R&D expenditure incurred. This includes accelerated depreciation, enhanced allowances, (super-) deductions as well as tax credits and temporary exemptions from tax. On the other hand, output-based incentives such as patent box regimes offer a reduced corporate tax rate on income derived from intangible property (IP). The exact design of R&D tax incentives varies widely across Member States. Therefore, only the most important trends and types of R&D tax incentives that are available in the Member States are illustrated in Figure 5.

[42] See Scheffler/Köstler (2017), pp. 101 f.
[43] See, for instance, European Commission (2003); European Commission (2005a); European Commission (2005b), pp. 12 f.
[44] See CCTB draft Council Directive, p. 9.
[45] See, for example, CPB (2014), p. 52; VVA Consulting/ZEW (2015), p. 60 as well as Annex 1, pp. 76-98.

Figure 5: Tax incentives for R&D



According to Figure 5, all Member States except Bulgaria, Germany, Estonia and Sweden have some form of R&D tax incentive in place. 13 Member States even employ several approaches simultaneously.[46] With regard to the R&D super-deduction established in the CCTB draft Council Directive, twelve of the EU-28 Member States are in line with the Directive. However, there is wide variety regarding the percentage amount of the enhanced deduction that ranges from 13.5% in Belgium to 200% in Hungary or Lithuania. In addition, a limitation of the deductible amount applies only in some Member States (e.g. Malta) while others grant an enhanced deduction e.g. if the qualifying R&D expenditure of the current tax year exceeds the expenditure incurred during the previous year (Czech Republic, Slovak Republic). Furthermore, in some Member States, taxpayers are allowed to carry forward the unused amount of the enhanced deduction (e.g. Malta, Poland or Slovenia).

Accelerated depreciation for qualifying R&D assets can be claimed in 13 Member States with specific national rules on the underlying rate and method. For example in Denmark, qualifying acquisition costs are fully depreciable in the year of acquisition[47] whereas taxpayers in France or Luxembourg have to adopt a multiplier of the straight-line rate. Again, other countries prescribe fixed (accelerated) depreciation rates.

Furthermore, taxpayers in twelve Member States can benefit from an R&D tax credit and therefore reduce their tax liability accordingly. The cross-country review of available tax credits reveals important differences regarding their amount, carry-forward or carry-backward options, time restrictions and the possibility to receive a refund of any unused amount. Lastly, taxpayers in Romania can – under certain conditions – benefit from a ten-year exemption from corporate income tax as well as from a salary income tax exemption.[48]

Twelve Member States have a special intangible property (IP) box regime in place. In general, IP box regimes offer reduced tax rates for income from IP or grant generous tax exemptions from the tax base such that IP income is effectively taxed at a lower rate than regular income.[49] However, given that IP boxes cannot be implemented in the quantitative analysis conducted with the European Tax Analyzer, we abstain from a further consideration.

[46] See, for example, also Ernst et al. (2016), p. 20 for an overview.
[47] A further condition stipulates that rights have to be acquired in connection with the purchaser's business.
[48] Taxpayers that exclusively conduct R&D and related activities can benefit from the corporate income tax exemption.
[49] See Spengel et al. (2017), pp. 52-55 for a recent overview on the availability and design of IP box regimes in the EU.

Upon the introduction of a CCTB, the application of an R&D super-deduction would become mandatory also for those Member States that currently do not envisage general R&D tax incentives in their national tax codes. In turn, any other R&D tax incentive that is currently available under national law would no longer be available for corporations that are subject to the CCTB, but would be replaced by the CCTB R&D super-deduction (Art. 1 (2) of the CCTB draft Council Directive).

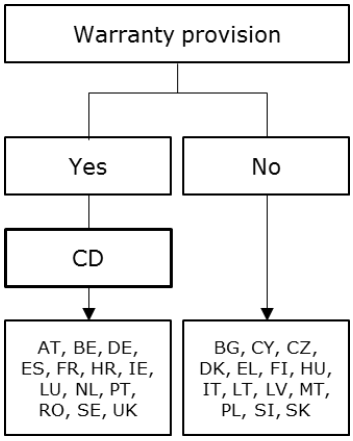
2.4 Provisions for legal obligations (warranty provisions)

According to Article 23 of the 2016 CCTB draft Council Directive, provisions are recognised if the taxpayer has a legal obligation, or a probable future legal obligation, arising from activities or transactions carried out in or before the tax year. Any amount arising from that obligation which can be reliably estimated shall be deductible, provided that the eventual settlement of the amount is expected to result in a deductible expense. A legal obligation may thereby derive from a contract, a legislation, an administrative act, or another operation of law. Where the obligation relates to an activity or transaction which will continue over future tax years, the provision shall be spread proportionately over the estimated duration. Provisions shall be reviewed and adjusted at the end of every tax year. They shall be measured at the expected expenditure required to settle the obligation at the end of the tax year, provided that the estimate is based on all relevant factors. Account shall be taken of all risks and uncertainties, future events being reasonably expected to occur, and future benefits directly linked to the event giving rise to the provision. If the term of the provision is twelve months or longer, it shall be discounted at the yearly average of the Euro Interbank Offered Rate (Euribor) for obligations with a maturity of twelve months. The recommendations on the recognition and measurement of provisions strongly resemble those of the original C(C)CTB draft Council Directive. What is new is the explicit prohibition to deduct provisions for contingent losses and future cost increases.

In the following, the focus is on provisions for warranties only, as only those are modelled in the European Tax Analyzer and hence enter the subsequent quantitative analysis. Warranty provisions satisfy the requirements for provisions according to the draft Council Directive. As displayed in Figure 6, 13 Member States permit the recognition of provisions for warranties and are hence in line with the proposed Council Directive.[50] The remaining countries generally prohibit a tax-effective deduction for warranty provisions.

[50] See also Spengel/Zöllkau (2012), pp. 49-53 for a similar analysis with regard to the 2011 proposal.

Figure 6: Recognition of warranty provisions



2.5 Provisions for pensions

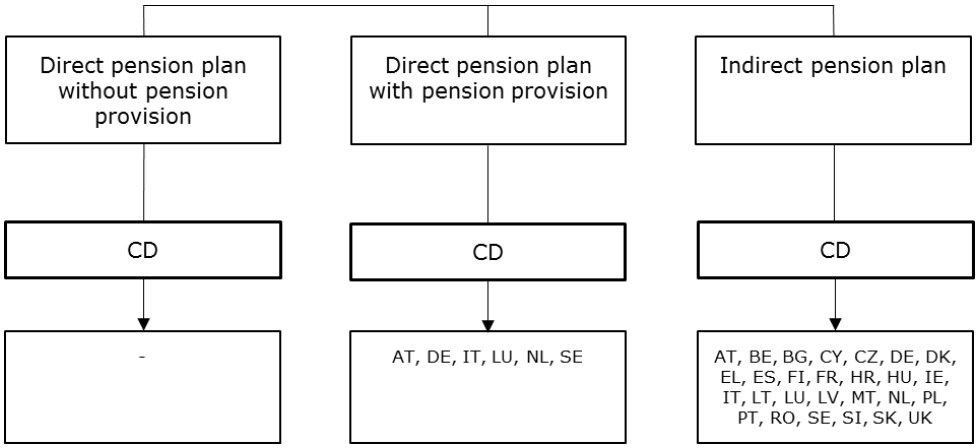
Generally, post employment benefits can be provided via direct and indirect pension plans.[51] Direct pension plans can go along with or without the recognition of a provision during the period of employment. If no provision is created, the pension payments are deductible only when actually paid. In contrast, if a provision is built up during the period of eligibility of the employee, pension contributions are deductible when they accrue to the pension plan. In case of an indirect pension plan, pension obligations are funded by payments to an external pension fund, e.g. an insurance company or another organisation. The contributions to the fund affect liquidity as well as profit and loss during the period of employment. Direct pension plans with the recognition of a provision and indirect pension plans result ceteris paribus in the same consequences, except that the interest income on the pension contributions accrues to the corporation in case of a direct pension plan and to the pension fund in case of an indirect plan.

Contributions to indirect pension schemes – as incurred in the direct business interest of the taxpayer – shall be deductible under the draft Council Directive (Art. 9). As regards direct pension plans, Article 24 states that Member States may provide for the deduction of pension provisions. Since pension provisions generally fulfil the general criteria for the recognition of provisions according to Article 23 (1), the rule can be interpreted insofar as pension provisions should not be recognised according to the draft Council Directive. Still, Member States can depart from this principle in their national law.[52] Open questions remain as regards the detailed measurement of pension provisions.[53] For instance, it is not clear whether the general criteria for the recognition of provisions laid down in Article 23 (1), in particular as regards the discount rate, also apply to pension provisions.[54] Also the original C(C)CTB proposal, prescribing that actuarial techniques shall be used in order to determine the amount of pension provisions, did not provide detailed guidance on the measurement. Still, it was stated explicitly that pension provisions shall be discounted by reference to the yearly average of the Euribor for obligations with a maturity of twelve months.

[51] See Spengel/Zöllkau (2012), p. 53.
[52] See Scheffler/Köstler (2017), p. 74.
[53] See Spengel/Zöllkau (2012), p. 54.
[54] See Scheffler/Köstler (2017), p. 78.

Figure 7 displays the treatment of post employment benefits.[55] Indirect pension plans are currently common in all Member States. Only Austria, Germany, Italy, Luxembourg, the Netherlands and Sweden in addition grant tax deductions for allocations to pension provisions under direct pension schemes. In line with the proposed Council Directive, specified rates to discount pension provisions are used in all six countries, for instance 6% in Germany and Austria and 4% in the Netherlands. Since the CCTB proposal leaves the deductibility of pension provisions to the discretion of Member States, no strict harmonisation across Member States will be achieved in that regard.

Figure 7: Deductibility of pension payments



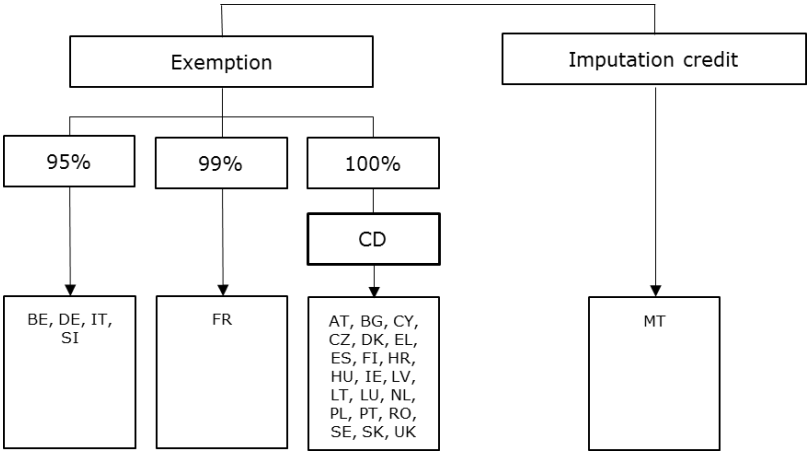
2.6 Avoidance of double taxation of dividends

If a corporation holds shares in another corporation, Article 8 d) of the CCTB draft Council Directive fully exempts the resulting dividends from taxation at the level of the recipient corporation, provided that the shareholding amounts to at least 10% of the capital or voting rights for twelve consecutive months. The exemption relates to both domestic as well as foreign-source dividends. According to Article 12 g) of the CCTB draft Council Directive, costs incurred by the taxpayer in relation to this tax-exempt income are not deductible for tax purposes. For shareholdings that do not exceed the 10% threshold, in turn, inter-company dividends are fully subject to tax at the level of the receiving corporation and the related expenses are fully deductible (Art. 9 (1)). The original proposal for the introduction of a C(C)CTB followed a uniform approach with an exemption of received profit distributions irrespective of the level of the shareholding (Art. 11 c)). However, Article 14 g) of the 2011 draft Council Directive stipulates to add back a lump-sum amount of 5% of the exempt dividend income which would lead to an overall exemption of 95% of the received dividends.

In the following, Article 8 d) of the CCTB draft Council Directive is compared to the prevailing country practice regarding the treatment of a profit distribution from a domestic substantial shareholding across the EU-28 Member States (Figure 8).[56]

[55] See also Spengel/Zöllkau (2012), pp. 53 f. for a similar analysis with regard to the 2011 proposal.
[56] See Spengel/Zöllkau (2012), pp. 35-37 for a similar analysis with regard to the 2011 proposal.

Figure 8: Profit distribution from domestic substantial shareholding



In line with the CCTB draft Council Directive, the majority of Member States fully exempts profit distributions from a domestic substantial shareholding from taxation at the level of the receiving entity. Belgium, France, Germany, Italy and Slovenia require the add-back of a lump-sum amount of 5% (1%) of the exempt dividend in the determination of taxable income which represents a non-deductible business expense. In general, most Member States allow for the deductibility of costs related to tax-exempt foreign dividends. Only in the Czech Republic, Greece and Luxembourg, such costs cannot be deducted.[57]

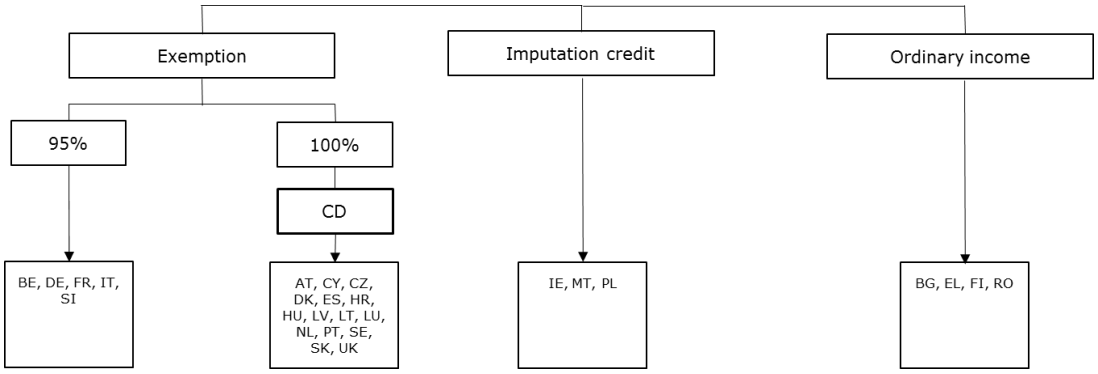
The minimum shareholding required to qualify for the exemption ranges from 5% (e.g. the Netherlands or Spain) to 10% (e.g. Czech Republic or Denmark); several Member States however do not impose a minimum threshold (e.g. Hungary). Member States such as Belgium, Greece or Poland have further established minimum holding periods of one or two years whereas a distinction between quoted and unquoted shares is made in Sweden. If an Estonian parent company further distributes its received dividends, these distributions are exempt from the distribution tax provided that the parent holds a minimum share of 10% in the dividend-paying subsidiary.

In general, received dividends are subject to tax at the level of the recipient in Malta. However, under the full imputation system, the shareholder receives a tax credit equivalent to the amount of tax that has already been paid at the level of the distributing entity.

Article 8 d) of the CCTB draft Council Directive does not differentiate between proceeds received from domestic and foreign, i.e. non-EU shareholdings. The respective country practice, however, differs (Figure 9). In general, the majority of the Member States (20 countries) exempts dividends received from non-EU[58] corporations under certain conditions whereas three countries grant a foreign tax credit. Third-country profit distributions are part of the ordinary taxable business income in four Member States.

[57] See Spengel et al. (2018), Table A-9.
[58] In several Member States such as Bulgaria, the inapplicability of the exemption method refers to non-EEA countries.

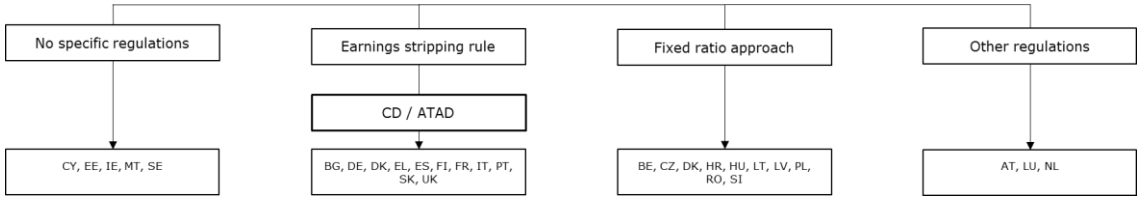
Figure 9: Profit distribution from foreign (non-EU) substantial shareholding



2.7 Interest deduction limitation rules

A rule limiting the deductibility of interest was not included in the original proposal released in 2011. Already enclosed in the ATAD,[59] an interest deduction limitation rule has been newly included upon the 2016 re-launch (Art. 13 CCTB draft Council Directive). This rule limits the deductibility of interest expenses that exceed the amount of interest received to the higher of 30% of a corporation's earnings before interest, tax, depreciation and amortisation (EBITDA, relative limit) or to a maximum amount of EUR 3 million (Art. 13 (2)). Any non-deductible interest of a given tax year is eligible for an unlimited carry-forward (Art. 13 (6)). Unused EBITDA, in contrast, cannot be carried forward. The interest deduction limitation rule is not applicable to standalone entities (Art. 13 (4)).

Figure 10: Deductibility of interest expenses



As summarised in Figure 10, only five out of the 28 considered Member States – among them Cyprus or Malta – do not apply specific rules to limit the deductibility of interest expenses.[60] Although interest deduction limitation rules have not been codified into the tax laws of Member States such as Austria or Luxemburg, national courts or tax administrations have established certain guidelines or administrative practice for the determination of an adequate debt/equity ratio.

Most Member States, however, have implemented specific rules to prevent an excessive deductibility of interest expenses. Although the respective design of the rules differs considerably among countries, it is nevertheless possible to point out several general trends and approaches: In line with the proposed CCTB draft Council Directive, eleven Member States apply a so-called earnings stripping rule that limits the deductibility of interest expenses to a certain percentage of EBIT(DA). Seven of

[59] In general, the interest deduction limitation rule proposed in the CCTB draft Council Directive corresponds to the rule set out in the ATAD. However, the ATAD grants more generous escape clauses, see Scheffler/Köstler (2017), p. 87.
[60] See also Spengel/Zöllkau (2012), pp. 79 f. for a similar analysis with regard to the 2011 proposal.

these Member States, for instance France, Germany, Spain or the United Kingdom, provide for a safe haven threshold below which full interest deductibility would be granted. Moreover, ten Member States restrict the deductibility of interest if a corporation's debt exceeds a certain debt-to-equity or debt-to-asset ratio (fixed ratio approach). Denmark is the only Member State that applies a combination of both approaches. The principles of the earnings stripping rule and fixed ratio approach are illustrated by the following examples:

> *Fixed ratio approach:*
>
> *A fictitious interest deduction limitation rule prohibits the deductibility of interest in case the total amount of debt exceeds a debt-to-equity ratio of 3:1 (so-called "safe haven"). If the equity level is at 50 monetary units (MU), the highest acceptable level of debt capital is thus 150 MU. For a loan of 250 monetary units, interest on 100 MU (=250-150) is not deductible from the corporate income tax base.*[61]
>
> *Earnings stripping rule:*
>
> *A fictitious interest deduction limitation rule limits the deductibility of interest to 30% of a corporation's EBITDA. For an EBITDA of 100 MU, the deductible interest expense is limited to 30 MU. If the overall interest expenditure amounts to 50 MU, an amount of 20 MU (=50-30) is not deductible from the corporate income tax base.*

Except for France and the Slovak Republic, all Member States that limit the deductibility of interest by means of an earnings stripping rule allow for a carry-forward of non-deductible interest to future periods as also proposed by the CCTB draft Council Directive.[62] Among the Member States that apply a fixed ratio approach, a carry-forward is only available in Romania.

However, although the country practice of many Member States seems to deviate from Article 13 of the CCTB draft Council Directive, these differences will be dispelled until the end of 2018: According to Article 11 (1) of the ATAD, Member States have to adjust their national tax laws to comply with the directive and apply the interest deduction limitation rule from 1 January 2019.[63]

2.8 Loss relief

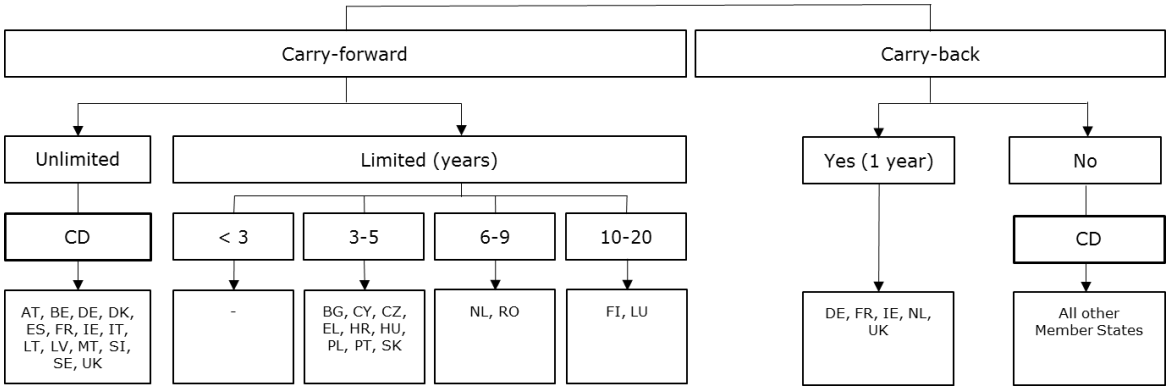
2.8.1 Inter-temporal loss relief

According to Article 4 (9) of the CCTB draft Council Directive, a loss is incurred when deductible expenses or similar items exceed revenues in a given tax year. Article 41 (1), (2) and (4) grants a carry-forward of losses without restrictions in time or amount. There is, however, no possibility for a carry-back of losses to previous years. These provisions are in line with the 2011 C(C)CTB proposal (Art. 43 of the 2011 C(C)CTB draft Council Directive). The entitlement to carry-forward non-deductible losses is lost upon an acquisition if the acquired company becomes a qualifying subsidiary of the acquirer or following major changes of business activity (Art. 41 (3)). This amendment to the original rule constitutes an "anti-abuse provision

[61] See Endres/Spengel (2015), p. 125.
[62] Germany, Italy and Spain additionally allow for a carry-forward of unused EBITDA.
[63] In case Member States currently already have an "equally effective" interest deduction limitation rule in place, they are entitled to apply the national rule at the latest until 1 January 2024 (Art. 11 (6) of the ATAD).

[that should] discourage attempts to circumvent the rules on loss deductibility through purchasing loss-making companies".[64] For unrelieved losses that exist upon joining the system, Article 47 of the CCTB draft Council Directive limits the deductibility of such losses to the allowable amount under the previous national rules.

Figure 11: Relief for ordinary losses



As illustrated in Figure 11, a carry-forward of excess unrelieved losses is available in all Member States.[65] With regard to the allowable carry-forward period, country practice differs: In line with the CCTB draft Council Directive, 14 Member States do not impose any temporal restrictions on the loss carry-forward. For the remainder of Member States, the carry-forward period varies between four years (Slovak Republic) and 17 years (Luxembourg). In contrast, a carry-back of losses is available for one year prior to the year in which the loss is incurred in only five Member States.[66]

Apart from the above-mentioned restrictions to the carry-forward period, several Member States impose limitations on the allowable loss amount which can be set off against future profits. In total, twelve Member States set relative limitations on the amount of loss carry-forward (minimum tax regulations).[67] Four of these Member States, however, allow for a basic loss amount up to which losses are fully deductible: In Germany, for instance, a basic amount of EUR 1 million applies. Above this threshold, exceeding losses may only be set off against 60% of total taxable income, which leads to a minimum taxation of 40%.[68] In the other eight Member States, no basic amount is applicable and ordinary losses may be set off against 50% (Hungary, Poland, Slovenia) up to 80% (Italy) of taxable income.

2.8.2 Cross-border loss relief

The possibility of a cross-border loss offset represents one of the new elements of a CCTB (Art. 42). Since the original proposal for a C(C)CTB was intended to be implemented in one step, a mechanism for cross-border loss relief was not necessary since it was automatically granted through consolidation.[69] In line with the introduction of a CCCTB as a two-step approach under the re-launched draft Council

[64] See CCTB draft Council Directive, p. 10.
[65] See also Spengel/Zöllkau (2012), pp. 81-83 for a similar analysis with regard to the 2011 proposal.
[66] In Ireland and the United Kingdom, the availability of a loss carry-back is restricted to trading losses.
[67] Respective rules are in place in Austria, Denmark, France, Germany, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovenia, and Spain.
[68] A basic amount is in place in Denmark, France, and Spain as well.
[69] See CCTB draft Council Directive, p. 3; Schön/Schreiber/Spengel (2008), pp. 29-30.

Directive, the mechanism for a cross-border loss offset is only temporary until the final introduction of a consolidated tax base.[70]

According to Article 42 (1), cross-border loss relief is available with regard to immediate qualifying subsidiaries (as defined by Article 3 (1)) or permanent establishments (PE) situated in other Member States. A cross-border loss offset is not possible for PEs situated in third countries (Art. 12 j)). For qualifying subsidiaries, cross-border loss relief is possible in proportion to the underlying shareholding whereas for PEs, full offset is granted (Art. 42 (2)).

The cross-border loss relief is only temporary. Any subsequent profits of the qualifying subsidiary or PE must be added back up to the amount of the previously deducted loss (Art. 42 (3)). Furthermore, Article 42 (4) of the CCTB draft Council Directive prescribes a recapture in cases where the loss-making entity has not (yet) become profitable during a five-year period as well as upon sale, liquidation or transformation.

Figure 12: Cross-border loss relief

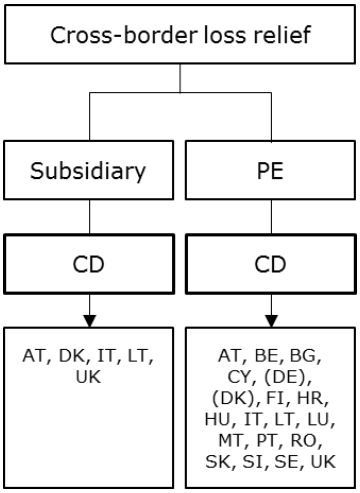


Figure 12 displays the current country practice regarding the treatment of cross-border losses of a foreign subsidiary or PE. Contrary to the provisions laid out in the CCTB draft Council Directive, most Member States do not provide for a cross-border compensation of current losses of a foreign subsidiary; such relief is currently only available in five Member States. Regarding current losses of a foreign PE, in contrast, 17 countries generally allow for a cross-border loss compensation.[71] In this context, losses of a foreign PE are usually treated similar to the existing country or treaty practice for the taxation of PE profits. In Romania and Sweden, cross-border loss relief is only available for PEs located in the European Economic Area (EEA) whereas in Bulgaria, cross-border loss relief is only possible against income from the same PE. In line with the CCTB draft Council Directive, Austria and Cyprus have recapture rules in place.

[70] See CCTB draft Council Directive, pp. 3, 10-11.

[71] In addition, in Denmark, losses of a foreign PE can only be set off against domestic income if the taxpayer opts for cross-border tax consolidation. In Germany, relief for current losses of a foreign PE is only granted with respect to active PEs for certain kinds of activities.

2.9 Notional interest deduction schemes

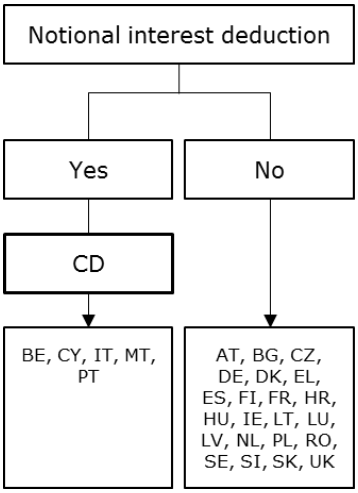
Article 11 of the CCTB draft Council Directive proposes an Allowance for Growth and Investment (AGI) which resembles a notional interest deduction. This element is new compared to the 2011 C(C)CTB draft Council Directive. The allowance aims to tackle the asymmetric tax treatment of debt and equity financing, whereby interest paid on loans is deductible (subject to certain limitations, see above) whilst this is not the case for dividends paid to shareholders. This encourages companies to rely on debt rather than on equity, making them potentially more vulnerable to shocks and bankruptcy. The AGI aims to attenuate this debt bias by granting a tax deduction for companies that increase their equity financing (e.g. by issuing new shares or retaining profits) rather than taking on debt. In particular, the allowance shall work as follows: The relevant base for calculating the deductible amount is the increase of the equity base at the end of the relevant tax year compared to the equity base on the first day of the first year under the rules of the Directive. After the first ten tax years that a taxpayer is subject to the Directive, the reference equity base shall annually be moved forward by one tax year. The definition of the equity itself is based on Directive 2013/34/EU[72] and the International Financial Reporting Standards. In order to avoid a manifold benefit, the tax value of participations in the capital of associated enterprises shall be deducted from the equity of the taxpayer when calculating the equity base. The allowance shall be calculated by multiplying the change in the equity base by a fixed rate which equals the yield of the euro area ten-year government benchmark bond in December of the year preceding the relevant tax year, as published by the European Central Bank, increased by a risk premium of two percentage points. For the tax year 2017, which is the year underlying the quantitative analysis, this would result in a yield of 3.2882%.[73] If there is an equity base decrease, an amount equal to the defined yield on the equity base decrease shall become taxable.

As displayed in Figure 13, of the EU-28 Member States, only Belgium, Cyprus, Italy, Portugal and Malta provide for notional interest deduction schemes. Still, the definition of the equity base and of the notional interest rate for calculating the allowance differs from the CCTB proposal. The notional interest deduction schemes in the five Member States that provide such schemes currently are shortly depicted in the following section.

[72] Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC (OJ L 182, 29.6.2013, pp. 19-76).

[73] As we assume an introduction of the CCTB for the tax year 2017, the relevant yield is from December 2016, namely 1.2882%. The other economic data (interest rates) for the simulation is derived from 2012. The yield for 2012 does not show a major deviation compared to 2016 (only 0.8107 percentage points). See ECB (2018) for euro-area ten-year government benchmark bond yield.

Figure 13: Existence of notional interest deduction schemes



Belgian companies and Belgian branches of non-resident companies are entitled to deduct a deemed interest expense on the net accounting equity as of the end of the preceding accounting year, after correcting for a number of elements. The net accounting equity, as recorded in the company's annual accounts according to Belgian generally accepted accounting principles, includes the company's capital, share premiums, revaluation capital gains, reserves, retained earnings, and capital investment subsidies. The most relevant adjustments relate to assets which do not generate income on a structural basis, shares held in the company itself, shares held as financial fixed assets, and shares issued by investment companies of which the income qualifies for the participation exemption.[74] The deduction is calculated by multiplying the adjusted net accounting equity by the notional interest rate which is based on the ten-year Belgian government bond rate of the third quarter (July, August and September) of the second year prior to the tax year. For the tax year 2017, the rate is equal to 0.237%.

The operating principle of the Belgian notional interest deduction is illustrated by the following example (Table 4). The equity of a Belgian corporation amounts to 1,000 monetary units, the return on investment is at 0.237%, 10% or 20%. For fiscal year 2017, the Belgian corporate income tax rate is 33.99%. For the following simplified example, we assume that the NID does not depend on current profits and profit reserves. Hence, high equity capital leads to a high notional interest deduction irrespective of the actually yielded return. With increasing profitability, the impact of the notional interest deduction decreases and the effective tax rate converges to the statutory corporate income tax rate.

[74] As of 2018, the notional interest deduction is only granted on incremental equity over a period of five years.

Table 4: Example for the Belgian notional interest deduction

	0.237%	10%	20%
1. Profit before notional interest deduction	2.37	100.00	200.00
2. Notional interest (0.237% of equity)	-2.37	-2.37	-2.37
3. Taxable income (1.-2.)	0.00	97.63	197.63
4. Corporate income tax (33.99%)	0	33.18	67.17
5. Profit after tax (1.-4.)	2.37	66.82	133.83
6. Tax burden	0.00	33.18	67.17
7. Ordinary tax burden (33.99%)	33.99	33.99	33.99
8. Average tax burden in % (6./1.)	0.00	33.18	33.59

The notional interest deduction applicable to Italian resident companies and permanent establishments of non-resident entities is calculated by multiplying the increase of a company's net equity as compared to its accounting net equity on 31 December 2010 by a defined rate which is 1.6% for the tax year 2017. For determining the relevant equity increases, cash equity contributions, waivers of financial receivables that the shareholders had towards the company or undistributed profits set aside to reserves other than non-disposable reserves are taken into account. The base of the allowance needs to be corrected by certain downward adjustments. The deduction of the notional yield may not result in a tax loss for the company. Any excess notional yield that cannot be deducted immediately may be carried forward indefinitely, or, alternatively, converted into a tax credit and used to offset local income tax (IRAP) liabilities.

With effect from 1 January 2015, Cyprus tax resident companies and Cyprus permanent establishments of non-tax resident companies are entitled to a notional interest deduction on new equity defined as equity introduced in a company as from 1 January 2015 in the form of paid-up share capital and share premium. The deduction is calculated by multiplying the new equity by the reference interest rate which is the highest of either the yield of the ten-year government bond of the state in which the new equity is invested plus 3%, or the yield of the ten-year Cyprus government bond plus 3%, on 31 December of the preceding tax year. In the subsequent quantitative analysis, it is assumed that the yield of the ten-year Cyprus government bond exceeds the one of other states in which Cyprian subsidiaries are invested. Hence, the notional interest rate for 2017 amounts to 6.489%. The notional interest deduction is limited to 80% of the taxable income arising from the new equity under consideration.

The notional interest deduction scheme in Portugal was introduced with effect from 1 January 2017. The amount deductible is at 7% of the share capital contributions subscribed in cash or through the conversion of shareholder loans made on or after 1 January 2017. Contributions in kind do not qualify for the deduction. The deduction is limited to a maximum amount of EUR 2 million and is only available in the year in which the capital contribution takes place and in the following five fiscal years.[75]

[75] For taxpayers applying the notional interest deduction, the net financing expenses are limited to the higher value of EUR 1 million and 25% of the income before depreciations, amortisations, net financing expenses, and taxes (instead of the standard 30%).

Malta recently introduced a notional interest deduction scheme for assessment years 2018 onwards. Companies resident in Malta and permanent establishments of non-resident companies situated in Malta can deduct notional interest on their risk capital, including the share capital, share premiums, positive retained earnings, non-interest bearing loans, and any other item reported as equity in the financial statements. The notional interest rate is defined as the risk-free rate set by reference to the current yield to maturity on Malta Government Stocks with a remaining term of approximately 20 years, plus a 5% premium. In the last quarter of 2017, this results in a notional yield of 7.03%.[76] The NID is capped at 90% of the chargeable income whereby the unused NID can be carried forward indefinitely. Shareholders receiving dividends are deemed for tax purposes to receive interest income in the amount of the NID.

2.10 Interim conclusion

The qualitative analysis demonstrates that if the CCTB draft Council Directive shall be implemented as it stands, most Member States will need to adjust at least some elements of the tax base computation. Still, the proposal by the European Commission does not completely deviate from current country practice. Depending on the element and on the Member State, more or less need for adjustment arises.

Figure 14: Selected issues of the CCTB draft Council Directive and need for adjustment in EU Member States

Selected issues of the CCTB draft Council Directive	Article	Need for adjustment in EU Member States
		Major Minor
Depreciation		
Commercial and office buildings	Article 33 (1) a)	
Industrial buildings	Article 33 (1) b)	
Long-life fixed tangible assets (useful life ≥ 15 years)	Article 33 (1) c)	
Medium-life fixed tangible assets (useful life ≥ 8 years and < 15 years)	Article 33 (1) d)	
Asset pool (useful life < 8 years)	Article 37	
Fixed intangible assets	Article 33 (1) e)	
Valuation of inventory	Article 19	
Tax incentives for R&D	Article 9 (3)	
Provisions for legal obligations	Article 23	
Provisions for pensions	Article 24	
Avoidance of double taxation of dividends	Article 8 d)	
Domestic dividends		
Foreign (non-EU) dividends		
Interest deduction limitation rules	Article 13	
Loss relief		
Inter-temporal	Article 41	
Cross-border	Article 42	
Notional interest deduction schemes	Article 11	

[76] https://www.centralbankmalta.org/malta-government-stocks.

Figure 14 illustrates in how far the elements of tax base computation as proposed by the CCTB draft Council Directive and considered in this study imply a need for adjustment in the EU Member States. The overall classification into "Major need for adjustment" (marked in red) and "Minor need for adjustment" (marked in green) is based on determining for each Member State and element separately whether a major or minor need for adjustment arises in the course of adopting the CCTB draft Council Directive and then summing up the respective countries that fall in each category.

With regard to the depreciation method, it turns out that currently the most common method is the straight-line method. Therefore, most of the EU-28 Member States are in line with the CCTB draft Council Directive. For the overall classification, we categorise those countries as "Minor" that provide for the straight-line method under national law, regardless of whether other methods are applicable in addition or not. Countries that currently do not provide for the straight-line method are classified as "Major".[77] Still, important differences between the CCTB draft Council Directive and current tax accounting practice in the EU Member States arise from different depreciation rates. This is mainly due to the different classifications of tangible fixed assets (useful life vs. asset-specific categories). Besides, only few countries allow for the depreciation of machinery and equipment as an asset pool.

Under the CCTB draft Council Directive, inventory can be valued by the FiFo, the LiFo as well as the weighted-average cost method. Since Member States should allow all three methods and leave the decision of which one to use to the taxpayers' discretion, a need for adjustment arises in those Member States that currently do not provide for all three methods. Still, no strict harmonisation of tax bases will be achieved due to the availability of several valuation methods. In practice, though, the LiFo method constitutes the most favourable method from the perspective of taxpayers.[78] Hence, taxpayers in 19 of the EU-28 Member States – those that currently do not provide for the LiFO method – will presumably switch to the LiFo method upon the introduction of the CCTB. These countries are classified as "Major" in the overview above.

While most Member States provide R&D tax incentives, only twelve countries are in line with the CCTB proposal and offer an enhanced deduction for costs related to R&D. Still, the exact design of the incentive varies widely, in particular with respect to the amount of the enhanced deduction. In case Member States provide for some form of an enhanced deduction, they are classified as requiring little need for adjustment in the above figure. All Member States that offer any other R&D tax incentive apart from an enhanced deduction or even no R&D tax incentive at all have a high need for adjustment.

With respect to the tax-effective recognition of provisions for legal obligations, in particular warranties, the practice in the Member States follows no clear direction. Slightly more than half of the countries need to adapt their current system and allow for the deduction of warranty provisions in order to comply with the proposal.

Contributions to indirect pension plans are currently common in all Member States. Some countries also permit the recognition of a tax-deductible pension provision. The CCTB proposal leaves the deduction of pension provisions to the Member States' discretion. Hence, no need for further adjustment arises in the course of implementing the CCTB proposal. Still, no strict harmonisation will be achieved in that regard.

[77] Deviations with respect to the depreciation of long- and medium-life fixed tangible assets are determined based on the asset category of machinery and equipment (see Section 2.1.2).

[78] This expectation is based on the underlying assumption of a consistent increase of asset prices in the future.

As regards the elimination of double taxation on intercompany dividends, all Member States, except for Malta, exempt dividends received from another resident company. Apart from the elimination of the add-back of a lump-sum amount of 5% (1%) of the distributed dividends in five Member States which is still classified as little need for adjustment, only Malta would need to abandon its full imputation system and there is very little overall need for adjustment. With regard to foreign dividends, however, the impact of the CCTB draft Council Directive is stronger since foreign dividends are currently fully subject to tax in several Member States. In the above figure, all Member States that exempt a certain percentage of domestic or foreign dividends are classified as requiring only little adjustments to comply with the CCTB draft Council Directive. Thus, in case of domestic dividends, only Malta is assigned to the "high need for adjustment" category due to the application of the imputation system. Similarly, the treatment as ordinary income in case of foreign dividends results in a high need for adjustment.

Although most Member States dispose of a rule to limit the deductibility of excessive interest, the underlying approaches are quite heterogeneous which results in a relatively high need for adjustment: Only ten Member States apply an earnings stripping rule that is similar to the one proposed by the CCTB draft Council Directive. Still, the earnings stripping rule proposed by the CCTB draft Council Directive is included in the ATAD which shall be implemented by Member States with effect from January 2019. Hence, interest deduction limitation rules will be harmonised across Member States in the near future, regardless of the application of the CCTB and there is little need for further adjustments to comply with the CCTB draft Council Directive.

With regard to the relief of losses, the CCTB draft Council Directive neither imposes restrictions on the amount nor on the timing of the loss compensation. Hence, it considerably deviates from the current country practice in the majority of Member States and results in a high need for adjustment as illustrated in the above figure. The refusal of a loss carry-back, however, is predominantly in line with country practice. The need for adaptation is even higher with regard to cross-border loss compensation which is only available in few Member States. In that regard, all Member States that grant cross-border loss compensation only face little need for adjustment; the tax systems of all other Member States require more adjustments to comply with the CCTB draft Council Directive.

Only five Member States provide for a notional interest deduction scheme. Still, in none of them, the design of the allowance is exactly in line with the CCTB draft Council Directive. Thus, the CCTB proposal raises the need for all Member States to introduce, or at least adjust, the allowance for equity. Still, Member States that currently already provide for a notional interest deduction scheme are classified as requiring little need for adjustment since a comparable system has already been employed.

In how far the implementation of the CCTB proposal indeed deviates from current country practice will be investigated in the remainder of this study which analyses the change in effective corporate tax burdens in the EU Member States when moving from the current systems to a common tax base.

3 Methodology for the Computation of Effective Tax Burdens

3.1 The European Tax Analyzer model

The quantitative analysis of the consequences on effective company tax burdens stemming from the introduction of a CCTB is based on the European Tax Analyzer model. The European Tax Analyzer is a computer programme for a model firm that calculates and compares effective average tax burdens for companies located in different jurisdictions.[79] The current version covers the tax systems of the 28 EU Member States, Canada, China, Japan, Switzerland, and the US. Since the standard model firm is designed as a corporation, the effective average tax burden can be calculated at the level of the corporation as well as at the level of the shareholders. This study will exclusively consider the effective average tax burden at the corporate level. The effective average tax burden is derived by simulating the development of a corporation over a ten-year period. For the computation of the effective average tax burden, the model uses the economic data of the corporation and national tax regulations as inputs.

The European Tax Analyzer model was used in earlier studies on behalf of the European Commission.[80] The European Tax Analyzer calculates and compares effective average tax burdens for companies accumulated over a period of ten years. The development of the corporation is based on the initial capital stock and the estimates for its future development (corporate planning).

A. **Initial capital stock**: The capital stock includes the firm's total assets and liabilities which are either new or have already existed before. The assets consist of real estate, office and factory buildings, plant and machinery, office equipment, intangibles (patents), financial assets, shares in other corporations (both domestic and foreign), inventories, trade debtors, cash funds, and deposits. The liabilities include new equity capital, long-term and short-term debt, and trade creditors.

B. **Development of capital stock**: The corporate planning estimators are important for the development of the corporation over the ten-year simulation period. Besides macroeconomic data such as interest rates (short- and long-term rates for debtor and creditor) and price increases (primary products, general inflation, wages, real estate, and investment goods), several data concerning the structure and costs for employees as well as R&D costs have to be defined. For depreciable assets, it is generally assumed that they are disposed at the end of their useful life and replaced by an identical asset. The replacement costs are thereby adjusted for inflation.

C. **Corporate finance**: The initial capital stock contains new equity as well as both long- and short-term debt capital. Since the corporate plans, inter alia, make assumptions about the distribution policy, the company can be financed by retained earnings (e.g. the distribution rate is below 100%) in addition to new equity and debt financing. If the national tax codes allow for internal book reserves (e.g. book reserves for bad debts), the money put into these reserves can also serve as a source of internal financing.

[79] For detailed descriptions of the model, see Spengel (1995); Jacobs/Spengel (1996); Meyer (1996); Stetter (2005); Gutekunst (2005); Hermann (2006); VVA Consulting/ZEW (2015); Bräutigam/Spengel/Stutzenberger (2018).
[80] See Jacobs/Spengel (2002); Spengel et al. (2008); VVA Consulting/ZEW (2015).

For the sake of comparability, it is assumed that the model firm always shows identical data before taxation. Due to this necessary assumption any differences between pre- and post-tax data in the model can be solely attributed to the applied national taxation rules.

3.2 Computation of the effective average tax burden

The European Tax Analyzer can be used to calculate the pre-tax and post-tax value of the corporation at the end of each period. The value of the corporation is represented by the estimated cash flows and the value of the net assets at the end of the simulation period. Cash flow (liquidity) is defined as the net total of cash receipts (sales, interest, dividends and other) and cash expenses (material costs, salaries) in each period. The value of the assets has to be adjusted at the end of the simulation as during the ten periods, hidden reserves are accrued. The historical acquisition costs do not reflect the fair value of the assets and hidden reserves are added to the taxable income in period ten and taxed accordingly. Remaining loss carry-forwards at the end of period ten also have a certain value for the corporation as they would lower the taxable income of future periods. As our simulation stops in period ten, we add 50% of the unused loss carry-forwards to the equity value in countries without constraints to the utilisation of losses. If there is, however, a constraint for loss carry-forwards (e.g. if the loss carry-forward is limited in time), we use a rate of 25%.

	Pre-tax cash flow at the end of the simulation period
+	Value of the net assets at the end of the simulation period (= assets in the capital stock at replacement prices – liabilities in the capital stock at nominal values)
=	Pre-tax value of the firm at the end of the simulation period

The post-tax value is calculated in a similar way, but taking into account the different tax rules in each country. Tax liabilities are paid in the same period as they accrue and result in an immediate cash expense. The adjustment of the assets to their fair market value at the end of the simulation period can result in additional tax liabilities. The procedure can be summarised as follows:

	Pre-tax cash flow at the end of the simulation period
–	Tax liabilities in each period
=	Post-tax cash flow at the end of the simulation period
+	Value of the net assets at the end of the simulation period (= assets in the capital stock at replacement prices – liabilities in the capital stock at nominal values)
– /+	Tax liabilities on hidden reserves / tax refunds on hidden liabilities
=	Post-tax value of the firm at the end of the simulation period

The effective tax burden is determined by the difference of pre-tax and post-tax value of the corporation at the end of the ten-year simulation period. This multi-period approach assures that the tax liability also includes effects which only arise in the long term (e.g. the consequences of different depreciation rules as well as liquidity and interest effects).

	Pre-tax value of the firm at the end of the simulation period
–	Post-tax value of the firm at the end of the simulation period
=	Effective average tax burden on corporate level

In contrast to models which compute tax burdens solely based on pre-tax returns (yields),[81] calculations based on cash receipts and cash expenses regarding balancing investments allow for the entire computation of all tax bases at any time during the period of simulation (because all relevant income and assets have been entered into the tax base). As a consequence, the model can include complicated tax provisions such as progressive tax rates, interest deduction limitation rules and loss carry-overs without any difficulty.

3.3 Model firm and economic assumptions

The model uses empirical data mainly taken from the AMADEUS database to determine an EU-28 average company.[82] The data used for the generation of the model firm consists of financial data for the year 2011 of 2,424,612 EU-28 corporations.[83] The implemented EU-28 average company thus represents a model of a firm ignoring country- and industry-specific effects on pre-tax data. In other words, the balance sheet, the profit and loss account and the corporate planning of this model company are given and independent from country-specific taxation rules. For the sake of comparability, it is assumed that this model firm shows identical financial ratios before any tax effects in each considered country. As a consequence, differences between the pre-tax and post-tax data can be solely attributed to differing tax rules in the considered countries.

Table 5 sets out the balance sheet of the generated EU-28 average company.[84] It depicts the different types of investments and their sources of finance and highlights their relative weight. Moreover, the structure of the model firm and its characteristics, expressed in common financial ratios, are presented in Table 6 (base case). The base case company is a profitable and growing company over the whole simulation period.

[81] See Schreiber/Spengel/Lammersen (2002).

[82] The AMADEUS database (Bureau van Dijk Electronic Publishing (https://amadeus.bvdinfo.com)) provides financial and supplementary information for more than 17 million companies in the European Union (Update September 2013).

[83] For a description of the selection steps to generate the final sample of firms, see VVA Consulting/ZEW (2015), Annex 1, pp. 58-68. The 2011 base year was chosen as a compromise of timeliness and large sampling. For the current study, we abstain from an update of the model corporation for the European Tax Analyzer due to the elaborate process set out in the SME study conducted on behalf of the European Commission (see VVA Consulting/ZEW (2015), Annex 1, pp. 58-68).

[84] In period six of the ten periods of the simulation.

Table 5: Tax balance sheet of the implemented EU-28 model firm (period 6 of 10)

ASSETS	EUR	EQUITY AND LIABILITIES	EUR
A. Fixed assets		A. Equity	
I. Intangible assets	5,199,376	I. Subscribed capital	21,305,895
II. Tangible assets		II. Revenue reserves	41,504,474
1. Land, similar rights and buildings	17,604,472	III. Net profit/Net loss	10,383,662
2. Technical equipment and machinery	13,320,641	B. Provisions	
3. Factory and office equipment	10,226,065	I. Provisions for pensions and similar obligations	0
III. Financial Assets		II. Other provisions	8,062,568
1. Participating interests	11,167,634	C. Creditors	
2. Long-term receivables	1,240,848	I. Long-term bank loans	19,937,409
		II. Amounts owed to shareholders	22,660,522
B. Current assets			
I. Stocks	27,361,625	III. Trade creditors	15,709,464
II. Trade debtors	41,937,873	IV. Short-term bank loans and overdrafts	32,385,194
III. Securities, cash, deposits	43,890,654		
TOTAL	**171,949,188**	**TOTAL**	**171,949,188**

Table 6: Financial ratios of the implemented EU-28 model firm (period 6 of 10)

Net profit/Net loss for period (EUR)	10,383,662
Total assets (EUR)	171,949,188
Sales (EUR)	209,689,369
Share of tangible fixed assets (*capital intensity*)	23.93%
Return on sales (*profitability*)	4.95%
Return on equity	16.53%
Equity ratio	42.57%
Inventories to capital	15.91%
Costs for personnel to turnover *(labour intensity)*	10.46%

The procedure of the European Tax Analyzer computation requires various estimates and assumptions in order to define and describe the model firm and the economic conditions that are assumed to prevail.[85] The underlying economic assumptions are defined as follows:

- expected economic lifetime for assets: 50 years for both production buildings and office buildings; five years for patents and concessions; four years for plant and five to ten years for machinery; nine years for office furniture and fixtures; zero for both financial assets and stocks;
- depreciable assets are assumed to be run down at the end of their expected economic life and replaced by new assets, based on the historical cost of the deposited assets adjusted for inflation. Thus, the initial capital stock remains at least constant;

[85] For a detailed description of the estimates and assumptions, see Spengel/Oestreicher (2012); VVA Consulting/ZEW (2015), Annex 1, p. 65.

- the company is a growing and profitable company over the whole simulation period. Depending on the annual profits of the company and the required investment amounts for the replacement of assets, a certain amount of the annual profits is distributed to the shareholders. The remaining profits are retained and serve as internal funds;
- the goods produced are assumed to be either stocked or sold on the market in the period of production, so multi-period production is possible;
- inflation rates:[86] 2.7% of consumer price index, 2.5% of price index for basic material, 2.2% of price index for wages, and 2.7% of price index for investment goods;
- interest rates for creditors and debtors:[87] 1.1% for short-term credit, 2.5% for long-term credit, 3.9% for short-term debt, and 3.5% for long-term debt.

3.4 Tax parameters incorporated into the model

In order to calculate the tax liability in each of the 28 EU Member States, the European Tax Analyzer accounts for all taxes that may be influenced by the investments and financing at the corporate level. Besides the corporate income tax and country-specific surcharges, consideration is also given to real estate taxes, payroll taxes, various types of trade taxes (e.g. on income, capital or other special tax bases), and net wealth taxes. Since only the corporate income tax is subject to tax harmonisation under the proposed CCTB, all other country-specific taxes remain unchanged when computing the reform-induced changes in effective tax burdens.

The computation of the tax bases considers the most relevant assets and liabilities as well as the effects of the corporate planning. The following elements are considered for profit computation:

(1) Depreciation (depreciation methods and periods for all considered assets),

(2) Inventory (stock) valuation (valuation method, i.e. FiFo, LiFo and weighted average cost method;),

(3) Research and Development costs (immediate expensing or capitalisation),

(4) Employee pension schemes (deductibility of pension costs, contributions to pension funds, book reserves),

(5) Provisions for bad debt and guarantee accruals,

(6) Elimination and mitigation of double taxation on foreign source income (exemption, foreign tax credit, deduction of foreign taxes),

(7) Thin-capitalisation rules, earning stripping rules,

(8) Non-deductible items (e.g. non-deductible taxes),

(9) Notional interest deductions, and

(10) Loss relief (carry-back and carry-forward).

[86] See Eurostat and Statistical Office of Germany. All data taken from 2012. The numbers displayed are the averages of the monthly or quarterly values in 2012.
[87] See ECB, MFI interest rate statistics. All data taken from 2012. The numbers displayed are the averages of the monthly values in 2012. Short-term refers to a time period of up to one year. Long-term refers to a time period of more than one year.

3.5 Example: Impact of different depreciation schemes on the size of the tax base

To illustrate the functioning of the European Tax Analyzer, the following example shall visualise the impact of depreciation rules for the determination of the corporate income tax base. In line with the European Tax Analyzer where the effective tax burden is specified at the end of the simulation period, the concept of the future value is used in the calculation of the effective tax burden. Expressed as a formula, the future value (*FV*) before taxes can be simplified as:

$$FV = \sum_{t=1}^{T} CF_t * (1+i)^{T-t}$$

After taxes, *FV* is rewritten as:

$$FV = \sum_{t=1}^{T} CF_t * q^{T-t} - \tau * \sum_{t=1}^{T} (CF_t - Dep_t) * q^{T-t}$$

$$\text{with } q = 1 + i * (1-\tau)$$

where the statutory tax rate is represented by τ, annual payments are represented by CF_t, the interest rate is illustrated by *i*, *q* represents the compounding factor and annual tax depreciation charges are depicted by Dep_t.[88]

For the sake of readability, the following simplified example on the calculation of the effective tax burden only covers a time horizon of four periods instead of the ten-year period covered by the European Tax Analyzer.[89] We consider an investment for the acquisition of machinery with a useful life of four periods. The acquisition costs of EUR 1,000 are depreciated in equal annual instalments over the useful life (straight-line depreciation). The investment generates income receipts of EUR 1,100, EUR 800, EUR 600 and EUR 400 throughout the economic life. By assumption, the interest rate is 10%, the corporate income tax rate amounts to 25%. Table 7 and Table 8 illustrate the determination of the future value of the investment before and after taxes.

Table 7: Future value of the investment (before taxes, in EUR)

Period	0	1	2	3	4
Capital expenditure of depreciable asset	-1,000				
Receipts		1,100	800	600	400
Interest receipts		-	110	201	281
Cash flow available for investment		1,100	910	801	681
Future value of the investment		1,100	2,010	2,811	3,492

[88] The interplay between the statutory tax rate and the interest rate ensures that any interest income or interest payments that occur during the investment period become tax relevant as well. See Bräutigam/Nicolay/Spengel (2017), p. 13.

[89] See Spengel et al. (2008), pp. 17-19 for a similar example in the context of the influence of the temporal distribution of the tax base.

Table 8: Future value of the investment (after taxes, straight-line depreciation, in EUR)

Period	0	1	2	3	4
Capital expenditure of depreciable asset	-1,000				
Receipts		1,100	800	600	400
Interest receipts		-	89	162	225
Depreciation		250	250	250	250
Tax base		850	639	512	375
Tax payment (25%)		213	160	128	94
Cash flow available for investment		888	729	634	531
Future value of the investment		888	1,617	2,250	2,782

As set out in Section 3.2, the effective tax burden is determined as the difference between the pre-tax value of the investment and the post-tax value of the investment at the end of the simulation period within the model framework of the European Tax Analyzer. Hence, in the above simplified example, the tax burden would amount to EUR 710 (= EUR 3,492 – EUR 2,782).

If, in contrast, the tax rules of a country allowed an immediate depreciation (i.e. full depreciation at the end of the first period), the future value of the investment would be calculated as follows (Table 9):

Table 9: Future value of the investment (after taxes, accelerated depreciation, in EUR)

Period	0	1	2	3	4
Capital expenditure of depreciable asset	-1,000				
Receipts		1,100	800	600	400
Interest receipts		-	108	176	234
Depreciation		1,000	0	0	0
Tax base		100	908	776	634
Tax payment		25	227	194	158
Cash flow available for investment		1075	681	582	475
Future value of the investment		1,075	1,756	2,337	2,813

The resulting effective tax burden under this depreciation schedule would hence amount to EUR 679 (= EUR 3,492 – EUR 2,813). This variation in depreciation rules illustrates the influence of temporal effects on the effective tax burden and hence also on liquidity. In general, lower cash outflows of tax payments are associated with higher liquidity that is available for investments. In consequence, the associated tax deferral results in higher interest receipts in consecutive periods.[90]

[90] See Spengel et al. (2008), pp. 19 f.

4 Impact of the CCTB Provisions on the Effective Tax Burdens in the EU Member States

4.1 Assumptions underlying the model calculations

For the following model calculations, certain assumptions have to be made with respect to the underlying model as well as the implementation of the CCTB provisions in Member States' national tax law as described below.

First, with regard to national tax law, the legal status as of 2017 is considered as a baseline scenario. That is, we consider the effect the CCTB introduction would have if it was implemented at the end of the fiscal year 2017. Any envisaged future reforms that have not yet become effective in 2017 will not be taken into account. Hence, for instance, we disregard future adaptations to Member States' tax accounting rules that would be necessary to comply with the provisions of the ATAD until the end of 2018 or announced tax rate reductions.

Second, since 1 January 2000, Estonia applies a special corporate tax system and taxes only profit distributions. Hence, the valuation of assets and other tax base determination rules are currently not relevant for the taxation of corporations. For a comprehensive analysis of the consequences of the CCTB introduction across all Member States, we include Estonia into the model calculations. However, corporate tax rates are not affected by an adoption of the CCTB. This implies that the change in effective tax burdens for Estonia is always zero as the system (levy of taxes only on distributed profits) may still be applied after the CCTB implementation.

Third, we assume that the large average model corporation used in the subsequent calculations belongs to a corporate group with consolidated revenues of more than EUR 750 million and that all other conditions specified in Article 2 (1) CCTB draft Council Directive are fulfilled. Hence, the application of the CCTB provisions would be mandatory for the underlying model corporation. Furthermore, we assume that the earnings of the large average model corporation are fully subject to the regular corporate income tax rate. We thus abstain from considering potential IP box regimes. The impact of other R&D tax incentives and potential implications for the introduction of the CCTB will be considered in a distinct R&D scenario in Section 6.

Fourth, all values are expressed in EUR. In case of foreign currencies, the exchange rates are based on the ECB exchange reference rates as of 2017.

Fifth, to ensure the future validity of our results and to avoid confounding effects, we abstain from including temporary changes to Member States' national tax codes into our calculations if these changes are only valid for 2017. From 2017, for instance, the French distribution tax has been repealed with retroactive effect after a ruling of the Constitutional Court. To compensate for the revenue losses associated with the abolition, two exceptional surtaxes on corporate income tax have been introduced for 2017. Since the surtaxes will presumably not be imposed in subsequent years, their inclusion into our model calculations would bias the results and conclusions on the general effects of the CCTB adoption.

Sixth, the deductibility of other taxes for corporate income tax purposes is generally maintained as stipulated under current national tax law. In case additional local profit taxes are derived from the corporate income tax base under current corporate income tax law, it is assumed that they will subsequently rely on the corporate income tax base determined according to the provisions of the CCTB (e.g. including interest deduction limitation rules or AGI deduction).

Seventh, tax accounting rules regarding the valuation of inventories and pension provisions are not harmonised by the CCTB draft Council Directive. For the valuation of inventories, Article 19 (2) prescribes that inventories shall be measured by using the FiFo, the LiFo or the weighted-average cost method. As all three methods shall be available, it would hence be up to the companies to decide which method to use. We propose that the LiFo method as the most tax-favourable approach is consistently adopted by companies across all Member States. The CCTB proposal leaves the deductibility of pension provisions to the discretion of Member States (Art. 24). Since the treatment of pension obligations is an integral part of national social systems, we assume that Member States continue to apply their current practice of direct and indirect pension obligations. We further assume that the general criteria for the recognition of provisions laid down in Article 23 (1), in particular as regards the discount rate, do not apply to pension provisions, such that national discount rates remain applicable.

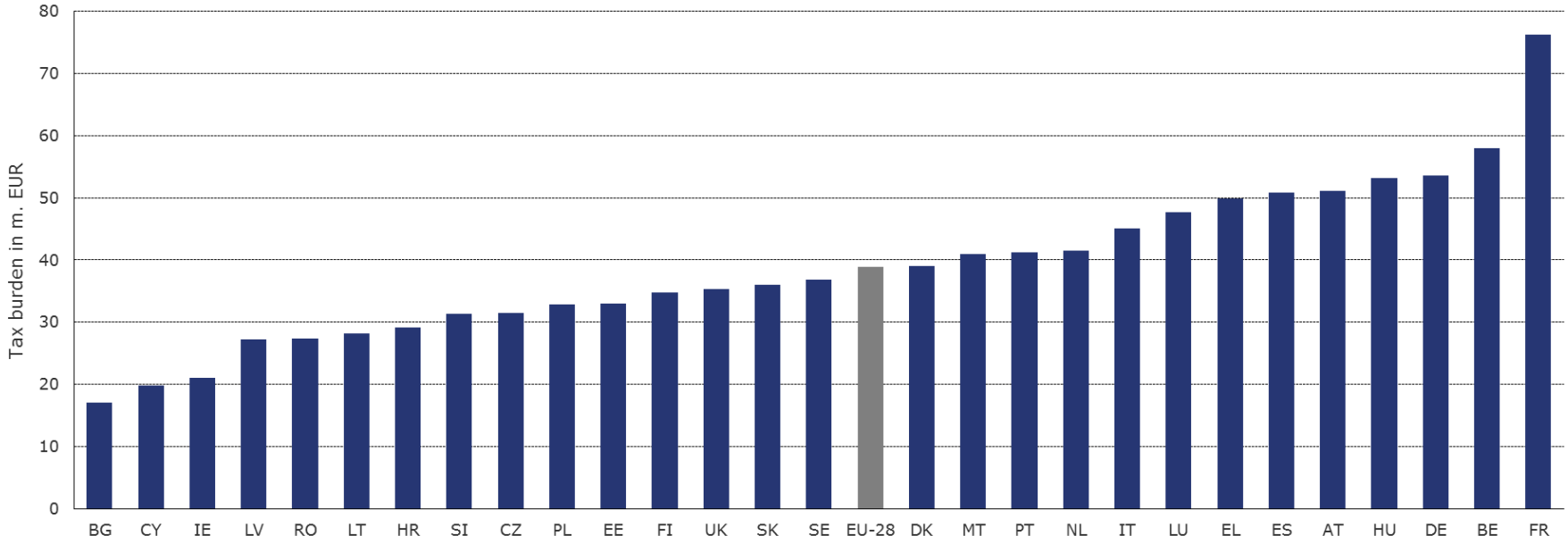
Eighth, Article 4 (12) of the CCTB draft Council Directive classifies the defined yield on net equity increases in terms of the AGI (Art. 11) as borrowing costs. Hence, we assume that the AGI must also be included in the EBITDA calculations. This assumption should also hold in the reverse case when the equity base decreases and a defined yield is taxed. In this particular case, EBITDA would decrease. Furthermore, if national regulations for any other tax besides corporate income tax refer to an interest figure, this should always refer to interest as defined by Article 4 (12) of the CCTB draft Council Directive. Regarding the trade tax add-backs in Germany, for instance, any positive or negative AGI has to be added at 25% and thus in a similar way as regular interest payments or receipts (Sec. 8 (1) a) of the German Trade Tax Code).

4.2 Overall effect of the introduction of a CCTB

In a first step, the effective tax burdens in the EU Member States are computed according to national tax law (baseline scenario). In a second step, the national tax rules are replaced by the CCTB regulations on depreciation, inventory valuation, provisions for legal obligations, interest deduction limitation, inter-temporal loss relief and notional interest deduction. The change in effective tax burdens between the baseline scenario and the CCTB framework constitutes the reference scenario for the subsequent analysis.

Figure 15 graphically illustrates the remarkable dispersion of effective tax burdens across the Member States under national tax law (baseline scenario as of 2017).

Figure 15: Effective tax burdens in the EU Member States under national provisions (ten-year period)



Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, calculated according to current national tax accounting provisions as of 2017.

Over the simulation period of ten years, the tax burdens range from EUR 17.02 million in Bulgaria to EUR 76.27 million in France, whereby the unweighted average effective tax burden of all EU-28 Member States amounts to EUR 38.92 million. Comparably low effective tax burdens can be observed in Bulgaria, Cyprus, Latvia, Romania, Lithuania and Croatia. These countries joined the EU in 2004 or later years and hence belong to the group of "new" Member States. Among the "old" Member States, Ireland is the only country where the effective tax burden is comparatively low.[91] By contrast, tax burdens in large Member States such as France, Germany and Spain are significantly higher than the EU average. An effective tax burden which is relatively close to the EU average can be observed e.g. in the Netherlands, Portugal, Malta,[92] Denmark and Sweden.

The effective tax burdens are determined by the different kinds of taxes imposed in the Member States[93] as well as the applicable tax rates and the size of the underlying tax bases. In general, the overall tax burden is mostly influenced by the corporate income tax[94] which illustrates the high impact a CCTB might have on the effective tax burdens. Besides, e.g. real estate taxes, trade taxes on income and/or capital as well as net wealth taxes can play an important role in assessing the level of the effective tax burden. For example, in Germany, the tax burden is influenced almost equally by the corporate income tax as well as the local trade tax; in Hungary, the impact of the local trade taxes even exceeds the impact of the corporate income tax.[95]

Figure 16 contrasts the effective tax burdens across the EU Member States that would result from the introduction of the CCTB with the effective tax burdens at status quo.

[91] See also Spengel et al. (2008), pp. 38 f.; Spengel/Oestreicher (2012), p. 31; Spengel et al (2012), p. 206 for a similar reasoning.

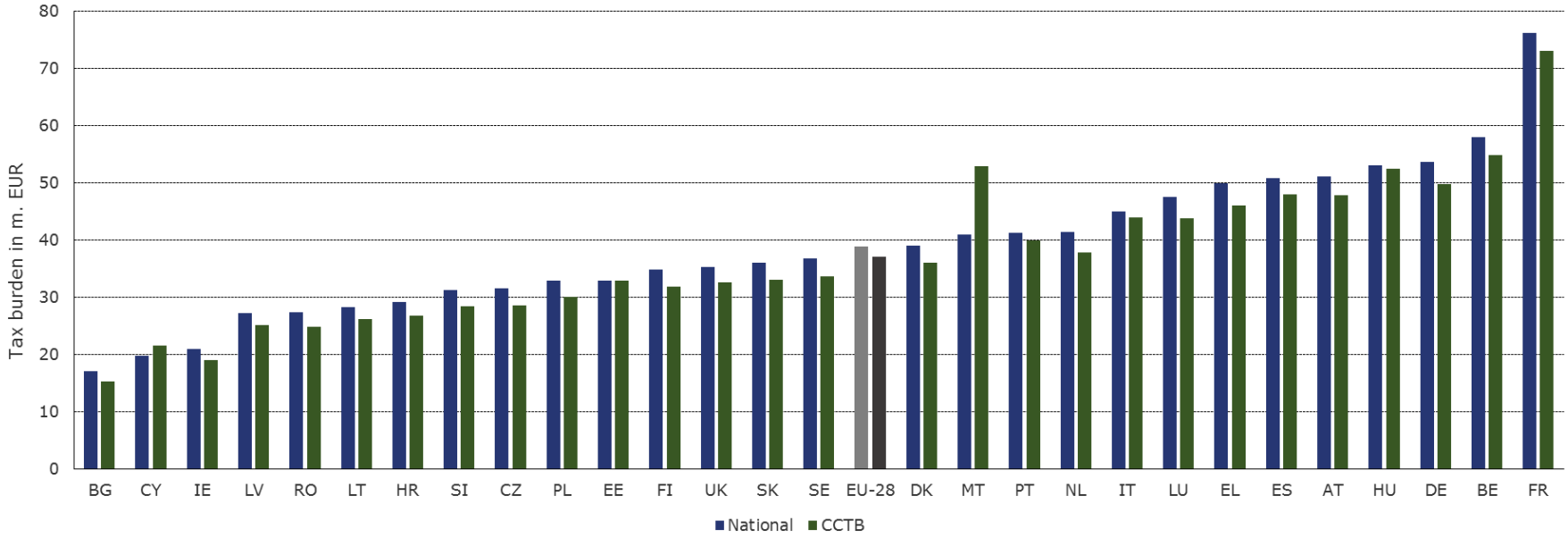
[92] As regards Malta, the high tax burden is striking. Still, only the tax burden at corporate level is considered which is mainly determined by the rather high Maltese corporate income tax rate of 35%. The overall tax burden in Malta across both the corporate and the shareholder level, though, is comparatively low. This is because of the full imputation system in terms of which shareholders are entitled to credit the tax paid at corporate level on the profits out of which dividends are distributed against their income tax liability.

[93] See Spengel et al. (2008), p. 40; Spengel/Oestreicher (2012), p. 32; Spengel et al. (2012), p. 207.

[94] See Spengel et al. (2008), p. 40; Spengel/Oestreicher (2012), p. 32; Spengel et al. (2012), p. 207.

[95] Although the corporate income tax base heavily influences the overall tax burden, differences in tax bases hardly explain the spread in effective tax burdens. This becomes obvious from the fact that the spread in tax burdens remains remarkably high upon the introduction of a CCTB (see below). This finding can be interpreted as evidence for the tax bases being already harmonised to a large extent under current national tax law. Corporate income tax rates and additional local taxes, though, are harmonised neither under current tax law nor under the CCTB framework and are therefore the key drivers for the observed spread in tax burdens both before and after the implementation of the CCTB.

Figure 16: Impact of the CCTB on the effective tax burdens in the EU Member States (ten-year period)



Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro. Blue bar: status quo (current national tax accounting rules as of 2017). Green bar: full CCTB.

Table 10 displays the effective tax burdens in the EU Member States, the rank under both national tax regulations and CCTB, the percentage deviation between the tax burdens and the change in rank.

Table 10: Changes in the effective tax burdens under a CCTB compared to the application of national tax base provisions

Country	Ten-year tax burden in m. EUR		Deviation	Rank national	Rank CCTB	Rank change
	National	CCTB				
AT	51.10	47.92	-6.2%	24	22	2
BE	57.99	54.82	-5.5%	27	27	0
BG	17.02	15.23	-10.5%	1	1	0
CY	19.81	21.55	8.8%	2	3	-1
CZ	31.53	28.57	-9.4%	9	9	0
DE	53.64	49.83	-7.1%	26	24	2
DK	39.10	36.07	-7.7%	16	16	0
EE	32.96	32.96	0.0%	11	13	-2
EL	49.89	46.01	-7.8%	22	21	1
ES	50.80	48.01	-5.5%	23	23	0
FI	34.79	31.90	-8.3%	12	11	1
FR	76.27	73.09	-4.2%	28	28	0
HR	29.21	26.73	-8.5%	7	7	0
HU	53.15	52.50	-1.2%	25	25	0
IE	21.01	18.97	-9.7%	3	2	1
IT	45.03	43.95	-2.4%	20	20	0
LT	28.23	26.15	-7.4%	6	6	0
LU	47.62	43.80	-8.0%	21	19	2
LV	27.29	25.15	-7.8%	4	5	-1
MT	40.99	52.99	29.3%	17	26	-9
NL	41.46	37.81	-8.8%	19	17	2
PL	32.85	30.04	-8.5%	10	10	0
PT	41.23	39.94	-3.1%	18	18	0
RO	27.31	24.81	-9.2%	5	4	1
SE	36.86	33.64	-8.7%	15	15	0
SI	31.32	28.47	-9.1%	8	8	0
SK	35.97	33.09	-8.0%	14	14	0
UK	35.34	32.63	-7.7%	13	12	1
Average	**38.92**	**37.02**	**-5.1%**			

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. National: status quo (current national tax accounting rules as of 2017). CCTB: full CCTB. Deviation: percentage change based on unrounded tax burdens for individual countries; (CCTB–National)/National. Rank: Member States are ranked based on the level of the effective tax burden with a value of 1 indicating the lowest tax burden and a value of 28 indicating the highest tax burden. Average is the simple arithmetic average.

In all EU Member States except for Cyprus and Malta, the effective tax burden declines upon the introduction of a CCTB. This decline ranges from -10.5% in Bulgaria to -1.2% in Hungary, whereby the average decrease is around -5.1%. However, it should be recognised that this average is strongly affected by the large tax burden increases in Cyprus and Malta (at 8.8% and 29.3%, respectively). The median change of -7.8% is less affected by outliers and therefore constitutes a better benchmark for comparisons. A decrease of effective tax burdens below the median can be traced back to two reasons: First, in most of these Member States, a relatively low corporate income tax rate applies. This results in a higher after-tax profit and a higher amount attributable to the equity reserves. Furthermore, this increases the relevant equity for the calculation of the AGI in subsequent periods. Second, if other taxes are levied at the corporate level, these taxes do not have a strong influence on the tax burden of the model firm.

The relatively slight reduction in the overall tax burden in Hungary, France and Italy can be attributed to the fact that in addition to the corporate income tax, other taxes such as the local business tax and the innovation tax in Hungary influence the overall tax burden. Hence, as these taxes continue to apply unchanged under the CCTB framework, the overall impact of the CCTB is relatively smaller compared to other Member States. By contrast, an increase in the model firms' effective tax burden can only be detected in Cyprus (+8.8%) and Malta (+29.3%). Malta is also the only country for which the ranking position substantially changes after the introduction of the CCTB (from 17 to 26). The positive deviation in Cyprus and Malta is a result of the notional interest deduction which is investigated in more detail below. The stronger effect in Malta compared to Cyprus is presumably due to the different characteristics of the NID. Besides, in Malta, the corporate income tax is the only tax which is applicable at the corporate level. Hence, this tax alone influences the total tax burden. Additionally, Malta has a much higher corporate income tax rate (35%) compared to Cyprus. The total tax burden in Cyprus is determined by both the corporate income tax and an additional payroll tax.

In Estonia, the introduction of the CCTB would have no effect. Currently, there is no annual net taxation of corporate profits. Instead, only the amount of distributed corporate profits is taxable at a rate of 25% of the net distribution. Hence, tax rules for the valuation or depreciation of assets, loss relief or interest deductibility have no further significance under the existing country practice. As the Estonian tax system of levying taxes only on distributed profits may still be applied after the CCTB implementation, the effective tax burden of Estonian corporations remains unaffected.

For 15 of the countries considered, no change in the ranking position can be observed. Apart from Malta with a rank change of nine positions, twelve countries exhibit a change in ranking position from -2 to +2. The CCTB will not induce a harmonisation of national corporate income tax rates. Hence, the remarkable spread in effective tax burdens across Member States will persist.[96]

[96] See Spengel et al. (2012), p. 208.

4.3 Isolated effects of single elements of the CCTB

In Section 4.2, the overall effect of the CCTB introduction on effective corporate tax burdens has been considered. In the following subsection, the effects of selected elements of the CCTB on the effective tax burdens are analysed in isolation. We thereby follow two approaches: First, we simulate a scenario where national tax rules apply for all other elements, while the particular element of interest is harmonised according to the CCTB draft Council Directive. This scenario allows to isolate the single effect of a CCTB provision and its interaction with current national tax provisions. Second, we simulate a scenario where all other CCTB elements described above apply, while the respective element under consideration is implemented according to national tax law. This additional analysis intends to illustrate the effect if a single provision of the current CCTB proposal was not included in the final directive. Overall, this analysis helps to identify the determinants of the overall change in effective tax burdens and to assess the relative importance of certain elements of the CCTB. It is, however, important to note that the sum of all changes caused by the isolated consideration of single CCTB elements is not equal to the overall effect of the CCTB introduction as indicated in Table 10. Due to timing effects and interdependencies, the isolated impact of certain regulations on the tax burden may be either intensified or weakened.[97]

The average effects of the isolated analyses across the 28 EU Member States are depicted in Table 11. As already conjectured in the overall analysis in Section 4.2, the AGI has a considerable impact on effective tax burdens. Across all Member States, the AGI thus seems to be the most important driver of the changes in effective tax burdens that result from the CCTB introduction. In contrast, the harmonisation of other provisions such as depreciation rules, inventory valuation or the treatment of inter-company dividends on average only seem to have a minor impact on effective tax burdens.

For interest deduction limitation rules as well as loss compensation rules, on average, no effect can be observed upon the introduction of the CCTB since the profitable model firm considered in the reference scenario neither incurs regular losses nor non-deductible interest expenses during the ten-year simulation period. To evaluate the isolated effects of both interest deduction limitation and loss compensation rules, we introduce two distinct additional reference scenarios in Sections 4.3.6 and 4.3.7, respectively.

Since the average effects illustrated in Table 11 might hide country-specific deviations and particularities, the following subsections will analyse the impact of single tax base provisions on the changes in effective tax burdens induced by the CCTB introduction in more detail.

[97] See also Spengel et al. (2012), p. 210.

Table 11: Isolated effects of single elements of the CCTB on the effective tax burdens (average across EU Member States)

Element	Ten-year tax burden in m. EUR				Average deviation			
	National [A]	CCTB [B]	National with isolated CCTB element [C]	CCTB with isolated national element [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AGI	38.92	37.02	37.09	39.00	-5.1%	-4.9%	0.2%	-5.3%
Depreciation	38.92	37.02	39.06	37.18	-5.1%	0.4%	-4.6%	-0.5%
Inventory valuation	38.92	37.02	38.90	36.99	-5.1%	-0.1%	-5.2%	0.1%
Warranty provisions	38.92	37.02	38.87	36.94	-5.1%	-0.2%	-5.3%	0.3%
Inter-company dividends	38.92	37.02	38.83	37.11	-5.1%	-0.3%	-4.8%	-0.2%
Interest deduction limitation rules	38.92	37.02	38.92	37.02	-5.1%	0.0%	-5.1%	0.0%
Loss relief	38.92	37.02	38.92	37.02	-5.1%	0.0%	-5.1%	0.0%

Note: Average effective tax burden across the EU Member States under different scenarios and corresponding deviations. Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: element considered according to CCTB, other elements according to current national rules. [D]: element considered according to current national rules, other elements according to CCTB. Average deviation: Simple average of national percentage changes to tax burden under each comparison, as reported in Tables 12 for AGI; 16 for depreciation; 17 for inventory valuation; 18 for warranty provisions; 19 for inter-company dividends; 20 for interest limitation rules; and 21 for inter-temporal loss relief.

4.3.1 Allowance for Growth and Investment

Given the overall impact of the CCTB on the effective tax burden above, and especially in light of the substantial increase in Cyprus and Malta, we take a closer look at the Allowance for Growth and Investment which is likely to play a crucial role in explaining the changes in tax burdens arising under the CCTB. To evaluate the effect of the NID in more detail, we proceed as described above. First, we consider the effective tax burden under current national tax law except for NID schemes and assume that all Member States introduce the AGI as proposed in the CCTB draft Council Directive. Second, we consider the effective tax burden under the CCTB draft Council Directive while excluding the AGI. For those Member States which currently have a NID scheme in place (Belgium, Cyprus, Italy, Malta, and Portugal), the national rules are implemented instead.[98] The respective figures are displayed in Table 12 (columns [C] and [D]). The effective tax burden under national tax accounting rules at status quo and upon the full introduction of the CCTB are repeated in columns [A] and [B].

When implementing the AGI and keeping all other rules for the tax base computation unchanged, i.e. as under current national tax law, the effective tax burden would decline on average ([C] vs. [A]). The average change amounts to -4.9% across all countries and to -7.2% across those countries that currently do not provide for the deduction of fictitious interest on equity. For most Member States, the changes in the effective tax burden when implementing only the AGI ([C] vs. [A]) resemble the changes in the effective tax burden when implementing the AGI and all other provisions of the CCTB ([B] vs. [A]). This observation provides evidence that – given the model assumptions outlined in Section 3 and 4.1 – the AGI is the pivotal element of the impact of the CCTB on the effective tax burden in the EU Member States as it will lead to a tax base narrowing. The base case scenario assumes a newly founded, profitable and growing company which can therefore highly benefit from the AGI introduction. Moreover, it has to be stressed that the effects of the AGI are considered over a time horizon of ten years. The findings will be elaborated in more detail in the following.

[98] Strictly speaking, as the NID influences the computation of the tax base which should be harmonised under the CCTB, it could hence not continue to apply as prescribed under national tax law when a CCTB would come into effect. Still, Member States would have the possibility to grant a tax credit in the amount of the NID. Under this assumption, national rules on NID would still be applicable. It is hence meaningful to investigate the scenario where the provisions of the CCTB are combined with national rules on NID.

Table 12: Isolated effect of the AGI under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with AGI [C]	CCTB with national NID [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	51.10	47.92	47.95	51.11	-6.2%	-6.2%	0.0%	-6.3%
BE	57.99	54.82	55.35	58.05	-5.5%	-4.5%	0.1%	-5.6%
BG	17.02	15.23	15.31	17.05	-10.5%	-10.0%	0.2%	-10.7%
CY	19.81	21.55	21.89	19.41	8.8%	10.5%	-2.0%	11.0%
CZ	31.53	28.57	28.72	31.61	-9.4%	-8.9%	0.2%	-9.6%
DE	53.64	49.83	49.50	53.59	-7.1%	-7.7%	-0.1%	-7.0%
DK	39.10	36.07	35.92	39.02	-7.7%	-8.1%	-0.2%	-7.6%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%	0.0%
EL	49.89	46.01	45.39	49.49	-7.8%	-9.0%	-0.8%	-7.0%
ES	50.80	48.01	48.22	50.95	-5.5%	-5.1%	0.3%	-5.8%
FI	34.79	31.90	31.74	34.70	-8.3%	-8.8%	-0.2%	-8.1%
FR	76.27	73.09	73.29	76.37	-4.2%	-3.9%	0.1%	-4.3%
HR	29.21	26.73	27.16	29.77	-8.5%	-7.0%	1.9%	-10.2%
HU	53.15	52.50	52.50	53.50	-1.2%	-1.2%	0.7%	-1.9%
IE	21.01	18.97	18.87	20.96	-9.7%	-10.2%	-0.2%	-9.5%
IT	45.03	43.95	43.73	45.49	-2.4%	-2.9%	1.0%	-3.4%
LT	28.23	26.15	26.45	28.38	-7.4%	-6.3%	0.5%	-7.9%
LU	47.62	43.80	44.31	47.67	-8.0%	-6.9%	0.1%	-8.1%
LV	27.29	25.15	25.37	27.40	-7.8%	-7.0%	0.4%	-8.2%
MT	40.99	52.99	52.76	42.10	29.3%	28.7%	2.7%	25.9%
NL	41.46	37.81	37.99	41.55	-8.8%	-8.4%	0.2%	-9.0%
PL	32.85	30.04	29.84	32.75	-8.5%	-9.1%	-0.3%	-8.3%
PT	41.23	39.94	40.24	41.32	-3.1%	-2.4%	0.2%	-3.3%
RO	27.31	24.81	25.12	27.46	-9.2%	-8.0%	0.6%	-9.7%
SE	36.86	33.64	33.84	36.95	-8.7%	-8.2%	0.3%	-9.0%
SI	31.32	28.47	28.46	31.23	-9.1%	-9.1%	-0.3%	-8.8%
SK	35.97	33.09	33.14	35.99	-8.0%	-7.9%	0.1%	-8.1%
UK	35.34	32.63	32.49	35.27	-7.7%	-8.1%	-0.2%	-7.5%
Average	**38.92**	**37.02**	**37.09**	**39.00**	**-5.1%**	**-4.9%**	**0.2%**	**-5.3%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: current national rules without national rules for notional interest deduction, plus AGI. [D]: CCTB without AGI, plus national rules for notional interest deduction. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

In Member States which currently do not provide for a NID, the implementation of the AGI, while keeping all other elements of the tax base computation unchanged, would lead to a narrowing of the tax base. The effective tax burden would hence decline, with a decrease ranging from 1.2% in Hungary to 10.2% in Ireland. The relatively weak effect in Hungary can be attributed to the fact that in addition to the corporate income tax, other taxes, namely the local business tax and the innovation tax, are levied. As these taxes continue to apply unchanged under the CCTB framework, the overall impact of the AGI is relatively small compared to other Member States. The strong decrease in Ireland is determined by two reasons: First, a low corporate income tax rate applies (12.5%). This results in a higher after-tax profit and a higher amount attributable to the equity reserves, which in turn increase the relevant equity for the calculation of the AGI in subsequent periods. Second, the real estate tax is the only additional tax at the corporate level, such that the overall tax burden is mainly determined by the corporate income tax.

In those countries that already have a NID scheme in place, the impact of the AGI decisively depends on the exact design of the current NID scheme and in particular on the NID rate and the NID base. Table 13 provides an overview of the NID schemes currently in place and an explanation for the observed change in the effective tax burden when replacing the national NID by the AGI. In Cyprus and Malta, the national NID rates (6.489% and 7.03%, respectively) are substantially higher than the rate of the AGI (3.2882%). Hence, the tax base under CCTB would increase, resulting in a higher effective tax burden than under national tax rules. The different strength of the increase in Cyprus and Malta is i.a. due to the different national rules for the calculation of the relevant equity base.[99] While in Malta, the whole equity stock qualifies for a deduction, the NID in Cyprus is limited to new equity introduced in a company as from 1 January 2015. Although Portugal also provides for a NID rate which more than doubles the AGI rate (7%), the national NID is only granted for the first five periods and is limited to a maximum amount of EUR 2 million. This is why Portugal, in contrast to Cyprus and Malta, shows a decrease in the effective tax burden under the CCTB. In Belgium and Italy, the tax advantage of the national NID is rather low (NID rates of 0.237% and 1.6%, respectively). The AGI is hence more advantageous, thus resulting in a lower effective tax burden when replacing the national NID by the AGI.

Table 13: Comparison of national NID rates and bases and effect of a replacement of national NID schemes by the AGI

Country	NID base	NID rate	Effect on effective tax burden due to replacement of national NID by AGI
CCTB (AGI)	New equity	3.2882%	
BE	All equity	0.237%	Decrease (higher AGI rate overcompensates narrower base)
CY	New equity	6.489%	Increase (lower AGI rate)
IT	New equity	1.6%	Slight decrease (higher AGI rate)
MT	All equity	7.03%	Substantial increase (lower AGI base/rate)
PT	All equity	7.0%	Slight decrease (lower AGI rate & narrower AGI base vs. national limitations in time & amount)

[99] For further reasons, see Section 4.2.

In the scenario of a CCTB without AGI, the changes in the effective tax burden relative to the tax burden under national tax rules ([D] vs. [A]) are significantly smaller than in the scenario of a CCTB including the AGI ([B] vs. [A]) – ranging from -2.0% in Cyprus to +2.7% in Malta. On average, the deviation for all countries under consideration is almost zero (+0.2%). Hence, if the CCTB was introduced without the AGI (and if all current national NID schemes were kept in place), its impact would be much smaller than when implementing the CCTB including the AGI.

When comparing the scenario of a CCTB without AGI to the scenario where the CCTB as a whole is implemented ([B] vs. [D]), the changes in the effective tax burden resemble those between the scenarios [B] and [A]. The average change amounts to -5.3%. The small difference in the percentage changes demonstrates that the effect of the other CCTB provisions is small compared to the effect of the AGI which drives the change in the overall tax burden.

Table 14 shows the results of additional analyses that provide more insights into the effect of the AGI. Apart from the CCTB including the AGI as proposed in the CCTB draft Council Directive, we consider the following scenarios. First, we assume that the AGI rate varies. According to the CCTB draft Council Directive, the AGI rate should equal the yield of the euro area ten-year government benchmark bond in December of the year preceding the relevant tax year, as published by the European Central Bank – i.e. 1.2882% for the tax year 2017 –, increased by a risk premium of two percentage points. Instead of considering a risk premium of two percentage points, we now assume a risk premium of zero percentage points, resulting in an AGI rate of 1.2882% instead of 3.2882%. Second, we vary the calculation of the equity base. The CCTB draft Council Directive defines the relevant base for calculating the deductible amount as the increase of the equity base at the end of the relevant tax year compared to the equity base on the first day of the first year under the rules of the Directive. After the first ten tax years that a taxpayer is subject to the Directive, the reference equity base shall annually be moved forward by one tax year. Instead of considering a rolling equity base after ten years, we now assume a rolling equity base after five years. We conduct the analyses for those Member States that currently have a NID scheme in place (Belgium, Cyprus, Italy, Malta, and Portugal), and for the Member States where the AGI has the strongest and weakest effect, namely Ireland and Hungary (see above).

Table 14: Analysis of different AGI schemes

Country	Ten-year tax burden in m. EUR				Deviation		
	National	CCTB	CCTB with 1.2882% AGI rate	CCTB with 5 yr. rolling AGI base	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]
	[A]	[B]	[C]	[D]			
BE	57.99	54.82	57.08	55.73	-5.5%	-1.6%	-3.9%
CY	19.81	21.55	22.86	22.08	8.8%	15.4%	11.5%
HU	53.15	52.50	53.11	52.76	-1.2%	-0.1%	-0.7%
IE	21.01	18.97	20.19	19.46	-9.7%	-3.9%	-7.4%
IT	45.03	43.95	45.77	44.69	-2.4%	1.6%	-0.8%
MT	40.99	52.99	55.64	54.07	29.3%	35.7%	31.9%
PT	41.23	39.94	42.12	40.81	-3.1%	2.1%	-1.0%

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: Variation of AGI rate. [D]: Variation of AGI base year. Deviation: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A] and [D] vs. [A] calculated as ([C]-[A])/[A] and ([D]-[A])/[A].

When considering a lower AGI rate, the tax advantage of the AGI is less pronounced. Hence, for those Member States that exhibit a decline in the effective tax burden under the CCTB framework, the decline is weaker (Belgium, Hungary, Ireland) or even turns into an increase (Italy, Portugal). For those Member States where the effective tax burden increases under the CCTB (Cyprus, Malta), the increase becomes even stronger with a lower AGI rate because the tax disadvantage of the AGI compared to the current national NID schemes increases further.

Changing the rolling equity base from ten to five years results in a similar effect: The tax advantage of the AGI declines. This is mainly driven by the model of the European Tax Analyzer. We consider the effective tax burden over a time horizon of ten years. When implementing the AGI as proposed, with a rolling equity base after ten years, the effect of the rolling base does not become obvious from the results. For all ten years, the calculation of the relevant equity base increase is determined by reference to the equity base in the first year. The rolling base would start to be effective from year eleven onwards and is hence not reflected in the results. When considering a rolling equity base after five years instead, the equity base increase declines from period six onwards. While for period one to five, the equity base increase is determined as the difference between the equity at the end of the relevant tax year and the equity at the beginning of the first year, it is defined as the equity at the end of the relevant tax year minus the equity that has been accumulated as retained earnings until the fifth preceding year for period six to ten. Hence, the equity base in the last five periods considered is smaller than in the original CCTB scenario, resulting in a lower AGI and in a higher effective tax burden. Still, it is important to note that the precise effect of the rolling equity base crucially depends on the investment policy of the firm. If, for instance, the firm increases its equity stock after the first five years, the equity base increase in period six, which is determined as the difference of the equity base in period six and two, is stronger, resulting in a higher AGI.

In contrast to existing NID regimes, the AGI proposal provides for the taxation of negative equity interest, i.e. in case of an equity base decrease, an amount equal to the defined yield on the equity base decrease shall become taxable. As described in Section 3.3, the model framework of the European Tax Analyzer considers a profitable model firm in the original scenario. Thus, the effect of this special property of the AGI is not reflected in the effective tax burdens. In order to analyse the impact of the AGI in the case of a decrease in the relevant equity base, we simulate a loss-making model firm by means of increased extraordinary expenses for the first six simulation periods (see Section 4.3.7 for a detailed analysis of the loss scenario).

Table 15 depicts the effective tax burdens under status quo and under the CCTB framework in case of a loss-making model firm. In columns [C] and [D], the AGI rate and the definition of the AGI base, respectively, are varied as described above. Again, we conduct the analysis for those Member States that currently have a NID scheme in place (Belgium, Cyprus, Italy, Malta, and Portugal), and for the Member States where the AGI has the strongest and weakest effect in the reference scenario, namely Ireland and Hungary.

Table 15: Analysis of different AGI schemes for a loss-making model firm

Country	Ten-year tax burden in m. EUR				Deviation		
	National [A]	CCTB [B]	CCTB with 1.2282% AGI rate [C]	CCTB with 5 yr. rolling AGI base [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]
BE	23.64	22.77	22.55	22.42	-3.7%	-4.6%	-5.1%
CY	13.69	9.51	9.60	9.46	-30.5%	-29.8%	-30.9%
HU	52.49	47.59	47.28	47.40	-9.3%	-9.9%	-9.7%
IE	7.38	6.67	6.66	6.56	-9.5%	-9.8%	-11.0%
IT	20.41	21.46	21.28	21.20	5.1%	4.2%	3.8%
MT	14.83	19.66	19.90	19.55	32.6%	34.2%	31.9%
PT	15.68	15.26	15.22	15.02	-2.7%	-3.0%	-4.2%

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals, for a loss-making model firm. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: Variation of AGI rate. [D]: Variation of AGI base year. Deviation: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A] and [D] vs. [A] calculated as ([C]-[A])/[A] and ([D]-[A])/[A].

We can observe that the size and – in case of Cyprus and Italy – also the sign of the percentage change when moving from status quo to CCTB differs compared to the scenario of a profitable model firm (Table 14, column [B] vs. [A]). The difference is mainly driven by the coexistence of those rules that were not effective in case of a profitable model firm, in particular the rules for loss compensation and interest deduction limitation as well as the taxation of negative equity interest.

When comparing the scenario of a CCTB with an AGI rate of 3.2282% (column [B]) to the case of a CCTB with a reduced AGI rate of 1.2282% (column [C]), the change in effective tax burdens is smaller than the change between [B] and [C] for a profitable model firm (Table 14). For a loss-making model firm, the effect of a reduced AGI rate is ambiguous: On the one hand, a lower yield on equity base increases results in lower positive AGI amounts which are deductible. On the other hand, a lower yield on equity base decreases results in lower negative AGI amounts which are taxable. As the model firm generates negative AGI amounts during the loss periods and positive AGI amounts during the profitable periods, both effects are present. While for Belgium, Hungary, Ireland, Italy and Portugal, the positive effect from the reduced AGI rate on equity base decreases slightly overcompensates the negative effect of the lower AGI rate on equity base increases, the effect is vice versa for Cyprus and Malta.

When changing the rolling equity base from ten to five years, the tax advantage of the AGI increases in all Member States considered. The model firm generates losses in the first six periods. If the equity base in the first year is used as reference base for the calculation of the AGI in all ten periods, the positive AGI amounts in the last periods are smaller than in the case where the reference equity base annually moves forward. This is because the year-end equity bases decline compared to the equity base in the first year due to the losses. When calculating the equity base increase with reference to a lower basis, the increase hence becomes stronger. Overall, given the simulation of the loss scenario with increased expenses in the first six periods, the negative AGI amounts in the first periods are unaffected by the application of a rolling equity base after five years instead of ten years, but the positive AGI amounts which are deductible in the last years of the simulation period increase, resulting in a lower effective tax burden.

4.3.2 Depreciation

Other than most national depreciation schemes, the depreciation rules stipulated by the CCTB are based on the assets' useful lives rather than on different asset categories (Art. 33 (1) and 37 (1) of the draft Council Directive, see also Section 2.1). For the single Member States, this would result in a rather high need for adjustment, also because depreciation rules differ widely regarding the depreciation rates or periods (Figure 14, Section 2.10). To isolate the impact of harmonised depreciation rules in the context of the introduction of a CCTB, we conduct a two-sided analysis (Table 16). First, we consider the effective tax burden under current national tax law where national depreciation rules have been replaced by the depreciation rules established by the CCTB ([C]). Subsequently, we consider the effective tax burden while assuming that the CCTB is introduced without harmonising depreciation rules such that Member States continue to use their current depreciation schemes ([D]). For reference and comparability, the effective tax burden under national tax accounting rules at status quo ([A]) and upon the full introduction of the CCTB ([B]) are also included.

If only depreciation rules are harmonised, the average change in effective tax burdens approximately amounts to 0.4% ([C] vs. [A]). Yet, the overall impact of harmonised depreciation rules is very heterogeneous across Member States and ranges from a 1.5% decrease in Cyprus to an increase of 2.3% in Italy. The comparatively strong decline in Cyprus relates to the rather strict depreciation rules. Currently, the depreciation rates for short-life machinery and equipment are considerably lower than the rate of 25% that is proposed for the asset pool according to Article 37 (1) of the CCTB draft Council Directive. For other Member States such as Greece, this beneficial effect is partly mitigated by the strict depreciation rules for office buildings.[100] The strong increase in Italy can be explained by the availability of an enhanced depreciation regime for machinery and equipment that allows to increase the acquisition costs by 40% for depreciation purposes. Similarly, under the Croatian accelerated depreciation regime, depreciation rates may be doubled. This explains the comparatively high increase in tax burden at 2.0% upon the harmonisation of tax depreciation rules which would be associated with less favourable rules for Croatian taxpayers. Although the accelerated depreciation in Hungary allows for a depreciation period of two years only, the adverse effect that would result from the depreciation of machinery and equipment would be diminished by more tax-favourable rules for the depreciation of buildings upon the introduction of the CCTB.

In the reverse case, the impact of national depreciation rules is analysed within the framework of the CCTB. If the CCTB was introduced without harmonising national depreciation rules ([D]), the average decrease in the effective tax burden when compared to status quo would be at 4.6% ([D] vs. [A]) and thus very similar to the decrease upon the introduction of the full CCTB (at 5.1%, [B] vs. [A]). On average, the effective tax burden is by 0.5% lower when the tax burden for the CCTB with and without harmonised depreciation rules are compared ([B] vs. [D]). Similar to the preceding analysis, however, the changes in the effective tax burden are quite heterogeneous and range from a decrease of 1.9% in Lithuania to an increase of 0.9% in Italy. Nevertheless, the impact of different depreciation rules within a common tax framework where all other rules are harmonised seems to be of slightly less magnitude than in the reverse case.

Therefore, on average and for most Member States, harmonised depreciation rules have only a minor impact on the effective tax burdens.

[100] See also Spengel et al. (2012), pp. 210 f. for a similar reasoning in an impact assessment of the 2011 CCTB draft Council Directive.

Table 16: Isolated effect of the depreciation under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with CCTB depreciation [C]	CCTB with national depreciation [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	51.10	47.92	51.11	47.92	-6.2%	0.0%	-6.2%	0.0%
BE	57.99	54.82	58.17	55.23	-5.5%	0.3%	-4.8%	-0.7%
BG	17.02	15.23	17.13	15.47	-10.5%	0.7%	-9.1%	-1.5%
CY	19.81	21.55	19.51	21.41	8.8%	-1.5%	8.1%	0.7%
CZ	31.53	28.57	31.74	28.98	-9.4%	0.7%	-8.1%	-1.4%
DE	53.64	49.83	53.69	49.93	-7.1%	0.1%	-6.9%	-0.2%
DK	39.10	36.07	39.17	36.21	-7.7%	0.2%	-7.4%	-0.4%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%	0.0%
EL	49.89	46.01	49.69	45.73	-7.8%	-0.4%	-8.3%	0.6%
ES	50.80	48.01	50.99	48.27	-5.5%	0.4%	-5.0%	-0.5%
FI	34.79	31.90	34.84	32.01	-8.3%	0.2%	-8.0%	-0.3%
FR	76.27	73.09	76.44	73.37	-4.2%	0.2%	-3.8%	-0.4%
HR	29.21	26.73	29.80	27.19	-8.5%	2.0%	-6.9%	-1.7%
HU	53.15	52.50	53.57	52.48	-1.2%	0.8%	-1.2%	0.0%
IE	21.01	18.97	20.98	18.92	-9.7%	-0.2%	-10.0%	0.3%
IT	45.03	43.95	46.09	43.55	-2.4%	2.3%	-3.3%	0.9%
LT	28.23	26.15	28.49	26.66	-7.4%	0.9%	-5.6%	-1.9%
LU	47.62	43.80	47.67	44.31	-8.0%	0.1%	-6.9%	-1.2%
LV	27.29	25.15	27.50	25.33	-7.8%	0.8%	-7.2%	-0.7%
MT	40.99	52.99	41.21	53.15	29.3%	0.5%	29.7%	-0.3%
NL	41.46	37.81	41.55	37.99	-8.8%	0.2%	-8.4%	-0.5%
PL	32.85	30.04	32.86	30.02	-8.5%	0.0%	-8.6%	0.1%
PT	41.23	39.94	41.35	40.31	-3.1%	0.3%	-2.2%	-0.9%
RO	27.31	24.81	27.46	25.12	-9.2%	0.6%	-8.0%	-1.2%
SE	36.86	33.64	36.99	33.91	-8.7%	0.4%	-8.0%	-0.8%
SI	31.32	28.47	31.42	28.66	-9.1%	0.3%	-8.5%	-0.7%
SK	35.97	33.09	36.14	33.42	-8.0%	0.5%	-7.1%	-1.0%
UK	35.34	32.63	35.30	32.55	-7.7%	-0.1%	-7.9%	0.2%
Average	**38.92**	**37.02**	**39.06**	**37.18**	**-5.1%**	**0.4%**	**-4.6%**	**-0.5%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: depreciation according to CCTB, other elements according to current national rules. [D]: depreciation according to current national rules, other elements according to CCTB. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

4.3.3 Valuation of inventory

According to Article 19 (2) of the CCTB draft Council Directive, inventory may be valued using the FiFo, LiFo or weighted-average cost method. In the quantitative analysis, we assume that all corporations will use the most tax-efficient LiFo method upon the introduction of the CCTB. Therefore, 19 Member States would have to adjust their tax treatment for the valuation of inventory (Figure 4, Section 2.2). In the following two-sided analysis, the isolated effect of a harmonised approach for the valuation of inventory is assessed (Table 17). First, we thus consider the effective tax burden under current national tax law where national rules for the valuation of inventory are replaced by the LiFo method ([C]). Second, we consider the tax burden for the CCTB introduction in case Member States continue to use their current approaches for the valuation of inventory ([D]). For reference and comparability, the effective tax burden under national tax accounting rules at status quo ([A]) and upon the full introduction of the CCTB ([B]) are also included.

Currently, eight Member States already employ the LiFo method for the valuation of inventory. In these Member States, the two-sided analysis neither changes the tax burden under national tax law nor upon the introduction of the CCTB ([C] vs. [A] and [B] vs. [D]). For all other Member States except for Malta and Portugal, the effective tax burden decreases if current national inventory valuation is replaced by the more tax-favourable LiFo method. The decrease ranges from 2% in Cyprus to 0.1% in the vast majority of Member States irrespective of the valuation method previously used. The average decrease amounts to 0.1%.

In Malta and Portugal, in contrast, the tax burden would increase by 0.7% and 0.1%, respectively, if only inventory valuation rules were harmonised. Both countries prescribe the use of the weighted-average cost method according to their current domestic tax law. Furthermore, both countries currently have a NID with a comparatively high notional interest rate in place (7.03% in Malta, 7.0% in Portugal).[101] In Malta, on the one hand, the corporate income tax burden decreases due to the implementation of the tax-favourable LiFo method and associated decreases in the corporate income tax base. On the other hand, a more favourable inventory valuation goes along with lower profit reserves, resulting in a lower NID and therefore in an increase of the tax burden. Overall, the increase in tax burden after a switch to the LiFo method overcompensates the decrease. In Portugal, the notional interest deduction is based on overall share capital. Since this value is not affected by changes in revenue, higher profits that stem from the use of the LiFo method have no impact on the deductible amount. The tax burden increase, though, stems from the fact that the LiFo method increases the hidden reserves which are added to the tax base at the end of the simulation period. This is because the goods that are still in stock are those that were capitalised at lower prices and – under the assumption of increasing prices over time – have gained in value. The corporate tax rate in Portugal is comparatively high. Hence, the increased hidden reserves are taxed at a higher rate, which overcompensates the tax burden decrease due to the tax-favourable LiFo method. Although Cyprus also has a NID in place at status quo, the effective tax burden decreases upon the replacement of the weighted-average cost approach by the LiFo method. The two opposing forces outlined above with respect to Malta can explain the effect. In Cyprus, the NID is only based on new equity and is hence more affected by lower profit reserves than the NID scheme in Malta which is based on the whole equity stock. Overall, however, the decrease in tax burden due to the more tax-favourable LiFo method overcompensates the increase due to a lower NID.

[101] See also Section 2.9 as well as Table 13 in Section 4.3.1 for further information on the design of current notional interest deduction regimes.

Table 17: Isolated effect of the inventory valuation under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with CCTB inventory valuation [C]	CCTB with national inventory valuation [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	51.10	47.92	51.10	47.92	-6.2%	0.0%	-6.2%	0.0%
BE	57.99	54.82	57.99	54.82	-5.5%	0.0%	-5.5%	0.0%
BG	17.02	15.23	17.00	15.19	-10.5%	-0.1%	-10.7%	0.3%
CY	19.81	21.55	19.41	21.50	8.8%	-2.0%	8.5%	0.2%
CZ	31.53	28.57	31.51	28.50	-9.4%	-0.1%	-9.6%	0.2%
DE	53.64	49.83	53.64	49.83	-7.1%	0.0%	-7.1%	0.0%
DK	39.10	36.07	39.07	36.01	-7.7%	-0.1%	-7.9%	0.2%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%	0.0%
EL	49.89	46.01	49.84	45.94	-7.8%	-0.1%	-7.9%	0.2%
ES	50.80	48.01	50.78	47.95	-5.5%	-0.1%	-5.6%	0.1%
FI	34.79	31.90	34.76	31.85	-8.3%	-0.1%	-8.5%	0.2%
FR	76.27	73.09	76.22	73.14	-4.2%	-0.1%	-4.1%	-0.1%
HR	29.21	26.73	29.20	26.72	-8.5%	0.0%	-8.5%	0.0%
HU	53.15	52.50	53.14	52.47	-1.2%	0.0%	-1.3%	0.1%
IE	21.01	18.97	20.99	18.94	-9.7%	-0.1%	-9.9%	0.2%
IT	45.03	43.95	45.03	43.95	-2.4%	0.0%	-2.4%	0.0%
LT	28.23	26.15	28.22	26.10	-7.4%	-0.1%	-7.5%	0.2%
LU	47.62	43.80	47.62	43.80	-8.0%	0.0%	-8.0%	0.0%
LV	27.29	25.15	27.27	25.11	-7.8%	0.0%	-8.0%	0.2%
MT	40.99	52.99	41.27	52.89	29.3%	0.7%	29.0%	0.2%
NL	41.46	37.81	41.46	37.81	-8.8%	0.0%	-8.8%	0.0%
PL	32.85	30.04	32.85	30.04	-8.5%	0.0%	-8.5%	0.0%
PT	41.23	39.94	41.27	39.87	-3.1%	0.1%	-3.3%	0.2%
RO	27.31	24.81	27.31	24.81	-9.2%	0.0%	-9.2%	0.0%
SE	36.86	33.64	36.82	33.56	-8.7%	-0.1%	-8.9%	0.2%
SI	31.32	28.47	31.30	28.42	-9.1%	-0.1%	-9.3%	0.2%
SK	35.97	33.09	35.95	33.03	-8.0%	-0.1%	-8.2%	0.2%
UK	35.34	32.63	35.31	32.57	-7.7%	-0.1%	-7.8%	0.2%
Average	**38.92**	**37.02**	**38.90**	**36.99**	**-5.1%**	**-0.1%**	**-5.2%**	**0.1%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: inventory valuation according to CCTB, other elements according to current national rules. [D]: inventory valuation according to current national rules, other elements according to CCTB. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

When the reverse case is considered and the CCTB was introduced without harmonising inventory valuation rules, the average difference in effective tax burdens amounts to 0.1% ([B] vs. [D]). Changes are quite uniform and range from -0.1% in France to +0.3% in Bulgaria. Thus, the impact of rules for the valuation of inventory is comparatively small within the context of the CCTB as a harmonised set of tax accounting rules across EU Member States.

4.3.4 Provisions for legal obligations (warranty provisions)

As illustrated in Figure 6 in Section 2.4, only about half of the Member States are in line with Article 23 of the CCTB draft Council Directive and allow for the deductibility of provisions for legal obligations. In the following, the effect of common rules for the tax deductibility of such provisions is isolated from the overall impact of the CCTB introduction by means of a two-sided analysis, see Table 18. First, we therefore consider the effective tax burden when all current national tax accounting rules are maintained except for the treatment of expenditure for the settlement of legal obligations ([C]). These rules are aligned to the respective CCTB rule and warranty provisions are treated as tax-deductible. Subsequently, we consider the tax burden under the CCTB with current national treatment of warranty provisions ([D]). Table 18 also includes the effective tax burden under national tax accounting rules at status quo ([A]) and upon the full introduction of the CCTB ([B]) to ensure comparability.

For all 13 Member States that already allow for the tax-deductibility of warranty provisions under current domestic tax law, the two-sided analysis does not change the tax burden under national tax accounting rules or upon the introduction of the CCTB ([C] vs. [A] and [B] vs. [D]). For the remainder of Member States, the mere harmonisation of the treatment of warranty provisions would reduce the effective tax burden – on average – by 0.2% ([C] vs. [A]). In general, the possibility to recognise a warranty provision would reduce the effective tax burden since expenditures may be recognised before the liability is effectively due.[102] The strongest decline would result in Cyprus (-2.7%) whereas Malta is the only Member State where the effective tax burden would increase (+2.2%). Similar to the isolated analysis of the AGI (Section 4.3.1), these changes in effective tax burdens represent outliers since the decrease in effective tax burden varies between 0.3% and 0.7% across all other Member States. Thus, except for Malta and Cyprus, the isolated introduction of harmonised rules for warranty provisions would only have a minor impact on the effective corporate tax burden.

The increase in the effective tax burden in Malta can be attributed to the interaction of the warranty provision and the NID: In general, the deductibility of a warranty provision reduces the taxable profit. In turn, however, this also reduces the amount attributable to the profit reserves which leads to a lower NID as compared to the national baseline scenario. Overall, the increase in tax burden that results from the lower NID overcompensates the decrease that follows from the tax-beneficial deductibility of a warranty provision. In Cyprus, on the other hand, the tax burden reducing effects from the deductibility of a warranty provision outweigh the corresponding tax burden increasing effect that stems from a lower NID.

[102] See also Spengel et al. (2012), p. 212.

Table 18: Isolated effect of the warranty provisions under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with CCTB warranty provisions [C]	CCTB with national warranty provisions [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	51.10	47.92	51.10	47.92	-6.2%	0.0%	-6.2%	0.0%
BE	57.99	54.82	57.99	54.82	-5.5%	0.0%	-5.5%	0.0%
BG	17.02	15.23	16.95	15.15	-10.5%	-0.4%	-11.0%	0.6%
CY	19.81	21.55	19.27	21.45	8.8%	-2.7%	8.3%	0.5%
CZ	31.53	28.57	31.43	28.40	-9.4%	-0.3%	-10.0%	0.6%
DE	53.64	49.83	53.64	49.83	-7.1%	0.0%	-7.1%	0.0%
DK	39.10	36.07	38.98	35.83	-7.7%	-0.3%	-8.4%	0.7%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%	0.0%
EL	49.89	46.01	49.74	45.73	-7.8%	-0.3%	-8.3%	0.6%
ES	50.80	48.01	50.80	48.01	-5.5%	0.0%	-5.5%	0.0%
FI	34.79	31.90	34.68	31.68	-8.3%	-0.3%	-8.9%	0.7%
FR	76.27	73.09	76.27	73.09	-4.2%	0.0%	-4.2%	0.0%
HR	29.21	26.73	29.21	26.73	-8.5%	0.0%	-8.5%	0.0%
HU	53.15	52.50	52.87	52.38	-1.2%	-0.5%	-1.4%	0.2%
IE	21.01	18.97	21.01	18.97	-9.7%	0.0%	-9.7%	0.0%
IT	45.03	43.95	44.72	44.07	-2.4%	-0.7%	-2.1%	-0.3%
LT	28.23	26.15	28.15	25.97	-7.4%	-0.3%	-8.0%	0.7%
LU	47.62	43.80	47.62	43.80	-8.0%	0.0%	-8.0%	0.0%
LV	27.29	25.15	27.20	24.97	-7.8%	-0.3%	-8.5%	0.7%
MT	40.99	52.99	41.88	52.73	29.3%	2.2%	28.6%	0.5%
NL	41.46	37.81	41.46	37.81	-8.8%	0.0%	-8.8%	0.0%
PL	32.85	30.04	32.74	29.83	-8.5%	-0.3%	-9.2%	0.7%
PT	41.23	39.94	41.23	39.94	-3.1%	0.0%	-3.1%	0.0%
RO	27.31	24.81	27.31	24.81	-9.2%	0.0%	-9.2%	0.0%
SE	36.86	33.64	36.86	33.64	-8.7%	0.0%	-8.7%	0.0%
SI	31.32	28.47	31.22	28.26	-9.1%	-0.3%	-9.8%	0.8%
SK	35.97	33.09	35.86	32.86	-8.0%	-0.3%	-8.7%	0.7%
UK	35.34	32.63	35.34	32.63	-7.7%	0.0%	-7.7%	0.0%
Average	**38.92**	**37.02**	**38.87**	**36.94**	**-5.1%**	**-0.2%**	**-5.3%**	**0.3%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: warranty provisions according to CCTB, other elements according to current national rules. [D]: warranty provisions according to current national rules, other elements according to CCTB. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

In the reverse case where the CCTB is introduced with current national rules for the treatment of warranty provisions, the effective tax burden increases on average by 0.3%. The increase varies from 0.2% in Hungary to 0.8% in Slovenia. On the one hand, the deductibility of a warranty provision has a tax base reducing effect. On the other hand, the recognition of warranty provisions increases the hidden liabilities which are deducted from the tax base in the last simulation period. The overall balance of hidden reserves and liabilities now turns positive. This effect overcompensates the general tax-favourable effect of the recognition of a warranty provision.[103] Nevertheless, the overall isolated effect of the warranty provisions on the effective tax burden upon the introduction of a CCTB is relatively small.

4.3.5 Avoidance of double taxation of dividends

To isolate the effect of the 100% tax exemption of dividends as stipulated by Article 8 d) of the CCTB draft Council Directive from the overall impact of the CCTB introduction, we again conduct a two-sided analysis, see Table 19. On the one hand, we consider the effective tax burden when all current national tax accounting rules are maintained except for the treatment of inter-corporate dividends which is aligned to the rules of the CCTB draft Council Directive (100% exemption, [C]). On the other hand, we consider the tax burden under the CCTB with current national rules for the avoidance of double taxation of inter-corporate dividends identified in Section 2.6 ([D]). To ensure comparability, Table 19 also includes the effective tax burden under national tax accounting rules at status quo ([A]) and upon the full introduction of the CCTB ([B]).

In general, the full exemption of inter-corporate dividends according to Article 8 d) of the CCTB draft Council Directive would have a slight tax burden reducing effect: Overall, the effective tax burden would decrease on average by 0.3% if common rules for inter-corporate dividends were introduced ([C] vs. [A]). The decrease ranges from 4.2% in Malta to 0.2% in Belgium, Germany, Italy and Slovenia. In turn, if the tax burden under the CCTB with national treatment of inter-company dividends was compared to the tax burden under the CCTB, the tax burden would decrease on average by 0.2% ([B] vs. [D]). In this case, the decrease varies between 3% in Malta and 0.2% in Belgium, Germany, Italy and Slovenia.

For all 20 Member States where inter-corporate dividends are already fully exempt under current national tax accounting rules, the treatment of inter-corporate dividends as stipulated by the CCTB draft Council Directive does not influence the effective tax burden in the national case and vice versa (i.e. [C] vs. [A] and [B] vs. [D]). Hence, for these Member States, the provisions set out in Article 8 d) of the CCTB draft Council Directive do not drive the changes in effective tax burdens upon the introduction of the CCTB at all.

Under current French tax law, inter-corporate dividends are exempt by 99%. In the two-sided analysis, the associated changes in tax burden are minor and merely result in a deviation of -0.03% for both directions, respectively. The CCTB 100% exemption of inter-corporate dividends thus has only a very little and negligible effect on the overall change in tax burden induced by the CCTB.

[103] Italy is the only Member State where the effective tax burden in the CCTB case slightly decreases if the deductibility of a warranty provision is denied as under current national tax law (-0.3%). This is because of the regional tax on productive activities (Imposta Regionale sulle Attività Produttive, "IRAP") levied in Italy. The tax is based on the operating profit which increases due to the warranty provision. Hence, the tax burden increasing effect of the higher IRAP outweighs the tax burden reducing effect due to the recognition of a warranty provision.

Table 19: Isolated effect of the avoidance of double taxation of dividends under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with CCTB treatment of dividends [C]	CCTB with national treatment of dividends [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	51.10	47.92	51.10	47.92	-6.2%	0.0%	-6.2%	0.0%
BE	57.99	54.82	57.89	54.92	-5.5%	-0.2%	-5.3%	-0.2%
BG	17.02	15.23	17.02	15.23	-10.5%	0.0%	-10.5%	0.0%
CY	19.81	21.55	19.81	21.55	8.8%	0.0%	8.8%	0.0%
CZ	31.53	28.57	31.53	28.57	-9.4%	0.0%	-9.4%	0.0%
DE	53.64	49.83	53.55	49.93	-7.1%	-0.2%	-6.9%	-0.2%
DK	39.10	36.07	39.10	36.07	-7.7%	0.0%	-7.7%	0.0%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%	0.0%
EL	49.89	46.01	49.89	46.01	-7.8%	0.0%	-7.8%	0.0%
ES	50.80	48.01	50.80	48.01	-5.5%	0.0%	-5.5%	0.0%
FI	34.79	31.90	34.79	31.90	-8.3%	0.0%	-8.3%	0.0%
FR	76.27	73.09	76.25	73.11	-4.2%	0.0%	-4.1%	0.0%
HR	29.21	26.73	29.21	26.73	-8.5%	0.0%	-8.5%	0.0%
HU	53.15	52.50	53.15	52.50	-1.2%	0.0%	-1.2%	0.0%
IE	21.01	18.97	20.49	19.51	-9.7%	-2.5%	-7.2%	-2.7%
IT	45.03	43.95	44.96	44.02	-2.4%	-0.2%	-2.2%	-0.2%
LT	28.23	26.15	28.23	26.15	-7.4%	0.0%	-7.4%	0.0%
LU	47.62	43.80	47.62	43.80	-8.0%	0.0%	-8.0%	0.0%
LV	27.29	25.15	27.29	25.15	-7.8%	0.0%	-7.8%	0.0%
MT	40.99	52.99	39.25	54.63	29.3%	-4.2%	33.3%	-3.0%
NL	41.46	37.81	41.46	37.81	-8.8%	0.0%	-8.8%	0.0%
PL	32.85	30.04	32.85	30.04	-8.5%	0.0%	-8.5%	0.0%
PT	41.23	39.94	41.23	39.94	-3.1%	0.0%	-3.1%	0.0%
RO	27.31	24.81	27.31	24.81	-9.2%	0.0%	-9.2%	0.0%
SE	36.86	33.64	36.86	33.64	-8.7%	0.0%	-8.7%	0.0%
SI	31.32	28.47	31.27	28.53	-9.1%	-0.2%	-8.9%	-0.2%
SK	35.97	33.09	35.97	33.09	-8.0%	0.0%	-8.0%	0.0%
UK	35.34	32.63	35.34	32.63	-7.7%	0.0%	-7.7%	0.0%
Average	**38.92**	**37.02**	**38.83**	**37.11**	**-5.1%**	**-0.3%**	**-4.8%**	**-0.2%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: treatment of inter-corporate dividends according to CCTB, other elements according to current national rules. [D]: treatment of inter-corporate dividends according to current national rules, other elements according to CCTB. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

In Belgium, Germany, Italy and Slovenia, inter-corporate dividends are currently exempt by 95%. If the exemption is extended to 100% as stipulated by the CCTB in the national case, the change in effective tax burdens amounts to -0.2% for all Member States ([C] vs. [A]). The same holds true for the reverse case where the 100% dividend exemption under the CCTB is replaced by the current 95% exemption in these countries ([B] vs. [D]). Hence, the treatment of inter-corporate dividends has only little, but uniform impact on the changes in effective tax burden upon the introduction of the CCTB if Member States already grant a broad exemption of these dividends.

Malta currently applies a full imputation system for domestic dividends where a credit is granted to compensate for taxes already paid at the level of the distributing entity. If this system was replaced by a 100% exemption as stipulated by the CCTB and all other national tax accounting rules were held unchanged, the tax burden would decrease by 4.2% ([C] vs. [A]). In the reverse case where the 100% dividend exemption is replaced by the Maltese full imputation system for domestic dividends, the tax burden in the CCTB case would decrease by 3% ([B] vs. [D]). Foreign EU-dividends are currently already fully exempt as well such that the change is completely driven by the different treatment of domestic inter-company dividends.

Domestic inter-corporate dividends are fully exempt from tax in Ireland. If the credit method for substantial foreign EU-shareholdings was replaced by the CCTB 100% exemption as well, the tax burden would decrease by 2.5% ([C] vs. [A]), whereas it would decrease by 2.7% ([B] vs. [D]) when moving from a CCTB with credit relief for foreign inter-company dividends to a CCTB with full exemption of inter-company dividends.

Overall, the 100% exemption of inter-corporate dividends has no effect for Member States that currently already apply the same treatment. Also for Member States that currently do not fully exempt inter-company dividends, the isolated effect of Article 8 d) of the CCTB draft Council Directive leads to generally lower tax burdens, although the impact is rather low or even negligible. Only in Ireland and Malta where credit relief is available for foreign (domestic) dividends, the isolated analysis of the treatment of inter-corporate dividends reveals that the effect of the 100% exemption of inter-corporate dividends is of stronger magnitude.

4.3.6 Interest deduction limitation rules

As of 2017, about half of the Member States that have a general interest deduction limitation rule in place employ a profit-based regulation (see Figure 10, Section 2.7). The applicability of such rules becomes much more probable if profits are declining and interest expenses are increasing, i.e. upon financial distress. To illustrate the effects of (harmonised) interest deduction limitation rules, we thus consider a specifically modelled crisis scenario where the applicability of interest deduction limitation rules is more likely than in the reference scenario explained in Section 3.3. For the crisis scenario, an exogenous shock is simulated by a one-time decline in revenue of 12.65%[104] in the middle of the simulation period (period six of ten). In addition, short-term and long-term borrowing rates at 3.9% and 3.5% are increased by three percentage points to 6.9% and 6.5%, respectively, to take account of rising interest rates during an economic crisis.[105]

[104] The decline in revenue at 12.65% reflects the average decline in sales of all corporations in the EU in 2009 compared to the year 2008. See Eurostat (2017).
[105] For a similar approach, see Bräutigam (2017), p. 80 as well as Spengel/Zinn (2011), p. 506; Spengel/Zinn (2012), p. 43.

To illustrate the effect of a harmonised interest deduction limitation rule according to Article 13 of the CCTB draft Council Directive, we again conduct a two-sided analysis. The approach of this analysis follows the analyses of the isolated effects of other elements of the CCTB draft Council Directive in the previous sections. On the one hand, we consider the effective tax burden when all current national tax accounting rules are maintained except for the treatment of interest deduction limitation rules which are aligned to the rules of Article 13 of the CCTB draft Council Directive (Table 20, [C]). On the other hand, we consider the tax burden under the CCTB with current national rules on interest deductibility identified in Section 2.7 ([D]). To ensure comparability, Table 20 also includes the effective tax burden under national tax accounting rules at status quo ([A]) and upon the full introduction of the CCTB ([B]), both using the crisis scenario.

On average, the introduction of a common interest deduction limitation rule according to the CCTB draft Council Directive would lead to a decrease in effective tax burdens by 0.1% ([C] vs. [A]). Yet, the overall impact of harmonised rules limiting interest deductibility on effective tax burdens is very heterogeneous across the 28 Member States and ranges from a 10.7% decrease in Denmark to an increase of 8.1% in Slovenia. Further remarkable changes can be observed in France (-4.3%), Belgium (+1.9%) and Poland (+1.4%). The strong decrease in Denmark indicates a lower tax burden of the model firm at the end of the simulation period if the national interest deduction limitation rules are replaced by the corresponding CCTB regulation. Thus, the regulation according to the CCTB draft Council Directive would be more advantageous for taxpayers. For the increase, e.g. in Slovenia, the favourability is reversed.

According to Denmark's national interest deduction limitation rules, taxpayers are subject to two sets of restriction: an asset-based rule as well as an EBIT-based rule. The asset-based rule limits net financing expenses above DKK 21.3 million to an amount equal to a fictitious return of 3.2% of a company's qualifying assets. The EBIT-based rule limits the deductibility of financing costs to an amount equal to 80% of the taxpayer's EBIT. In the specifically modelled crisis scenario, net financing expenses will increase whereas the qualifying assets and hence also the associated fictitious return at 3.2% will remain unchanged. Therefore, the introduction of the CCTB interest deduction limitation rule would be more favourable for the taxpayer than the current corresponding Danish national tax accounting rules.

In contrast to Article 13 (6) of the CCTB draft Council Directive, current French interest deduction limitation rules do not allow for a carry-forward of non-deductible interest. Hence, in case the national rule applies, part of the corporation's net financing expenses do not qualify as a tax-deductible expense. In contrast, the interest deduction limitation rule proposed by the CCTB draft Council Directive allows for an unlimited carry-forward of non-deductible financing expenses to subsequent periods. In effect, the tax burden would decrease by 4.3% if only interest deduction limitation rules were harmonised ([C] vs. [A]).

In Poland and Belgium, the deductibility of interest is only limited with regard to specific shareholder loans. In contrast, Article 13 of the CCTB draft Council Directive provides for a general and comprehensive deduction limitation that covers any type of debt (Art. 4 (12)). Therefore, the harmonisation of interest deduction limitation rules would result in higher effective tax burdens in these Member States.

Table 20: Isolated effect of the interest deduction limitation under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with CCTB interest deduction [C]	CCTB with national interest deduction [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	38.27	36.74	38.30	36.43	-4.0%	0.1%	-4.8%	0.8%
BE	40.80	39.41	41.58	39.30	-3.4%	1.9%	-3.7%	0.3%
BG	11.83	10.90	11.83	10.69	-7.9%	0.1%	-9.6%	1.9%
CY	15.29	16.14	15.25	15.86	5.5%	-0.3%	3.7%	1.8%
CZ	21.71	20.18	21.72	19.86	-7.0%	0.1%	-8.5%	1.6%
DE	38.57	38.39	38.47	37.91	-0.5%	-0.3%	-1.7%	1.3%
DK	31.08	26.05	27.76	29.45	-16.2%	-10.7%	-5.3%	-11.5%
EE	22.98	22.98	22.98	22.98	0.0%	0.0%	0.0%	0.0%
EL	35.14	32.78	35.32	32.67	-6.7%	0.5%	-7.0%	0.3%
ES	35.87	34.74	35.89	34.56	-3.2%	0.0%	-3.7%	0.5%
FI	24.46	22.81	24.46	22.74	-6.7%	0.0%	-7.0%	0.3%
FR	64.65	64.25	61.91	64.25	-0.6%	-4.3%	-0.6%	0.0%
HR	19.91	18.90	19.92	18.49	-5.1%	0.0%	-7.2%	2.2%
HU	48.24	49.32	48.22	48.79	2.2%	0.0%	1.1%	1.1%
IE	14.62	13.32	14.63	13.28	-8.9%	0.0%	-9.2%	0.3%
IT	33.44	33.00	33.43	32.92	-1.3%	0.0%	-1.5%	0.2%
LT	20.48	19.40	20.50	19.31	-5.3%	0.1%	-5.7%	0.5%
LU	32.90	31.92	32.91	31.61	-3.0%	0.0%	-3.9%	1.0%
LV	19.53	18.37	19.53	18.31	-5.9%	0.0%	-6.3%	0.4%
MT	27.13	37.32	27.17	36.85	37.5%	0.1%	35.8%	1.3%
NL	28.62	26.78	28.65	26.33	-6.4%	0.1%	-8.0%	1.7%
PL	23.11	21.40	23.44	21.39	-7.4%	1.4%	-7.4%	0.0%
PT	27.45	27.79	27.45	27.78	1.2%	0.0%	1.2%	0.1%
RO	19.04	17.80	19.04	17.50	-6.5%	0.0%	-8.1%	1.7%
SE	25.49	23.88	25.53	23.54	-6.3%	0.1%	-7.7%	1.5%
SI	21.50	19.83	23.24	19.77	-7.7%	8.1%	-8.0%	0.3%
SK	25.29	23.53	25.16	23.62	-7.0%	-0.5%	-6.6%	-0.4%
UK	25.40	24.03	25.40	23.96	-5.4%	0.0%	-5.7%	0.3%
Average	**28.31**	**27.57**	**28.20**	**27.50**	**-3.1%**	**-0.1%**	**-3.4%**	**0.3%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: interest deduction limitation according to CCTB, other elements according to current national rules. [D]: interest deduction limitation according to current national rules, other elements according to CCTB. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

As we assume that the arm's length principle between the model firm and related shareholders holds, the interest deduction limitation rule is not applicable to the model firm in Slovenia at status quo. If the national interest deduction limitation rule was replaced by the provisions set out in Article 13 of the CCTB draft Council Directive, interest deductibility would be limited resulting in a higher effective tax burden as compared to the reference scenario.

As explained in Section 2.7, there are five Member States without any limitation to interest deductibility. Thus, an increasing tax burden of the model firm would be expected if only the rules on the deduction of interest were harmonised ([C]). However, similar to minor effects in other Member States, the isolated impact of the introduction of the CCTB interest deduction limitation rule is only minor[106] due to timing effects.

In the reverse case, the impact of national interest deduction limitation rules is analysed within the framework of the CCTB.[107] If the CCTB was introduced without harmonising national interest deduction limitation rules ([D]), the average decrease in the effective tax burden would be at 3.4% when compared to the baseline scenario ([D] vs. [A]). This effect is very similar to the decrease upon the introduction of the full CCTB in the crisis scenario (average decrease of 3.1%, [B] vs. [A]). Furthermore, if the tax burden under the CCTB with national interest deduction limitation rules was compared to the tax burden under the CCTB, the tax burden would increase on average by 0.3% ([B] vs. [D]).

If the CCTB was introduced without harmonising national interest deduction limitation rules, Danish corporate taxpayers would bear a higher effective tax burden due to the comparatively more restrictive interest deduction limitation rules that are currently in place in Denmark. In France, the CCTB provision as well as current national interest deduction limitation rules show similar amounts of non-deductible interest expenses over the whole simulation period. Therefore, in the reverse case ([B] vs. [D]), the effect is close to zero. This effect can also be observed in Belgium, Poland and Slovenia. In these Member States, non-deductible interest expenses accrue upon the introduction of the full CCTB. However, these non-deductible expenses can be fully compensated over the simulation period of ten years because of the unlimited carry-forward of non-deductible interest expenses. Since the current national interest deduction limitation rules in the latter three Member States do not lead to non-deductible interest expenses for the considered model firm, the effective tax burdens under the CCTB are similar to the effective tax burdens under the CCTB with current national interest deduction limitation rules.

For most Member States, the effect is comparable to the change that results from the introduction of the CCTB interest deduction limitation rule when all other national rules remain unchanged ([C] vs. [A]).

Nevertheless, the overall isolated effect of the interest deduction limitation rule according to Article 13 of the CCTB draft Council Directive on the effective tax burden upon the introduction of a CCTB is relatively small.

[106] For these five Member States, the isolated effects of the introduction of the CCTB interest deduction limitation rules range from -0.3 in Cyprus to 0.1 in Malta and Sweden.

[107] In this analysis, we assume that the relevant borrowing costs are defined as under current national tax law. Hence, the definition of borrowing costs does not include a defined yield on net equity increases (AGI) and is thus less broad than stipulated according to Article 4 (12) of the CCTB draft Council Directive.

4.3.7 Loss relief

In all Member States, ordinary inter-temporal losses may be carried forward and set off against future profits (see Figure 11, Section 2.8.1).[108] With regard to the allowable carry-forward period, however, country practice differs: In line with Article 41 of the CCTB draft Council Directive, 14 Member States do not impose any temporal restrictions to the loss carry-forward. For the remainder of Member States, the carry-forward period varies between four years (Slovak Republic) and 17 years (Luxembourg). The regulations for inter-temporal loss relief are especially relevant if a taxpayer realizes losses in several tax years. However, as described in Section 3.3, the model framework of the European Tax Analyzer considers a profitable model firm in the reference scenario. Thus, in general, deductible expenses or similar items do not exceed revenues in a given tax year. To estimate the isolated effect of inter-temporal loss relief on the effective tax burden, we simulate a specific loss scenario by means of increased extraordinary expenses for six simulation periods (periods one to six).

As illustrated in Table 21, we first consider the effective tax burdens under current national tax law where national rules for inter-temporal loss relief have been replaced by the corresponding rules established by the CCTB ([C]) (Art. 41). Subsequently, we consider the effective tax burden while assuming that the CCTB is introduced without harmonising regulations for inter-temporal loss relief such that Member States continue to use their current rules ([D]). For comparability, the effective tax burdens under national tax accounting rules at status quo ([A]) and upon the full introduction of the CCTB ([B]) using the loss scenario are also included.

If only regulations for inter-temporal loss relief are harmonised, the average change in the effective tax burden approximately amounts to -2.2% ([C] vs. [A]). However, this average is strongly affected by large tax burden decreases, e.g. in Portugal and the Slovak Republic. The median change of 0.0% is less affected by outliers and therefore constitutes a better benchmark for comparisons. As depicted in Table 21, the introduction of a common inter-temporal loss relief according to Article 41 of the CCTB draft Council Directive would have an effect which is close to zero for 20 out of the 28 Member States. This low magnitude results from timing effects indicating that ordinary losses raised in previous periods can be offset against future profits within the ten-year simulation period and that there is no final forfeiture of excess unrelieved losses.

The tax burden decreases for companies in the other Member States range from -17.4% in Portugal to -1.2% in Cyprus. Except for France, these Member States impose temporal restrictions to the allowable loss carry-forward period with a maximum of five subsequent years. In the end, these restrictions might result in a forfeiture of losses over the simulation period. Therefore, the introduction of the CCTB rules on loss relief that grant a carry-forward of losses without restrictions in time or amount would allow for a higher offset of losses against future earnings and thus, reduces the overall tax burden of the model firm. The different magnitude of the effective tax burden decreases results from differences in Member States' current national tax accounting rules. Furthermore, France and Hungary levy additional sales-based taxes that influence the overall effective tax burden and have a considerable impact on the overall effective tax burden. As sales remain constant in the loss scenario, the overall effect of different provisions for inter-temporal loss relief could be attenuated.

[108] The effect of an introduction of a cross-border loss relief according to Article 42 of the CCTB draft Council Directive is not considered in the following analysis.

Table 21: Isolated effect of the inter-temporal loss relief under the CCTB

Country	Ten-year tax burden in m. EUR				Deviation			
	National [A]	CCTB [B]	National with CCTB loss relief [C]	CCTB with national loss relief [D]	[B] vs. [A]	[C] vs. [A]	[D] vs. [A]	[B] vs. [D]
AT	24.00	24.37	23.98	24.31	1.5%	-0.1%	1.3%	0.3%
BE	23.64	22.77	23.64	22.77	-3.7%	0.0%	-3.7%	0.0%
BG	5.32	5.18	5.12	5.40	-2.6%	-3.7%	1.4%	-3.9%
CY	13.69	9.51	13.53	9.91	-30.5%	-1.2%	-27.6%	-4.1%
CZ	12.03	10.31	12.03	10.78	-14.3%	0.0%	-10.5%	-4.3%
DE	19.60	20.02	19.60	20.08	2.2%	0.0%	2.5%	-0.3%
DK	15.61	15.30	15.61	15.22	-2.0%	0.0%	-2.5%	0.5%
EE	11.79	11.79	11.79	11.79	0.0%	0.0%	0.0%	0.0%
EL	21.13	18.67	21.13	20.49	-11.6%	0.0%	-3.1%	-8.8%
ES	19.18	18.88	19.17	18.84	-1.6%	-0.1%	-1.8%	0.2%
FI	13.01	12.93	13.01	12.93	-0.6%	0.0%	-0.6%	0.0%
FR	46.00	43.34	45.16	44.70	-5.8%	-1.8%	-2.8%	-3.0%
HR	10.82	9.85	9.41	9.85	-9.0%	-13.0%	-9.0%	0.0%
HU	52.49	47.59	48.94	48.64	-9.3%	-6.8%	-7.3%	-2.2%
IE	7.38	6.67	7.38	6.67	-9.5%	0.1%	-9.5%	0.0%
IT	20.41	21.46	20.41	21.47	5.1%	0.0%	5.2%	-0.1%
LT	11.56	11.80	11.54	11.77	2.1%	-0.1%	1.8%	0.3%
LU	16.35	16.71	16.35	16.71	2.2%	0.0%	2.2%	0.0%
LV	10.90	10.79	10.85	10.76	-1.0%	-0.5%	-1.3%	0.2%
MT	14.83	19.66	14.83	19.66	32.6%	0.0%	32.6%	0.0%
NL	14.33	14.06	14.33	14.06	-1.9%	0.0%	-1.9%	0.0%
PL	12.62	11.94	12.38	13.16	-5.4%	-2.0%	4.3%	-9.3%
PT	15.68	15.26	12.95	16.92	-2.7%	-17.4%	7.9%	-9.8%
RO	9.35	9.39	9.35	9.39	0.4%	0.0%	0.4%	0.0%
SE	13.02	12.84	13.02	12.84	-1.4%	0.0%	-1.4%	0.0%
SI	10.34	10.21	10.30	10.25	-1.3%	-0.4%	-0.9%	-0.4%
SK	15.33	13.16	13.19	14.82	-14.2%	-14.0%	-3.3%	-11.2%
UK	14.77	14.65	14.81	14.61	-0.8%	0.2%	-1.1%	0.3%
Average	**16.97**	**16.40**	**16.57**	**16.74**	**-3.0%**	**-2.2%**	**-1.0%**	**-2.0%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB. [C]: inter-temporal loss relief according to CCTB, other elements according to current national rules. [D]: inter-temporal loss relief according to current national rules, other elements according to CCTB. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [D] vs. [A] and [B] vs. [D] calculated as ([C]-[A])/[A], ([D]-[A])/[A] and ([B]-[D])/[D]. Average is the simple arithmetic average.

In the reverse case where the CCTB is introduced with current national provisions for inter-temporal loss relief, the effective tax burden changes on average by -2.0% ([B] vs. [D]). Again, this average is strongly affected by outliers[109] as the median change is at 0.0%. The effect is very similar to the change in effective tax burden under current national tax law where national rules for inter-temporal loss relief have been replaced by the rules for an inter-temporal loss relief established by the CCTB (average change is -2.2%; median is 0.0%, [C] vs. [A]). Since all national tax accounting rules are harmonised except for the inter-temporal loss relief, similar effects can be observed for Member States where current national loss compensation rules are comparable.

In the Czech Republic, Greece and Hungary, the tax burden decreases due to the temporal restrictions on the loss carry-forward in the current national provisions. For taxpayers in Poland and Portugal, the current national regulations on inter-temporal loss relief impose restrictions on the loss carry-forward in time and amount. In both Member States, the carry-forward period for ordinary losses is limited to five subsequent years. Furthermore, in Poland (Portugal), the deduction of loss carry-forwards is limited to 70% (50%) of the taxable profit assessed in the relevant fiscal year. A possibility for a carry-back of losses neither exists in Poland nor in Portugal. When comparing the tax burdens in these two countries under the CCTB with national inter-temporal loss relief to the tax burdens under the full CCTB ([B] vs. [D]), the results are very similar (-9.3% for Poland and -9.8% for Portugal). In contrast, when the tax burdens under current national tax lax are compared to the tax burdens at status quo where the national provisions for inter-temporal loss relief have been replaced by the CCTB loss compensation rules ([C] vs. [A]), the effective tax burden is further influenced by other, non-harmonised tax rules leading to a remarkably different effect (-2.0% for Poland and -17.4% for Portugal).

The difference between the cases [C] vs. [A] and [B] vs. [D] for Croatia is remarkably high (-13.0% vs. 0.0%). The current national provision for loss relief restricts the temporal carry-forward to five years. In combination with other features of the Croatian corporate tax system such as very favourable depreciation rules, a loss forfeiture occurs in the baseline scenario ([A]). The CCTB rules on loss relief allow for an unlimited loss carry-forward in time and amount and therefore do not lead to a loss forfeiture. As a consequence, the tax burden decreases by 13.0%. In scenario [D], the introduction of all other elements of the CCTB including new depreciation rules hampers the evolvement of a loss forfeiture. Therefore, the more restrictive national loss relief provision in Croatia does not unfold any effect.

Furthermore, it becomes evident that the combination of temporal restrictions on loss carry-forward as well as restrictions on the amount that may be carried forward are key drivers for the change in the effective tax burden. Nevertheless, due to the ten-year simulation period used in the model framework of the European Tax Analyzer, rather general restrictions for the loss carry-forward in time limit the risk of a final forfeiture of losses and associated tax burden increasing effects in the loss scenario. It is thus comparable to an unlimited carry-forward. Overall, for most Member States, the introduction of a common inter-temporal loss relief according to the CCTB draft Council Directive has only a minor effect.

[109] For those Member States, the decrease in the effective tax burden ranges from -11.2% in the Slovak Republic to -2.2% in Hungary.

4.4 Interim conclusion

We investigate the impact of the CCTB introduction on Member States' effective tax burdens. At status quo, effective tax burdens are considerably different across Member States. On average, the effective tax burden amounts to EUR 38.92 million across Member States. While country-specific characteristics of the corporate income tax such as tax rates or tax bases are certainly the most important driver of the overall tax burden in the majority of Member States, it is further influenced by other profit or non-profit taxes due at corporate level. Upon the introduction of the CCTB, the effective tax burden would decline in all Member States except Cyprus and Malta. Here, the AGI that replaces current national NID schemes is less tax-favourable and thus leads to a higher tax burden. After the CCTB introduction, the average effective tax burden would amount to EUR 37.02 million representing an average decrease of 5.1%.

To distinguish the isolated effects of the different CCTB elements that are modelled, we further conduct several individual analyses where the impact of single elements is considered in isolation. In this context, a two-sided approach is adopted: First, the effect of a single element is analysed by replacing the relevant national rule by the applicable CCTB provision and keeping all other national tax rules unchanged. Second, in the reverse case, we simulate the introduction of the CCTB with the respective tax base element modelled according to current national tax law. We model additional specific crisis and loss scenarios to enhance the likelihood of the applicability of interest deduction limitation as well as loss compensation rules and thus be able to highlight their effects.

The two-sided isolated analysis reveals the AGI as the most important driver of changes in the effective tax burden upon the introduction of the CCTB. On average, the effective tax burden would decrease by 4.9% if the AGI was simultaneously introduced across Member States. When assuming that all other elements of the CCTB were already harmonised and implementing the AGI in a last step, the effective tax burden would on average decrease by 5.3%. These findings provide evidence that the overall effect of the CCTB (tax burden decreases on average by 5.1% across all countries) mainly stems from the AGI. For Member States that currently do not have any NID scheme in place, the additional deduction granted by the AGI narrows the tax base and thus decreases the effective tax burden. If, in contrast, Member States currently already offer a NID scheme, the tax effect of the AGI depends on the characteristics of the current scheme with regard to the NID base and rate as well as their relation to the characteristics of the AGI. Due to the particular characteristics of the AGI proposed by the CCTB, we conduct further analyses where we vary the time horizon of the rolling AGI base year (rolling base after five instead of ten years) as well as the AGI rate (no risk premium). Both analyses confirm that the tax advantage of the AGI is weaker if the AGI characteristics are less pronounced. In sum, the modified AGI would lead to a lower decrease in the effective tax burden or an even stronger disadvantage in Member States where the AGI is less favourable than the existing national NID.

Although the tax effect of depreciation schemes proves only minor in the context of the two-sided analysis (average change of +0.4% vs. -0.5%), the impact is quite heterogeneous among Member States and strongly depends on the characteristics and favourability of the current depreciation systems in relation to the CCTB schemes. Due to a wide variety of assets considered, it could also be that the effect of taxpayer-friendly rules with regard to a certain asset category is diminished by less favourable rules with regard to another category.

Also with regard to rules for the valuation of inventory as well as provisions for legal obligations, the two-sided analysis reveals only a limited impact. If the LiFo method was consistently adopted across Member States, the effective tax burden would decrease on average by 0.1%, whereas it would increase on average by 0.1% when assuming that all other provisions of the CCTB were already in place and harmonising the rules for inventory valuation in a last step. Likewise, the effective tax burden would – on average – decrease by 0.2% if all Member States allowed for the deductibility of warranty provisions. In turn, the effective tax burden would on average increase by 0.3% when considering a scenario where all other CCTB provisions hold and harmonised rules for the treatment of warranty provisions are implemented in a last step.

The treatment of inter-company dividends only has a meaningful impact on effective tax burdens if Member States currently grant credit relief for inter-company dividends; the change in tax burden under any current form of exemption is only of minor magnitude. On average, the effective tax burden decreases by 0.3% (0.2%) in the context of the two-sided analysis.

For the profitable model corporation in the reference scenario, the isolated analysis of interest deduction limitation rules and loss compensation rules does not influence the average effective tax burden. Hence, we construct an additional crisis scenario as well as a loss scenario, respectively. For the tax treatment of inter-temporal ordinary losses, the two-sided analysis again reveals a more meaningful impact on effective tax burdens in a loss scenario. On average, the effective tax burden decreases by 2.2% (2.0%) upon the harmonisation of loss compensation rules only (harmonisation of loss compensation rules in the setting of a CCTB with national rules on loss relief). Within the model framework of the European Tax Analyzer, however, the impact of loss compensation rules strongly depends on possible restrictions to the loss carry-forward in time and amount especially when the rules could lead to a (partly) loss forfeiture in the end.

In the specifically modelled crisis scenario, in contrast, the impact of harmonised interest deduction limitation rules is of low magnitude: On average, the effective tax burden would decrease by 0.1% if harmonised interest deduction limitation rules were introduced according to the rules of the CCTB while all other national rules remained unchanged. Similarly, if the CCTB was introduced without harmonising interest deduction limitation rules and interest deduction limitation rules were harmonised in a separate step, the average difference in effective tax burdens would be at 0.3%.

5 Sensitivity Analysis

5.1 Financial characteristics of the underlying model firm

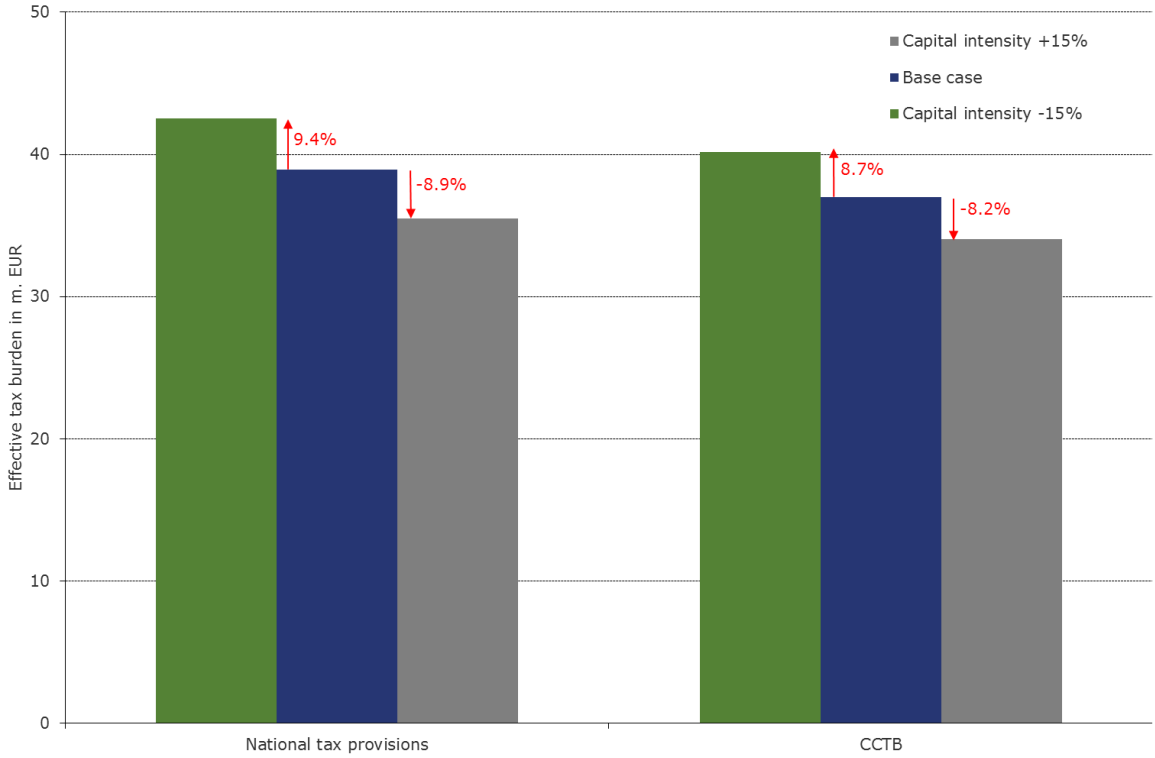
In the reference scenario (Section 4.2), we estimate the effect of the introduction of a CCTB on the effective tax burden for an EU-28 average large model corporation with financial parameters as set out in Section 3.3. In the subsequent analysis, we investigate the robustness of the results to changes in the financial characteristics of the model firm. In that regard, we modify the capital intensity, the equity ratio as well as the profitability of the model firm in the middle of the simulation period (period six of ten).[110]

First, we consider a change in the model firm's capital intensity[111] by increasing (decreasing) the sum of fixed assets by 15% with respect to the reference scenario and keeping the balance sheet total and the division of asset categories constant. To counterbalance the effect of an increase (decrease) of fixed assets, the debtor account (current assets) is adjusted accordingly.[112] In general, a higher capital intensity leads ceteris paribus to higher depreciation charges. Thus, the effective tax burdens should decrease (increase) for an increased (decreased) capital intensity.

Figure 17 displays the average effective tax burdens across the EU Member States for the model firm in the reference scenario and for a model firm with an increased (decreased) capital intensity – each under national tax provisions and under the CCTB. Under national tax provisions, the effective tax burden increases (decreases) on average by 9.4% (8.9%) when the capital intensity is decreased (increased) by 15% whereas the tax burden increases (decreases) on average by 8.7% (8.2%) in the CCTB case. Table A. 1 in the appendix provides more detailed results at country level. As expected, the effective tax burden would decrease (increase) if the model firm's capital intensity increased (decreased). The effect is of similar magnitude under national tax provisions and in the CCTB scenario. Hence, the change in tax burden in response to a change in the capital intensity does not differ considerably when replacing the current national rules by the provisions of the CCTB. Small differences can be attributed to the interplay of the depreciation, profits and the AGI. In addition, the effective tax burden in the CCTB framework is lower than under national rules throughout all specifications. This confirms the robustness of the results derived in Section 4.2, i.e. that the introduction of the CCTB would result in a decrease in the effective tax burden, regardless of the capital intensity of the firm.

[110] For a general description of the approach and a similar reasoning on the effects of the modified ratios illustrated in this section, see Spengel et al. (2008), pp. 61-71; VVA Consulting/ZEW (2015), Annex 1, pp. 68-70; Bräutigam (2017), pp. 72-74.
[111] The capital intensity of the model firm is calculated as the sum of fixed assets divided by the balance sheet total (total assets) in period six.
[112] See VVA Consulting/ZEW (2015), Annex 1, p. 69.

Figure 17: Impact of the capital intensity of the model firm on the effective tax burden (national tax provisions and CCTB, ten-year period)



Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro. Blue bars: base case. Green (grey) bars: capital intensity is decreased (increased) by 15%. Red arrows: percentage change that results from the variation in capital intensity. Deviations are calculated as simple averages of national percentage changes to tax burden under each comparison, as reported in Table A. 1 in the appendix.

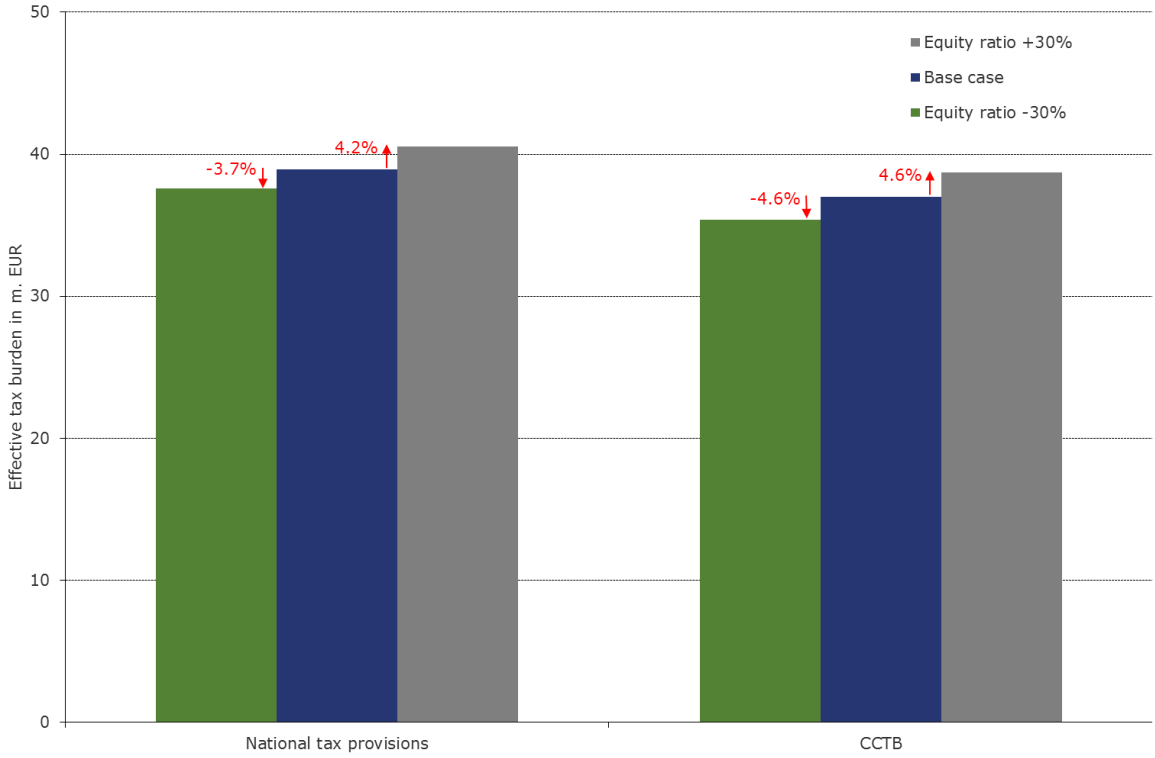
Next, we increase (decrease) the model firm's equity ratio[113] by 30% by modifying long-term debt and loans in equal shares while the balance sheet total is held constant. A higher (lower) equity ratio leads to lower (higher) liabilities and interest expenses. In general, this should lead to higher (lower) profits and an increase (decrease) in the effective tax burden. The reduction in tax burden due to a lower equity ratio is partly mitigated by interest deduction limitation rules that are in place in many Member States. A corresponding rule is included in Article 13 of the CCTB draft Council Directive. The applicability of such rules is more probable for a low equity ratio, such that interest expenses are in part not deductible. Under the CCTB, a variation of the equity ratio will further influence the AGI. For high (low) equity levels, the effect of the AGI will be more (less) pronounced.

The average effective tax burdens across the EU Member States for model firms with different equity ratios are depicted in Figure 18. Again, the effective tax burdens under national tax provisions and under the CCTB are contrasted. Country-specific effects are displayed in the appendix (see Table A. 2). As expected, an increase (decrease) in the equity ratio of the model firm would induce an increase (decrease) in the effective tax burden. Under national tax provisions, the effective tax burden decreases (increases) on average by 3.7% (4.2%) when the equity ratio is decreased (increased) by 30%. In turn, under the CCTB, the effective tax burden decreases

[113] The equity ratio of the model firm is calculated as equity (common stock + other equity) divided by the balance sheet total in period six.

(increases) on average by 4.6% in case the equity ratio is decreased (increased) by 30%. The changes in tax burden thus behave largely similar at status quo and under the CCTB. In case of the CCTB, the effect is of slightly higher magnitude due to the additional influence of the AGI outlined above. The effective tax burden under the CCTB remains smaller than the effective tax burden under current national rules throughout all variations. Again, this provides evidence that the effect of the introduction of the CCTB identified in the reference scenario (Section 4.2) also holds for firms with different debt-equity structures.

Figure 18: Impact of the equity ratio of the model firm on the effective tax burden (national tax provisions and CCTB, ten-year period)



Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro. Blue bars: base case. Green (grey) bars: equity ratio is decreased (increased) by 30%. Red arrows: percentage change that results from the variation in the equity ratio. Deviations are calculated as simple averages of national percentage changes to tax burden under each comparison, as reported in Table A. 2 in the appendix.

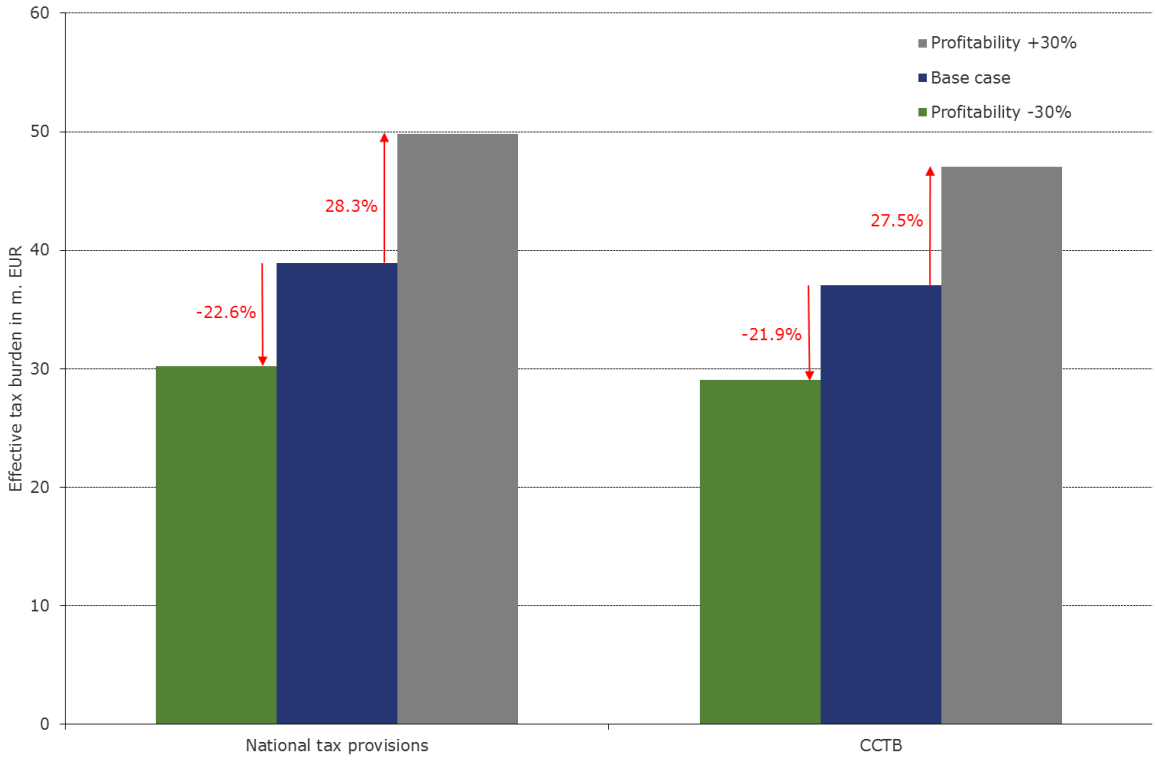
Finally, we evaluate the impact of a different profitability of the model firm on the effective tax burden. In that regard, we increase (decrease) sales revenues by 30% and hold expenses constant, such that the return on sales[114] varies accordingly. Generally, an increase (decrease) in sales revenues should result in a higher (lower) taxable profit and periodical liquidity and thus in a higher (lower) effective tax burden.

Figure 19 illustrates the average effective tax burdens across the EU Member States depending on the profitability of the model firm at status quo and under the CCTB. The detailed results at country level are displayed in Table A. 3 in the appendix. In line with the expectations outlined above, the effective tax burden increases (decreases) with an increasing (decreasing) profitability, both under national tax provisions and in

[114] The return on sales ratio of the model firm is calculated as profit after taxes divided by sales.

the CCTB case. Since the profitability directly relates to the taxable profit, the change in tax burden is stronger than the change due to the variation of the capital intensity and the equity ratio described above. Under national law, the changes in the effective tax burden induced by a 30% lower (higher) profitability are at -22.6% (28.3%) on average. In the CCTB case, the effective tax burden decreases on average by 21.9% for a 30% lower profitability whereas it increases on average by 27.5% for a 30% higher profitability. Hence, the effect is marginally less pronounced for the CCTB scenario as compared to the scenario under national tax provisions. For decreasing levels of profitability, the application of profit-based interest deduction limitation rules is more probable. The CCTB draft Council Directive prescribes the introduction of a profit-based earnings stripping rule in Article 13 whereas several Member States do not limit interest deductibility at all or apply a different approach in their current national tax law (see Section 2.7). Hence, the overall risk of non-deductible interest is higher across all Member States in the CCTB case. As such, the tax burden decrease is slightly mitigated when compared to the national case. For increasing levels of profitability, the small difference in magnitude can be attributed to interaction effects between the profitability level and the AGI. For all profitability levels considered, the effective tax burden under the CCTB falls below the effective tax burden under current national rules. Hence, the effect of the introduction of the CCTB identified in the reference scenario (Section 4.2) is robust to variations in the profitability level of the underlying model firm.

Figure 19: Impact of the profitability of the model firm on the effective tax burden (national tax provisions and CCTB, ten-year period)



Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro. Blue bars: base case. Green (grey) bars: profitability is decreased (increased) by 30%. Red arrows: percentage change that results from the variation in profitability. Deviations are calculated as simple averages of national percentage changes to tax burden under each comparison, as reported in Table A. 3 in the appendix.

Overall, the average changes in the effective tax burden induced by certain isolated modifications to the model assumptions are in the same direction and of similar magnitude under current national tax provisions and under the CCTB. The introduction of a CCTB would hence not substantially alter the impact of the variation of certain financial characteristics on the effective tax burden as compared to the impact at status quo. In addition, the analysis demonstrates that the effective tax burden under the CCTB is lower than the effective tax burden under national tax provisions throughout all specifications. In other words, the tax burden reducing effect of the introduction of the CCTB holds for model firms with different financial ratios. This confirms the robustness of the results identified in the main analysis.

5.2 Industry of the underlying model firm

In all previous sections, effective tax burdens have been calculated against the background of a model corporation that represents an average firm across different industries. However, as illustrated in Section 5.1, the introduction of the CCTB might affect firms with different financial characteristics differently. In the following, the overall tax effect of the CCTB introduction is thus analysed for model firms operating in distinct industries, i.e. commerce, construction, energy as well as manufacturing. The underlying financial ratios for these industries are shown in Table 22.[115] This industry analysis allows to verify the robustness of the results from the reference scenario (Section 4.2) as well as to augment the previous case-by-case analysis (Section 5.1).

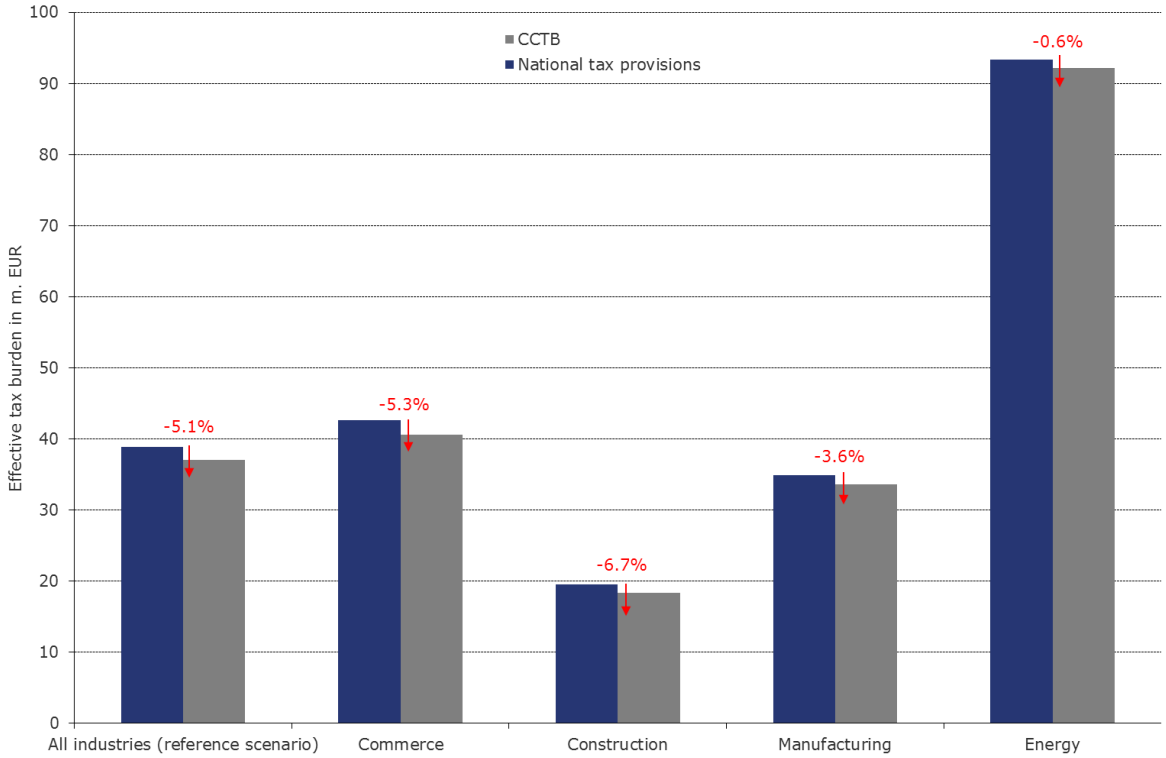
Table 22: Financial ratios of the industry-specific model firms (period 6 of 10)

	All industries	Com-merce	Construc-tion	Manu-facturing	Energy
Net profit for period (in m. EUR)	10.38	10.66	4.98	10.05	31.51
Total assets (in m. EUR)	171.95	177.55	102.84	171.40	663.74
Sales (in m. EUR)	209.69	369.61	106.23	168.73	459.40
Return on sales *(profitability)*	4.95%	2.89%	4.69%	5.95%	6.86%
Share of tangible fixed assets *(capital intensity)*	23.93%	18.16%	17.39%	28.83%	35.75%
Equity ratio	42.57%	38.70%	42.29%	38.46%	16.82%

As described in the reference scenario in Section 4.2, the introduction of a harmonised tax base according to the proposed CCTB draft Council Directive would – on average – result in a decrease in the effective tax burden across all industries at 5.1% (Figure 20). A similar trend can be observed for the single industries, as the average change in the national effective tax burdens is a decrease in all sectors considered. However, the decline is not uniform across industries and varies from an average decline of -0.6% in the energy sector to an average decline of -6.7% in the construction industry. Hence, the impact of the CCTB introduction is seemingly driven by different pre-tax financial characteristics of the industry-specific model firms and possible changes to tax provisions that relate to these characteristics. For country-specific results across industries, see Table A. 4 to Table A. 7 in the appendix.

[115] See also Spengel et al. (2008), pp. 72-78; Spengel et al. (2012), pp. 213-215; Bräutigam (2017), pp. 84-89 for an analysis of effective tax burdens for different industries.

Figure 20: Impact on effective tax burdens of firms in different industries (national tax provisions and CCTB, ten-year period)



Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro. Blue bars: status quo (current national tax accounting rules as of 2017). Grey bars: full CCTB. Red arrows: percentage change that results from the CCTB introduction for model corporations in different industries, defined as (CCTB–National)/National. Deviations are calculated as simple averages of national percentage changes to tax burden under each comparison, as reported in Tables A. 4 – A. 7 in the appendix.

As identified in particular in Section 4.3.1, the AGI is the most important driver of changes in effective tax burdens induced by the introduction of the CCTB. Due to their interdependencies with distinct financial ratios, industry-specific changes to the financial characteristics of the model firm can have an impact on effective corporate tax burdens upon the introduction of the CCTB, especially with regard to the AGI (see also Section 5.1). First, when compared to the average case across all industries, changes to the equity ratio might enhance or weaken the tax burden reducing effects associated with the AGI. In addition, a higher (lower) equity ratio could decrease (increase) the risk of non-deductible interest. Second, the AGI is granted with respect to increases in equity. Therefore, increasing levels of profitability would lead to higher equity base increases and reinforce the tax burden reducing effects of the AGI. Third, a higher capital intensity goes along with higher depreciation charges. As identified in Section 4.3.2, the CCTB depreciation rules are slightly less tax-favourable than most current national provisions. Therefore, the associated increase in effective tax burdens upon the introduction of the CCTB would be slightly reinforced for firms with a high capital intensity.

In the reference scenario (Section 4.2), the effective tax burden decreases on average by 5.1% across all industries. Although the magnitude of the decrease differs, in principle, this decrease is confirmed in the consideration of specific industries. As evident from Figure 20, the highest average decrease can be observed for the construction industry at 6.7% whereas the average decrease is by far lowest at 0.6% in the energy sector. All industry-specific model corporations differ from the average

firm used in the reference scenario in various dimensions. Hence, several, in part also mutually reinforcing effects drive the magnitude of the reduction in effective tax burdens upon the introduction of the CCTB.

This can be illustrated based on the example of the model corporation in the energy sector which represents an outlier in the industry-specific analysis of the impact of the introduction of the CCTB: The overall tax burden of the energy firm is considerably higher than the industry average due to its high sales and profitability. In general, the high profitability would also reinforce the tax burden reducing effects of the AGI. Still, the energy firm is further characterised by its very low equity ratio. Along with a higher risk of non-deductible interest due to the applicability of interest deduction limitation rules, the energy firm can thus only benefit from the AGI to a minor degree. In addition, a higher capital intensity reinforces the slight disadvantageous effect of the CCTB depreciation rules and thus further diminishes the overall reduction in effective tax burdens from the introduction of the CCTB. As a whole, the average decline in effective tax burdens upon the introduction of the CCTB is by far smallest for the model firm in the energy sector compared to the other industry-specific model firms (-0.6%).

Overall, the above analysis illustrates the effect of the CCTB introduction for various industries. In general, the analysis confirms the tax burden reducing effect of the introduction of the CCTB. Still, the magnitude of this reduction is substantially different across industries as the interplay of various changes to the model firm's financial ratios and the resulting interactions with the CCTB provisions affect the change in effective tax burdens.

6 R&D Scenario: Impact of the CCTB Provisions including R&D Tax Incentives on the Effective Tax Burdens in the EU Member States

6.1 Motivation and assumptions for the R&D scenario

One of the new elements that was introduced upon the re-launch of the CC(C)TB draft Council Directive in 2016 was the R&D super-deduction. According to Article 9 (3), R&D expenditure up to EUR 20 million can be deducted at 150% of the actual R&D costs whereas any R&D expenditure that exceeds this threshold is deductible at 125% of the actual costs. To date, 24 out of 28 EU Member States apply some sort of input- or output-based R&D tax incentive which would have to be replaced by the R&D super-deduction upon the introduction of the CCTB (see also Section 2.3). To distinguish the effect of the CCTB R&D super-deduction from the impact of the harmonisation of the other tax base provisions, this section replicates the main analysis on the overall effects of the CCTB introduction for a specific R&D scenario within the model framework of the European Tax Analyzer. Based on a first general analysis of the impact of current input-based R&D tax incentives available in the Member States, we examine the effect that the replacement of national tax accounting rules and input-based R&D tax incentives by the CCTB and associated R&D super-deduction would have for R&D companies. However, we do not consider output-based R&D tax incentives, i.e. so-called IP box regimes that are available in twelve Member States (see Section 2.3). Under such regimes, countries offer a special reduced rate for income from intellectual property. Since there is no publicly available data on the royalty and license income an average EU corporation derives from the use of its intellectual property, we refrain from including IP box regimes into the subsequent analysis.[116]

For fiscal year 2017, 21 out of 28 Member States provide specific input-based R&D tax incentives (see Section 2.3) that have been implemented in the model framework of the European Tax Analyzer. An overview and classification of the implemented R&D tax incentives for the Member States can be found in Table A. 8 in the appendix.[117]

Bulgaria, Estonia, Germany and Sweden do not have any R&D tax incentives in place. For all other Member States, we limit our considerations to general R&D tax incentives and thus abstain from the inclusion of specific incentives that might be only applicable to corporations in certain regions, to certain narrow types of activity, to corporations of specific size (i.e. SME-specific incentives) or under similar constraints. One example of such a specific R&D tax incentive is the additional tax deduction in Hungary that can only be claimed if the R&D activities are conducted jointly with a research institution.

In the R&D scenario, we consider the same large average model corporation as for the rest of the analysis, but now include R&D tax incentives. The research intensity of this underlying large average model corporation has been determined based on the "7th Community Innovation Survey 2010" which was conducted by Eurostat.[118] This allows to calculate an average R&D expense in relation to sales. The application of R&D tax incentives is restricted to certain expense categories (e.g. R&D personnel, assets used for R&D purposes).[119] OECD statistics are used to allocate overall R&D expenses to the

[116] See also VVA Consulting/ZEW (2015), pp. 76 f.
[117] Information on current national R&D tax incentives has been gathered from the IBFD database as well as special R&D tax guides and studies, such as EY (2017); PwC (2017); Ernst et al. (2016).
[118] See VVA Consulting/ZEW (2015), Annex 1, p. 66.
[119] See VVA Consulting/ZEW (2015), Annex 1, p. 66 for a similar approach.

different categories based on average values across EU Member States.[120] Division factors refer to data from 2013 due to data availability.

6.2 Impact of national R&D tax incentives

In a first step, the impact of R&D tax incentives ([B]) is analysed in relation to the baseline scenario ([A], status quo according to national tax provisions without any R&D tax incentives), see Table 23.[121] When compared to the baseline scenario, the effective tax burden is – on average – by 6.2% lower when current national R&D tax incentives are considered ([B] vs. [A]). The reduction in the effective tax burden varies from 0.4% in Finland to 29% in Ireland. In Finland, a 20% accelerated depreciation is currently available for industrial and office buildings used for R&D purposes. Although this rate is substantially higher than the regular depreciation rates for industrial and office buildings (7% and 4%, respectively), its scope is limited to buildings that are used for R&D purposes, which explains the comparatively small effect. The high reduction in Ireland, in contrast, is driven by the generous immediate depreciation for all assets used in the R&D process. The immediate depreciation is complemented by two different volume-based tax credits: A 25% tax credit is available for R&D capital expenditure, personnel and current costs. If the tax credit cannot be fully used during a given period, it may be carried back to the previous period or carried forward indefinitely. Furthermore, a 25% tax credit on costs related to the construction or refurbishment of buildings used for R&D purposes is granted.

In general, high reductions exceeding 10% are observed especially in Member States where the effective tax burden is already comparatively low at status quo (e.g. Croatia, Czech Republic, Ireland, Latvia, Lithuania, Slovenia). Hence, from a mere tax perspective, Member States with an attractive overall corporate tax system also seem to establish an attractive R&D environment for corporations.[122]

[120] See OECD (2018).
[121] The subsequent analysis follows the approach and reasoning of VVA Consulting/ZEW (2015), pp. 74-78.
[122] See VVA Consulting/ZEW (2015), p. 78.

Table 23: Impact of the CCTB R&D super-deduction on the effective tax burdens in the EU Member States

Country	Ten-year tax burden in m. EUR				Deviation		
	National without R&D tax incentives [A]	National with national R&D tax incentives [B]	National with CCTB R&D super-deduction [C]	CCTB with CCTB R&D super-deduction [D]	[B] vs. [A]	[C] vs. [B]	[D] vs. [B]
AT	51.10	48.69	48.83	45.57	-4.7%	0.3%	-6.4%
BE	57.99	56.82	54.91	51.60	-2.0%	-3.4%	-9.2%
BG	17.02	17.02	16.10	14.31	0.0%	-5.4%	-15.9%
CY	19.81	19.81	18.73	20.39	0.0%	-5.5%	2.9%
CZ	31.53	26.57	29.81	26.79	-15.7%	12.2%	0.8%
DE	53.64	53.64	50.79	46.87	0.0%	-5.3%	-12.6%
DK	39.10	39.10	37.10	34.01	0.0%	-5.1%	-13.0%
EE	32.96	32.96	32.96	32.96	0.0%	0.0%	0.0%
EL	49.89	47.06	47.26	43.28	-5.7%	0.4%	-8.0%
ES	50.80	48.37	48.55	45.67	-4.8%	0.4%	-5.6%
FI	34.79	34.66	32.97	30.03	-0.4%	-4.9%	-13.3%
FR	76.27	71.98	73.15	69.82	-5.6%	1.6%	-3.0%
HR	29.21	24.73	27.58	25.05	-15.4%	11.5%	1.3%
HU	53.15	53.15	52.33	51.66	0.0%	-1.5%	-2.8%
IE	21.01	14.92	19.87	17.81	-29.0%	33.2%	19.4%
IT	45.03	44.61	42.82	41.69	-0.9%	-4.0%	-6.5%
LT	28.23	22.77	26.87	24.76	-19.3%	18.0%	8.7%
LU	47.62	47.38	45.22	41.31	-0.5%	-4.6%	-12.8%
LV	27.29	24.00	25.92	23.75	-12.1%	8.0%	-1.0%
MT	40.99	39.28	37.47	49.67	-4.2%	-4.6%	26.5%
NL	41.46	40.00	39.19	35.46	-3.5%	-2.0%	-11.4%
PL	32.85	31.40	31.12	28.27	-4.4%	-0.9%	-10.0%
PT	41.23	35.64	38.76	37.35	-13.6%	8.7%	4.8%
RO	27.31	25.83	25.85	23.32	-5.4%	0.1%	-9.7%
SE	36.86	36.86	34.86	31.58	0.0%	-5.4%	-14.3%
SI	31.32	27.39	29.59	26.70	-12.5%	8.0%	-2.5%
SK	35.97	34.64	34.07	31.12	-3.7%	-1.7%	-10.2%
UK	35.34	32.14	33.61	30.85	-9.1%	4.6%	-4.0%
Average	**38.92**	**36.84**	**37.01**	**35.06**	**-6.2%**	**1.9%**	**-3.9%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017, without R&D tax incentives). [B]: status quo incl. R&D tax incentives. [C]: current national rules without R&D tax incentives, plus CCTB R&D super-deduction. [D]: full CCTB incl. R&D super-deduction. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [B] and [D] vs. [B] calculated as ([C]-[B])/[B] and ([D]-[B])/[B]. Average is the simple arithmetic average.

The majority of Member States offers R&D tax incentives that are targeted at the corporate income tax base, i.e. accelerated depreciations or enhanced deductions (see Section 2.3). The impact of accelerated depreciations for R&D purposes depends on the design of the general depreciation rules:[123] In Luxembourg, for example, machinery and equipment used for R&D can be depreciated at a slightly higher rate of 40% instead of the general declining-balance rate of 30%. Overall, this results only in a modest reduction of the effective tax burden at 0.5%. On the other hand, in the United Kingdom, immediate depreciation is available for machinery, equipment, furniture, buildings and intangibles which has a much stronger effect due to both a broader scope of assets covered and a larger difference in the applicable depreciation rates. In combination with an 11% volume-based tax credit on R&D personnel and current costs, the reduction in the effective tax burden amounts to 9.1%. In other Member States such as Belgium, Greece, Latvia and Romania, accelerated depreciation of assets used for R&D is complemented by an enhanced deductibility of certain costs which enhances the effect of the R&D tax incentives. These additional deductions range from 13.5% in Belgium (based on capital expenditure in tangible and intangible assets) to a 200% additional deduction of personnel expenses in Latvia. In the Czech Republic, Croatia, Lithuania, Poland, the Slovak Republic and Slovenia, only an enhanced deduction is in place that ranges from a 25% additional deduction for current costs in the Slovak Republic to an additional deduction of 200% of personnel and current costs in Lithuania. Overall, the enhanced deductibility reduces the effective tax burden by more than 15% in the respective Member States except Poland and the Slovak Republic.

Several Member States also have R&D tax credits in place that reduce the amount of tax due (Austria, France, Ireland, Malta, Netherlands, Portugal, Spain and United Kingdom). Usually, the tax credits are related to R&D personnel and current expenses. Apart from Austria, the Netherlands and Portugal, all of these Member States additionally have another R&D tax incentive in place. Nevertheless, it depends on the design of each particular R&D tax incentive whether a combination of two or more incentives has a stronger impact on the effective tax burden than the application of a single incentive. Hence, it could be that a very generous tax base incentive such as the 200% volume-based additional deduction in Lithuania induces a higher reduction to the overall tax burden than the combination of a comparatively narrow tax base incentive and several tax credits in Spain.[124]

In sum, R&D tax incentives can have a considerable impact on the effective tax burden of corporations. However, the implications of single R&D tax incentives cannot be traced back to the instrument itself. Rather, the effect is influenced by the scope of the instrument, the general design (e.g. credit rates, volume-based or incremental character, costs covered) as well as the interaction with other provisions of the general tax code.

6.3 Overall effect of the introduction of the CCTB for R&D companies

If national R&D tax incentives were replaced by the R&D super-deduction according to Article 9 (3) of the CCTB draft Council Directive (Table 23, [C]), the impact on the effective tax burden would be very heterogeneous. On average, the effective tax burden would increase by 1.9% compared to the tax burden under prevailing national R&D tax incentives ([C] vs. [B]). Changes range from a decrease of 5.5% in Cyprus to an increase of 33.2% in Ireland. Especially in Member States where corporations can

[123] See also VVA Consulting/ZEW (2015), p. 77 for a similar reasoning and explanations with regard to tax base incentives.

[124] See also VVA Consulting/ZEW (2015), p. 77 for a similar reasoning and explanations with regard to the effect of tax credits.

benefit considerably from the current R&D tax incentives, the effect reverses upon the harmonisation of R&D tax incentives and effective tax burdens increase in those Member States (e.g. Croatia, Czech Republic, Ireland, Lithuania). In these countries, the additional deduction of 50% (or 25% for R&D expenditure above EUR 20 million) offered by Article 9 (3) of the CCTB draft Council Directive is less attractive for companies than existing national R&D tax incentives. Reasons are manifold and include higher additional deductions (e.g. Czech Republic, Lithuania), a broader scope of eligible costs (e.g. Croatia) or the availability of other, more generous incentives (e.g. Ireland).

For the majority of Member States where no R&D tax incentive has been modelled in the R&D baseline scenario (Bulgaria, Cyprus, Denmark, Germany, Sweden), the tax burden would decrease by approximately 5%. Only in Hungary, the decrease is less strong at 1.5%. Although no R&D tax incentive has been available in Hungary in the R&D baseline scenario, the main driver of the effective tax burden at corporate level is the local trade tax (see also Section 4.2). Hence, the impact of the CCTB R&D super-deduction as an additional deduction from the corporate income tax base is not as pronounced as in other Member States. Especially corporations in Bulgaria would benefit from the (harmonised) introduction of the R&D super-deduction: In the overall baseline scenario without any R&D tax incentives, the effective tax burden is lowest in Bulgaria. In the R&D baseline scenario ([B]), on the other hand, the effective tax burden is lowest in Ireland since Bulgaria does not offer any R&D tax incentive whereas Irish R&D tax incentives are very generous. Upon the EU-wide harmonisation of R&D tax incentives, however, the tax burden would increase for Irish corporations while it would decrease for Bulgarian corporations and thereby increase the tax attractiveness of Bulgaria as a location for R&D.

In a next step, the effects of the introduction of the CCTB including the R&D super-deduction shall be evaluated in order to extend the analysis in Section 4.2 to corporations that are engaged in R&D activities (Table 23, [D]).[125] The effective tax burden decreases on average by 3.9% if the CCTB is introduced for R&D companies ([D] vs. [B]). The strongest decrease is at 15.9% in Bulgaria whereas the increase at 26.5% in Malta is highest. Overall, the effective tax burden for R&D companies decreases in 20 Member States whereas it increases in seven Member States.[126]

Except for Cyprus and Malta, the effective tax burden increases in those countries where the tax burden reducing effect of the CCTB R&D super-deduction is of lower magnitude when compared to the currently existing national R&D tax incentives (e.g. Croatia, Ireland, Lithuania). Hence, the tax burden increasing effect that results from replacing current R&D tax incentives outweighs the overall tax burden reducing effect that was associated with the introduction of the CCTB in the reference scenario (Table 10 in Section 4.2). In Greece, Latvia, Romania, Slovenia and Spain, in contrast, the effects are reversed.

Although no R&D tax incentive has been modelled for Cyprus in the R&D baseline scenario (Table 23, [B]), the effective tax burden would increase by 2.9% upon the introduction of the CCTB. When compared to the effect of the CCTB introduction in the reference scenario without national R&D tax incentives (Section 4.2), it is evident that the overall increase in the effective tax burden is mitigated by the consideration of the R&D super-deduction. In the reference scenario, the tax burden increases by 8.8% which is mainly driven by the replacement of the national NID by the AGI (Section 4.3.1). Hence, the availability of the R&D super-deduction can at least in part

[125] We do not consider a scenario where the CCTB is implemented without the R&D super-deduction and national R&D tax incentives continue to apply instead.
[126] In Estonia, the introduction of a CCTB at EU-level would not affect the effective tax burden. See also Section 4.1 for a more detailed reasoning.

counterbalance the tax burden increasing effects associated with the AGI for Cyprian corporations. A similar reasoning is true for Malta: In a national setting, the R&D super-deduction proposed in Article 9 (3) of the CCTB draft Council Directive has a slightly more favourable impact on the effective tax burden than the combination of an additional 50% volume-based deduction of current expenses and a 15% volume-based tax credit for expenditure incurred during the preceding period ([C] vs. [B] > [B] vs. [A]). Without consideration of R&D tax incentives, the tax burden would increase by 29.3% (Section 4.2, Table 10). In the R&D scenario, the R&D super-deduction could – to a small extent – diminish the increase in the effective tax burden associated with the introduction of the CCTB. Overall, the tax burden increase would be slightly reduced to 26.5%.

In Member States where no R&D tax incentive is available in the R&D baseline scenario, the reduction of the effective tax burden is especially pronounced (except Cyprus for the reasons explained above). Similarly, the effective tax burden decreases especially in Member States where the magnitude of national R&D tax incentives is less strong in the R&D baseline scenario (e.g. Finland, Italy, and Luxembourg) upon the introduction of the CCTB. The additional deduction of R&D expenses reinforces the tax burden reducing effect that the introduction of the CCTB would have for corporations situated in these Member States.

In sum, the effect of the introduction of the CCTB for corporations that are engaged in R&D activities is mixed. Especially in Member States that have very favourable R&D tax incentives in place, the tax burden increasing effects that result from the replacement of these incentives by the CCTB R&D super-deduction outweigh the tax burden reducing effects identified in Section 4.2 that would generally be associated with the introduction of the CCTB. In Member States where currently no R&D tax incentive is in place or where R&D tax incentives only have a minor effect in reducing the overall effective tax burden, the positive overall effect of the CCTB introduction is even reinforced when compared to the reference scenario without R&D tax incentives.

6.4 Interim conclusion

To date, the vast majority of Member States offer some sort of R&D tax incentive. In general, the design of the R&D tax incentives varies widely across Member States and many countries combine the use of several approaches. Depending on the respective design and scope of the incentives as well as on their relation to current regular tax accounting rules, the impact of Member States' R&D tax incentives on the effective tax burden differs.

For corporations that pursue R&D activities and can make use of current national R&D tax incentives (if available), the effect of the CCTB introduction is very heterogeneous. On the one hand, in Member States that do not offer any R&D tax incentives under current domestic law or where the impact of such incentives is only minor, the inclusion of the R&D super-deduction set out in Article 9 (3) of the CCTB draft Council Directive would reinforce the overall positive tax effects associated with the introduction of the CCTB and lead to lower effective tax burdens. In Cyprus and Malta, the R&D super-deduction could at least in part diminish the negative effects that result from the replacement of the current NID rules by the AGI. On the other hand, the overall effect of the introduction of a super-deduction for R&D costs would result in a higher effective tax burden in Member States that currently offer very generous R&D tax incentives.

7 Comparison of the Effects of the CCTB Draft Council Directives as of 2011 and 2016

The CCTB draft Council Directives of 2011 and 2016 differ in various dimensions. The most important changes which concern the elements of the tax base computation considered in this study are depicted in Table 24.

Table 24: Changes between 2011 and 2016 CCTB draft Council Directives

Element of tax base computation	CCTB 2011	CCTB 2016
Depreciation	Industrial buildings: 40 years; Fixed tangible assets with useful life < 15 years: asset pool (25%) (Art. 36, 39)	Industrial buildings: 25 years; Fixed tangible assets with useful life ≥ 8 years and < 15 years: 8 years; fixed tangible assets with useful life < 8 years: asset pool (25%) (Art. 33, 37)
Inventory valuation	FiFo or weighted-average cost[127] (Art. 29 (1))	FiFo, LiFo[128] or weighted-average cost (Art. 19 (2))
Pension provisions	Member States' discretion, but provisions must be discounted by reference to Euribor for obligations with a maturity of 12 months (Art. 26)	Member States' discretion (Art. 24)
Avoidance of double taxation of dividends	Exemption (95%) (Art. 11 c), 14 g))	Exemption (100%) (Art. 8 d))
Interest deduction limitation	-	Limitation (Art. 13)
Cross-border loss relief	-[129]	Possible with regard to immediate qualifying subsidiaries or permanent establishments in other Member States (Art. 42 (1))
Notional interest deduction	-	Allowance for Growth and Investment (Art. 11)
R&D tax incentive	-	R&D super-deduction (Art. 9 (3))

[127] We assume that the weighted-average cost method as the more tax-favourable approach is consistently adopted by companies across all Member States.
[128] We assume that the LiFo method as the most tax-favourable approach is consistently adopted by companies across all Member States.
[129] Since the original proposal for a CC(C)TB was intended to be implemented in one step, a mechanism for cross-border loss relief was not necessary since it was automatically granted through consolidation.

The limitation on the deduction of interest, the cross-border loss relief, the Allowance for Growth and Investment and the R&D super-deduction constitute new elements of the 2016 CCTB draft Council Directive. The depreciation rules, the rules for inventory valuation and the method for avoidance of double taxation of dividends have been slightly adapted and become more tax-favourable under the 2016 proposal than under the 2011 proposal. Whereas the 2011 proposal prescribed a discount rate for pension provisions, Member States can continue to apply their national discount rates under the 2016 proposal.

Table 25 shows the effective tax burdens in the EU Member States under current national tax provisions (legal status as of 2017), under the CCTB as of 2016 and under the CCTB as of 2011.[130] The changes in the tax burdens as compared to status quo as well as the deviation between the two CCTB proposals are tabulated in the second part of the table.

When implementing the 2011 CCTB draft Council Directive, the average change in the effective tax burden across the EU-28 Member States amounts to +2.8% and is 7.9 percentage points higher than the average deviation under the 2016 CCTB draft Council Directive (-5.1%). The implementation of the 2011 CCTB exerts only a small effect on the effective tax burden. In those Member States that currently do not have a NID scheme in place, the deviation under the CCTB as of 2011 as compared to national tax law ranges from -0.6% in Greece to +2.1% in Croatia and is hence close to zero ([C] vs. [A]). In those Member States that allow for the deduction of fictitious interest on equity (Belgium, Cyprus, Italy, Malta and Portugal), the deviation under the CCTB as of 2011 as compared to national tax law ranges from +1% in Belgium to +40% in Malta ([C] vs. [A]). This increase is due to the fact that the 2011 CCTB proposal did not foresee an AGI or a similar deduction for notional interest. The national NID schemes are no longer applicable under the 2011 CCTB. The more tax advantageous the national NID scheme, the higher is the disadvantage of the 2011 CCTB.

The difference in impact between the two proposals amounts to -7.6% on average ([B] vs. [C]). This can be explained as follows: First, as shown above and in Section 4.3, the provisions other than the AGI have only a small impact, both under the 2011 and the 2016 CCTB proposal. Second, the percentage deviations in columns "[B] vs. [A]" and "[B] vs. [C]" are close together for those Member States without a NID scheme in place. Taken together, these findings demonstrate that the difference between the impact of the 2011 and 2016 CCTB proposals mainly stems from the AGI.

[130] For the sake of comparability, the assumptions underlying the model calculations of Section 4.1 are also valid for the calculations in this section. Hence, we also abstain from including R&D tax incentives into the comparison.

Table 25: Comparison of the impact of the 2016 and 2011 CCTB draft Council Directives on the effective tax burdens in the EU Member States

Country	Ten-year tax burden in m. EUR			Deviation		
	National [A]	CCTB 2016 [B]	CCTB 2011 [C]	[B] vs. [A]	[C] vs. [A]	[B] vs. [C]
AT	51.10	47.92	51.12	-6.2%	0.0%	-6.3%
BE	57.99	54.82	58.57	-5.5%	1.0%	-6.4%
BG	17.02	15.23	17.09	-10.5%	0.4%	-10.8%
CY	19.81	21.55	23.74	8.8%	19.9%	-9.2%
CZ	31.53	28.57	31.67	-9.4%	0.4%	-9.8%
DE	53.64	49.83	53.62	-7.1%	0.0%	-7.1%
DK	39.10	36.07	39.09	-7.7%	0.0%	-7.7%
EE	32.96	32.96	32.96	0.0%	0.0%	0.0%
EL	49.89	46.01	49.58	-7.8%	-0.6%	-7.2%
ES	50.80	48.01	51.02	-5.5%	0.4%	-5.9%
FI	34.79	31.90	34.76	-8.3%	-0.1%	-8.2%
FR	76.27	73.09	76.47	-4.2%	0.3%	-4.4%
HR	29.21	26.73	29.83	-8.5%	2.1%	-10.4%
HU	53.15	52.50	53.53	-1.2%	0.7%	-1.9%
IE	21.01	18.97	20.99	-9.7%	-0.1%	-9.6%
IT	45.03	43.95	47.10	-2.4%	4.6%	-6.7%
LT	28.23	26.15	28.43	-7.4%	0.7%	-8.0%
LU	47.62	43.80	47.55	-8.0%	-0.2%	-7.9%
LV	27.29	25.15	27.44	-7.8%	0.6%	-8.4%
MT	40.99	52.99	57.38	29.3%	40.0%	-7.6%
NL	41.46	37.81	41.55	-8.8%	0.2%	-9.0%
PL	32.85	30.04	32.81	-8.5%	-0.1%	-8.4%
PT	41.23	39.94	43.56	-3.1%	5.7%	-8.3%
RO	27.31	24.81	27.52	-9.2%	0.8%	-9.8%
SE	36.86	33.64	36.99	-8.7%	0.4%	-9.1%
SI	31.32	28.47	31.29	-9.1%	-0.1%	-9.0%
SK	35.97	33.09	36.06	-8.0%	0.2%	-8.2%
UK	35.34	32.63	35.33	-7.7%	0.0%	-7.6%
Average	**38.92**	**37.02**	**39.89**	**-5.1%**	**2.8%**	**-7.6%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B]: full CCTB according to the draft Council Directive of 2016. [C]: full CCTB according to the draft Council Directive of 2011. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A] and [B] vs. [C] calculated as ([C]-[A])/[A] and ([B]-[C])/[C]. Average is the simple arithmetic average.

8 Conclusion

In the context of its 2015 action plan for a fair and efficient corporate tax system, the European Commission has re-launched a draft Council Directive for a staged introduction of the C(C)CTB in October 2016. Although the re-launched proposal is largely in line with the first draft Council Directive issued in 2011 regarding the determination of the corporate income tax base, it includes several new provisions such as the AGI, an R&D super-deduction and several anti-tax avoidance rules. The present study provides a comprehensive analysis of the impact of the introduction of the recent CCTB draft Council Directive on the effective corporate tax burdens across the 28 EU Member States. Furthermore, it highlights the main drivers of the changes to the effective corporate tax burdens induced by the harmonisation of corporate tax bases across Member States.

A comparison of certain key elements of the CCTB draft Council Directive and the current tax practice of the Member States (legal status as of 2017) identifies the highest need for adjustment in order to comply with the directive with regard to the NID/AGI, R&D tax incentives, rules for inter-temporal and especially cross-border loss relief as well as the applicable depreciation rates and the use of the pool depreciation method.

The effects of the introduction of the CCTB draft Council Directive on effective tax burdens (compared to the legal status as of 2017) are quantified based on the model framework of the "European Tax Analyzer". Effective tax burdens under the CCTB and national tax provisions are determined by the difference of the pre-tax and post-tax value of a model corporation at the end of a ten-year simulation period (i.e. we compute the cumulated effective tax burden over a ten-year period). In the baseline scenario, we consider a model firm and do not account for national R&D tax incentives.

First, we replace the national rules for the computation of the tax base by the respective provisions of the CCTB, i.e. we assume that the CCTB is fully implemented, including the AGI provision.[131] We find that the introduction of the CCTB draft Council Directive reduces the effective tax burden in all Member States except for Cyprus and Malta. The average reduction of effective burdens in the 28 EU Member States amounts to 5.1%. In Cyprus and Malta, the tax burden increases (i.e. the tax base widens) when replacing the current NID by the comparatively less tax-favourable AGI proposed in the CCTB. Despite the harmonisation of corporate tax bases, remarkable differences in Member States' effective tax burdens persist. This illustrates that the corporate tax rate seems to be an important driver of the effective tax burden.

Next, an isolated analysis is conducted to identify the most important drivers of the changes in effective tax burdens induced by the CCTB. Of all parameters considered, the AGI has the greatest impact on effective tax burdens whereas the overall effect of the other tax base provisions is predominantly minor. When replacing the national rules for the computation of the tax base by the respective provisions of the CCTB, but without taking into consideration the AGI, the average change in effective tax burdens as compared to the baseline scenario amounts to an increase by 0.2% (i.e. a small base widening). In turn, if only the AGI is introduced in Member States' current tax codes, the average decrease in effective tax burdens amounts to 4.9%, which is similar to the change induced by the overall introduction of the CCTB. We further model a specific crisis and loss scenario to analyse the impact of interest deduction limitation as well as loss compensation rules since the underlying model corporation for the reference scenario is profitable and does not regularly incur non-deductible

[131] With the exception of the R&D super-deduction.

interest costs. In the specific loss scenario, loss compensation rules also seem to have a comparably strong effect.

We confirm the robustness of our results in two sensitivity analyses where we first vary specific financial characteristics of the model firm in isolation and subsequently augment the analysis by a consideration of industry-specific model corporations. The effective tax burden under the CCTB (including the AGI) is lower than the effective tax burden under national tax provisions throughout all specifications. Small differences in the magnitude of the effect upon the introduction of the CCTB are mainly due to interaction effects with the AGI.

A super-deduction for R&D costs is one of the new elements of the re-launched CCTB draft Council Directive. Its impact is analysed in a specific R&D scenario against the impact of existing national R&D tax incentives. On average, the full implementation of the CCTB, i.e. including both the AGI and the R&D super-deduction, would reduce the effective tax burden by 3.9% in case national R&D incentives apply at status quo. In line with the broad heterogeneity of R&D tax incentives offered by most Member States, the impact of the CCTB introduction differs widely across countries. Depending on the favourability of the current national R&D tax incentives, the R&D super-deduction that replaces any existing R&D tax incentives might reverse the overall base narrowing effect of the CCTB introduction and lead instead to higher effective tax burdens.

In a last step, we compare the impact of the re-launched CCTB draft Council Directive (without R&D tax incentives) and the original proposal as of 2011. The average impact of the 2011 proposal is in the opposite direction than the impact of the re-launched CCTB draft Council Directive: Although the overall change in effective tax burdens is minor, tax burdens would slightly increase upon the harmonisation of corporate tax bases, on average by 2.8%. Again, this traces back to the AGI since the remainder of tax base provisions is mostly unchanged as compared to the 2016 CCTB proposal: The original C(C)CTB draft Council Directive does not provide for a comparable deduction and the overall impact of the harmonisation of corporate tax bases is rather small. This mirrors our findings on the isolated effects of the AGI.

The following limitations of the European Tax Analyzer model should be taken into account when interpreting the results: First, the European Tax Analyzer cannot quantify tax minimizing strategies and international tax planning advantages of multinational corporations.[132] For instance, multinationals could reduce their effective tax burdens by intra-group debt financing. Hence, the tax burdens estimated by means of the European Tax Analyzer tend to be an upper limit of the true effective tax burdens. Second, the European Tax Analyzer cannot model all provisions of the CCTB. Provisions for cross-border loss relief are e.g. not reflected in the model calculations. Third, the effective tax burden is expressed in absolute terms by comparing the pre-tax and post-tax value of the corporation at the end of the ten-year simulation period. Therefore, it cannot be put in relation to the statutory tax rate in a given country.[133] Still, cross-country comparisons and comparisons between different scenarios, which are in the focus of this study, are not impeded by these aspects of the model.

Overall, we find that the re-launch of the CCTB draft Council Directive would have a considerable impact for the majority of Member States mainly due to the AGI and R&D super-deduction as two of the newly introduced tax base elements. Both elements induce a remarkably strong need for adjustment across Member States, either because the element is largely not available in current corporate tax systems (AGI/NID) or because its design varies widely across Member States (R&D tax

[132] See also VVA Consulting/ZEW (2015), pp. 108, 112.
[133] See Bräutigam/Nicolay/Spengel (2017), p. 2.

incentives and – if available – AGI/NID). Furthermore, these provisions have a strong impact on effective tax burdens. Whereas the AGI induces a decrease in the tax burdens for the vast majority of Member States, this effect might be reversed if R&D tax incentives are additionally included.

Appendix

Table A. 1: Variation of the capital intensity of the model firm under status quo and CCTB

Country	National					CCTB				
	Ten-year tax burden in m. EUR			Deviation		Ten-year tax burden in m. EUR			Deviation	
	Base case [A]	Capital intensity -15% [B]	Capital intensity +15% [C]	[B] vs. [A]	[C] vs. [A]	Base case [D]	Capital intensity -15% [E]	Capital intensity +15% [F]	[E] vs. [D]	[F] vs. [D]
AT	51.10	55.30	47.10	8.2%	-7.8%	47.92	51.67	44.35	7.8%	-7.4%
BE	57.99	63.45	52.90	9.4%	-8.8%	54.82	59.60	50.31	8.7%	-8.2%
BG	17.02	18.68	15.44	9.8%	-9.2%	15.23	16.66	13.88	9.4%	-8.9%
CY	19.81	21.29	18.41	7.5%	-7.1%	21.55	23.43	19.76	8.7%	-8.3%
CZ	31.53	34.87	28.46	10.6%	-9.7%	28.57	31.41	25.87	9.9%	-9.4%
DE	53.64	58.93	48.61	9.9%	-9.4%	49.83	54.66	45.30	9.7%	-9.1%
DK	39.10	42.42	35.97	8.5%	-8.0%	36.07	38.96	33.34	8.0%	-7.6%
EE	32.96	36.13	29.97	9.6%	-9.1%	32.96	36.13	29.97	9.6%	-9.1%
EL	49.89	54.51	45.52	9.3%	-8.8%	46.01	50.15	42.10	9.0%	-8.5%
ES	50.80	55.96	45.91	10.2%	-9.6%	48.01	52.72	43.54	9.8%	-9.3%
FI	34.79	37.94	31.81	9.0%	-8.5%	31.90	34.65	29.31	8.6%	-8.1%
FR	76.27	81.70	71.13	7.1%	-6.7%	73.09	77.93	68.51	6.6%	-6.3%
HR	29.21	32.55	26.24	11.4%	-10.2%	26.73	29.47	24.14	10.2%	-9.7%
HU	53.15	54.36	51.56	2.3%	-3.0%	52.50	53.49	51.57	1.9%	-1.8%
IE	21.01	23.09	19.03	9.9%	-9.4%	18.97	20.80	17.24	9.6%	-9.1%
IT	45.03	49.48	40.79	9.9%	-9.4%	43.95	48.05	40.03	9.3%	-8.9%
LT	28.23	30.29	26.31	7.3%	-6.8%	26.15	27.85	24.56	6.5%	-6.1%
LU	47.62	52.07	43.57	9.3%	-8.5%	43.80	47.77	40.21	9.1%	-8.2%
LV	27.29	29.48	25.22	8.1%	-7.6%	25.15	27.00	23.41	7.4%	-6.9%
MT	40.99	47.72	34.61	16.4%	-15.6%	52.99	58.40	47.86	10.2%	-9.7%
NL	41.46	45.65	37.48	10.1%	-9.6%	37.81	41.54	34.27	9.9%	-9.4%
PL	32.85	35.87	29.99	9.2%	-8.7%	30.04	32.69	27.54	8.8%	-8.3%
PT	41.23	46.55	36.20	12.9%	-12.2%	39.94	44.07	36.04	10.3%	-9.8%
RO	27.31	29.91	24.84	9.5%	-9.0%	24.81	27.07	22.67	9.1%	-8.6%
SE	36.86	40.52	33.38	9.9%	-9.4%	33.64	36.88	30.58	9.6%	-9.1%
SI	31.32	34.59	28.22	10.4%	-9.9%	28.47	31.36	25.74	10.1%	-9.6%
SK	35.97	39.36	32.77	9.4%	-8.9%	33.09	36.05	30.29	8.9%	-8.5%
UK	35.34	37.97	32.87	7.5%	-7.0%	32.63	34.89	30.51	6.9%	-6.5%
Average	**38.92**	**42.52**	**35.51**	**9.4%**	**-8.9%**	**37.02**	**40.19**	**34.03**	**8.7%**	**-8.2%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B] ([C]): capital intensity is decreased (increased) by 15%. The analysis is repeated for the CCTB scenario in columns seven to eleven. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [E] vs. [D] and [F] vs. [D] calculated as ([C]-[A])/[A], ([E]-[D])/[D] and ([F]-[D])/[D]. Average is the simple arithmetic average.

Table A. 2: Variation of the equity ratio of the model firm under status quo and CCTB

Country	National					CCTB				
	Ten-year tax burden in m. EUR			Deviation		Ten-year tax burden in m. EUR			Deviation	
	Base case [A]	Equity ratio -30% [B]	Equity ratio +30% [C]	[B] vs. [A]	[C] vs. [A]	Base case [D]	Equity ratio -30% [E]	Equity ratio +30% [F]	[E] vs. [D]	[F] vs. [D]
AT	51.10	49.00	53.19	-4.1%	4.1%	47.92	46.05	49.78	-3.9%	3.9%
BE	57.99	56.70	60.63	-2.2%	4.6%	54.82	52.27	57.37	-4.7%	4.7%
BG	17.02	16.17	17.86	-5.0%	5.0%	15.23	14.50	15.97	-4.8%	4.8%
CY	19.81	19.05	20.57	-3.9%	3.9%	21.55	20.63	22.47	-4.3%	4.3%
CZ	31.53	30.62	33.13	-2.9%	5.1%	28.57	27.16	29.98	-4.9%	4.9%
DE	53.64	51.33	55.94	-4.3%	4.3%	49.83	47.85	51.89	-4.0%	4.1%
DK	39.10	37.73	40.94	-3.5%	4.7%	36.07	34.43	37.71	-4.5%	4.5%
EE	32.96	31.35	34.58	-4.9%	4.9%	32.96	31.35	34.58	-4.9%	4.9%
EL	49.89	47.48	52.30	-4.8%	4.8%	46.01	43.84	48.19	-4.7%	4.7%
ES	50.80	48.25	53.36	-5.0%	5.0%	48.01	45.66	50.35	-4.9%	4.9%
FI	34.79	33.11	36.47	-4.8%	4.8%	31.90	30.42	33.39	-4.7%	4.7%
FR	76.27	76.32	79.13	0.1%	3.8%	73.09	70.52	75.67	-3.5%	3.5%
HR	29.21	27.70	30.73	-5.2%	5.2%	26.73	25.40	28.07	-5.0%	5.0%
HU	53.15	52.79	53.90	-0.7%	1.4%	52.50	51.84	53.16	-1.2%	1.3%
IE	21.01	19.95	22.06	-5.0%	5.0%	18.97	18.05	19.90	-4.9%	4.9%
IT	45.03	43.13	46.93	-4.2%	4.2%	43.95	42.16	45.74	-4.1%	4.1%
LT	28.23	26.97	29.50	-4.5%	4.5%	26.15	25.04	27.26	-4.2%	4.2%
LU	47.62	44.30	51.02	-7.0%	7.1%	43.80	40.71	47.01	-7.1%	7.3%
LV	27.29	26.15	28.55	-4.2%	4.6%	25.15	24.04	26.26	-4.4%	4.4%
MT	40.99	43.93	38.08	7.2%	-7.1%	52.99	50.36	55.62	-5.0%	5.0%
NL	41.46	39.36	43.55	-5.1%	5.1%	37.81	35.94	39.67	-4.9%	4.9%
PL	32.85	31.26	34.44	-4.8%	4.9%	30.04	28.63	31.45	-4.7%	4.7%
PT	41.23	40.79	42.79	-1.1%	3.8%	39.94	37.88	42.00	-5.2%	5.2%
RO	27.31	25.96	28.66	-4.9%	4.9%	24.81	23.62	25.99	-4.8%	4.8%
SE	36.86	35.01	38.70	-5.0%	5.0%	33.64	32.01	35.28	-4.9%	4.9%
SI	31.32	29.72	32.92	-5.1%	5.1%	28.47	27.06	29.88	-5.0%	5.0%
SK	35.97	34.21	37.73	-4.9%	4.9%	33.09	31.53	34.65	-4.7%	4.7%
UK	35.34	33.74	36.94	-4.5%	4.5%	32.63	31.22	34.04	-4.3%	4.3%
Average	**38.92**	**37.57**	**40.52**	**-3.7%**	**4.2%**	**37.02**	**35.36**	**38.69**	**-4.6%**	**4.6%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B] ([C]): equity ratio is decreased (increased) by 30%. The analysis is repeated for the CCTB scenario in columns seven to eleven. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [E] vs. [D] and [F] vs. [D] calculated as ([C]-[A])/[A], ([E]-[D])/[D] and ([F]-[D])/[D]. Average is the simple arithmetic average.

Table A. 3: Variation of the profitability of the model firm under status quo and CCTB

Country	National					CCTB				
	Ten-year tax burden in m. EUR			Deviation		Ten-year tax burden in m. EUR			Deviation	
	Base case [A]	Profitability -30% [B]	Profitability +30% [C]	[B] vs. [A]	[C] vs. [A]	Base case [D]	Profitability -30% [E]	Profitability +30% [F]	[E] vs. [D]	[F] vs. [D]
AT	51.10	41.11	63.61	-19.5%	24.5%	47.92	38.96	59.13	-18.7%	23.4%
BE	57.99	44.55	74.82	-23.2%	29.0%	54.82	42.55	70.19	-22.4%	28.0%
BG	17.02	12.98	22.06	-23.7%	29.6%	15.23	11.70	19.65	-23.2%	29.0%
CY	19.81	16.14	24.38	-18.5%	23.1%	21.55	17.12	27.09	-20.6%	25.7%
CZ	31.53	23.91	41.07	-24.2%	30.2%	28.57	21.79	37.04	-23.7%	29.7%
DE	53.64	41.10	69.34	-23.4%	29.3%	49.83	38.45	64.23	-22.8%	28.9%
DK	39.10	30.28	50.12	-22.6%	28.2%	36.07	28.20	45.91	-21.8%	27.3%
EE	32.96	25.23	42.63	-23.5%	29.3%	32.96	25.23	42.63	-23.5%	29.3%
EL	49.89	38.34	64.34	-23.2%	29.0%	46.01	35.59	59.07	-22.6%	28.4%
ES	50.80	38.58	66.09	-24.1%	30.1%	48.01	36.77	62.09	-23.4%	29.3%
FI	34.79	26.76	44.82	-23.1%	28.8%	31.90	24.76	40.83	-22.4%	28.0%
FR	76.27	62.16	93.90	-18.5%	23.1%	73.09	60.22	89.18	-17.6%	22.0%
HR	29.21	21.98	38.46	-24.8%	31.7%	26.73	20.31	34.76	-24.0%	30.0%
HU	53.15	48.38	58.69	-9.0%	10.4%	52.50	48.50	57.50	-7.6%	9.5%
IE	21.01	15.98	27.30	-24.0%	29.9%	18.97	14.54	24.51	-23.3%	29.2%
IT	45.03	34.46	58.29	-23.5%	29.5%	43.95	33.84	56.58	-23.0%	28.8%
LT	28.23	22.20	35.78	-21.4%	26.7%	26.15	20.82	32.81	-20.4%	25.5%
LU	47.62	36.20	61.90	-24.0%	30.0%	43.80	33.50	56.75	-23.5%	29.6%
LV	27.29	21.25	34.83	-22.1%	27.6%	25.15	19.82	31.81	-21.2%	26.5%
MT	40.99	30.05	54.87	-26.7%	33.9%	52.99	40.34	68.82	-23.9%	29.9%
NL	41.46	31.48	53.97	-24.1%	30.2%	37.81	28.85	49.02	-23.7%	29.7%
PL	32.85	25.22	42.38	-23.2%	29.0%	30.04	23.26	38.51	-22.6%	28.2%
PT	41.23	30.35	55.02	-26.4%	33.4%	39.94	30.13	52.31	-24.6%	31.0%
RO	27.31	20.88	35.35	-23.6%	29.4%	24.81	19.12	31.92	-22.9%	28.7%
SE	36.86	28.04	47.88	-23.9%	29.9%	33.64	25.78	43.48	-23.4%	29.2%
SI	31.32	23.69	40.86	-24.4%	30.4%	28.47	21.70	36.95	-23.8%	29.8%
SK	35.97	27.55	46.50	-23.4%	29.3%	33.09	25.58	42.47	-22.7%	28.4%
UK	35.34	27.71	44.87	-21.6%	27.0%	32.63	25.85	41.10	-20.8%	26.0%
Average	**38.92**	**30.23**	**49.79**	**-22.6%**	**28.3%**	**37.02**	**29.05**	**47.01**	**-21.9%**	**27.5%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017). [B] ([C]): profitability is decreased (increased) by 30%. The analysis is repeated for the CCTB scenario in columns seven to eleven. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [C] vs. [A], [E] vs. [D] and [F] vs. [D] calculated as ([C]-[A])/[A], ([E]-[D])/[D] and ([F]-[D])/[D]. Average is the simple arithmetic average.

Table A. 4: Impact of the CCTB on a model firm in the commerce sector

Country	Ten-year tax burden in m. EUR				Deviation			
	National base case [A]	CCTB base case [B]	National commerce [C]	CCTB commerce [D]	[B] vs. [A]	[D] vs. [C]	[C] vs. [A]	[D] vs. [B]
AT	51.10	47.92	53.37	50.10	-6.2%	-6.1%	4.5%	4.6%
BE	57.99	54.82	61.26	57.92	-5.5%	-5.5%	5.6%	5.7%
BG	17.02	15.23	18.06	16.16	-10.5%	-10.5%	6.1%	6.1%
CY	19.81	21.55	20.90	22.68	8.8%	8.5%	5.5%	5.2%
CZ	31.53	28.57	33.58	30.33	-9.4%	-9.7%	6.5%	6.2%
DE	53.64	49.83	56.80	52.94	-7.1%	-6.8%	5.9%	6.2%
DK	39.10	36.07	41.26	38.04	-7.7%	-7.8%	5.5%	5.5%
EE	32.96	32.96	34.85	34.85	0.0%	0.0%	5.7%	5.7%
EL	49.89	46.01	52.63	48.67	-7.8%	-7.5%	5.5%	5.8%
ES	50.80	48.01	53.81	50.87	-5.5%	-5.5%	5.9%	6.0%
FI	34.79	31.90	36.77	33.71	-8.3%	-8.3%	5.7%	5.7%
FR	76.27	73.09	95.20	92.71	-4.2%	-2.6%	24.8%	26.9%
HR	29.21	26.73	31.27	28.42	-8.5%	-9.1%	7.1%	6.3%
HU	53.15	52.50	80.90	80.31	-1.2%	-0.7%	52.2%	53.0%
IE	21.01	18.97	22.20	20.12	-9.7%	-9.4%	5.7%	6.0%
IT	45.03	43.95	48.40	46.79	-2.4%	-3.3%	7.5%	6.5%
LT	28.23	26.15	29.72	27.45	-7.4%	-7.6%	5.3%	5.0%
LU	47.62	43.80	49.87	45.97	-8.0%	-7.8%	4.7%	5.0%
LV	27.29	25.15	28.81	26.47	-7.8%	-8.1%	5.6%	5.3%
MT	40.99	52.99	45.49	56.27	29.3%	23.7%	11.0%	6.2%
NL	41.46	37.81	43.87	40.13	-8.8%	-8.5%	5.8%	6.2%
PL	32.85	30.04	34.73	31.76	-8.5%	-8.5%	5.7%	5.7%
PT	41.23	39.94	44.43	42.49	-3.1%	-4.4%	7.7%	6.4%
RO	27.31	24.81	28.88	26.27	-9.2%	-9.0%	5.7%	5.9%
SE	36.86	33.64	39.00	35.68	-8.7%	-8.5%	5.8%	6.1%
SI	31.32	28.47	33.27	30.23	-9.1%	-9.1%	6.2%	6.2%
SK	35.97	33.09	38.10	35.00	-8.0%	-8.1%	5.9%	5.8%
UK	35.34	32.63	37.08	34.30	-7.7%	-7.5%	4.9%	5.1%
Average	**38.92**	**37.02**	**42.66**	**40.60**	**-5.1%**	**-5.3%**	**8.4%**	**8.2%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017) for a large average model corporation. [B]: full CCTB for a large average model corporation. [C] and [D]: repetition of both scenarios for a large model corporation in the commerce sector. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [D] vs. [C], [C] vs. [A] and [D] vs. [B] calculated as ([D]-[C])/[C], ([C]-[A])/[A] and ([D]-[B])/[B]. Average is the simple arithmetic average.

Table A. 5: Impact of the CCTB on a model firm in the construction sector

Country	Ten-year tax burden in m. EUR				Deviation			
	National base case [A]	CCTB base case [B]	National construction [C]	CCTB construction [D]	[B] vs. [A]	[D] vs. [C]	[C] vs. [A]	[D] vs. [B]
AT	51.10	47.92	29.41	27.45	-6.2%	-6.7%	-42.4%	-42.7%
BE	57.99	54.82	29.65	27.52	-5.5%	-7.2%	-48.9%	-49.8%
BG	17.02	15.23	8.77	7.73	-10.5%	-11.8%	-48.4%	-49.2%
CY	19.81	21.55	11.41	11.99	8.8%	5.1%	-42.4%	-44.4%
CZ	31.53	28.57	16.41	14.64	-9.4%	-10.8%	-48.0%	-48.8%
DE	53.64	49.83	28.04	26.52	-7.1%	-5.4%	-47.7%	-46.8%
DK	39.10	36.07	19.81	17.90	-7.7%	-9.7%	-49.3%	-50.4%
EE	32.96	32.96	17.00	17.00	0.0%	0.0%	-48.4%	-48.4%
EL	49.89	46.01	25.72	23.26	-7.8%	-9.6%	-48.4%	-49.5%
ES	50.80	48.01	26.47	24.70	-5.5%	-6.7%	-47.9%	-48.6%
FI	34.79	31.90	17.79	15.98	-8.3%	-10.1%	-48.9%	-49.9%
FR	76.27	73.09	33.07	30.76	-4.2%	-7.0%	-56.6%	-57.9%
HR	29.21	26.73	15.26	13.78	-8.5%	-9.7%	-47.8%	-48.4%
HU	53.15	52.50	16.53	15.98	-1.2%	-3.3%	-68.9%	-69.6%
IE	21.01	18.97	10.90	9.66	-9.7%	-11.4%	-48.1%	-49.1%
IT	45.03	43.95	23.60	22.81	-2.4%	-3.3%	-47.6%	-48.1%
LT	28.23	26.15	13.99	12.64	-7.4%	-9.6%	-50.5%	-51.7%
LU	47.62	43.80	24.87	22.92	-8.0%	-7.8%	-47.8%	-47.7%
LV	27.29	25.15	13.69	12.33	-7.8%	-9.9%	-49.8%	-51.0%
MT	40.99	52.99	21.81	27.28	29.3%	25.1%	-46.8%	-48.5%
NL	41.46	37.81	21.49	19.33	-8.8%	-10.1%	-48.2%	-48.9%
PL	32.85	30.04	16.84	15.09	-8.5%	-10.4%	-48.7%	-49.8%
PT	41.23	39.94	20.80	19.57	-3.1%	-5.9%	-49.5%	-51.0%
RO	27.31	24.81	14.03	12.54	-9.2%	-10.6%	-48.6%	-49.4%
SE	36.86	33.64	19.07	17.16	-8.7%	-10.0%	-48.3%	-49.0%
SI	31.32	28.47	16.37	14.61	-9.1%	-10.7%	-47.7%	-48.7%
SK	35.97	33.09	18.47	16.66	-8.0%	-9.8%	-48.6%	-49.6%
UK	35.34	32.63	17.59	15.89	-7.7%	-9.7%	-50.2%	-51.3%
Average	**38.92**	**37.02**	**19.60**	**18.35**	**-5.1%**	**-6.7%**	**-49.1%**	**-49.9%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017) for a large average model corporation. [B]: full CCTB for a large average model corporation. [C] and [D]: repetition of both scenarios for a large model corporation in the construction sector. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [D] vs. [C], [C] vs. [A] and [D] vs. [B] calculated as ([D]-[C])/[C], ([C]-[A])/[A] and ([D]-[B])/[B]. Average is the simple arithmetic average.

Table A. 6: Impact of the CCTB on a model firm in the manufacturing sector

Country	Ten-year tax burden in m. EUR				Deviation			
	National base case [A]	CCTB base case [B]	National manufacturing [C]	CCTB manufacturing [D]	[B] vs. [A]	[D] vs. [C]	[C] vs. [A]	[D] vs. [B]
AT	51.10	47.92	45.80	43.48	-6.2%	-5.1%	-10.4%	-9.3%
BE	57.99	54.82	52.42	50.23	-5.5%	-4.2%	-9.6%	-8.4%
BG	17.02	15.23	15.33	13.97	-10.5%	-8.9%	-9.9%	-8.3%
CY	19.81	21.55	18.15	19.61	8.8%	8.0%	-8.4%	-9.0%
CZ	31.53	28.57	28.48	26.21	-9.4%	-8.0%	-9.7%	-8.3%
DE	53.64	49.83	48.80	45.81	-7.1%	-6.1%	-9.0%	-8.1%
DK	39.10	36.07	35.29	33.07	-7.7%	-6.3%	-9.7%	-8.3%
EE	32.96	32.96	29.94	29.94	0.0%	0.0%	-9.2%	-9.2%
EL	49.89	46.01	45.17	42.23	-7.8%	-6.5%	-9.5%	-8.2%
ES	50.80	48.01	45.93	43.94	-5.5%	-4.3%	-9.6%	-8.5%
FI	34.79	31.90	31.41	29.29	-8.3%	-6.8%	-9.7%	-8.2%
FR	76.27	73.09	67.87	64.27	-4.2%	-5.3%	-11.0%	-12.1%
HR	29.21	26.73	25.91	24.52	-8.5%	-5.4%	-11.3%	-8.3%
HU	53.15	52.50	43.04	43.15	-1.2%	0.3%	-19.0%	-17.8%
IE	21.01	18.97	19.02	17.47	-9.7%	-8.2%	-9.5%	-7.9%
IT	45.03	43.95	41.08	40.42	-2.4%	-1.6%	-8.8%	-8.0%
LT	28.23	26.15	25.32	23.93	-7.4%	-5.5%	-10.3%	-8.5%
LU	47.62	43.80	43.58	40.59	-8.0%	-6.9%	-8.5%	-7.3%
LV	27.29	25.15	24.31	23.05	-7.8%	-5.2%	-10.9%	-8.4%
MT	40.99	52.99	36.27	48.53	29.3%	33.8%	-11.5%	-8.4%
NL	41.46	37.81	37.56	34.65	-8.8%	-7.7%	-9.4%	-8.3%
PL	32.85	30.04	29.66	27.59	-8.5%	-7.0%	-9.7%	-8.2%
PT	41.23	39.94	36.61	36.66	-3.1%	0.1%	-11.2%	-8.2%
RO	27.31	24.81	24.63	22.73	-9.2%	-7.7%	-9.8%	-8.4%
SE	36.86	33.64	33.33	30.84	-8.7%	-7.5%	-9.6%	-8.3%
SI	31.32	28.47	28.27	26.21	-9.1%	-7.3%	-9.7%	-7.9%
SK	35.97	33.09	32.54	30.39	-8.0%	-6.6%	-9.5%	-8.2%
UK	35.34	32.63	31.89	29.86	-7.7%	-6.4%	-9.8%	-8.5%
Average	**38.92**	**37.02**	**34.91**	**33.67**	**-5.1%**	**-3.6%**	**-10.1%**	**-8.8%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017) for a large average model corporation. [B]: full CCTB for a large average model corporation. [C] and [D]: repetition of both scenarios for a large model corporation in the manufacturing sector. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [D] vs. [C], [C] vs. [A] and [D] vs. [B] calculated as ([D]-[C])/[C], ([C]-[A])/[A] and ([D]-[B])/[B]. Average is the simple arithmetic average.

Table A. 7: Impact of the CCTB on a model firm in the energy sector

Country	Ten-year tax burden in m. EUR				Deviation			
	National base case [A]	CCTB base case [B]	National energy [C]	CCTB energy [D]	[B] vs. [A]	[D] vs. [C]	[C] vs. [A]	[D] vs. [B]
AT	51.10	47.92	107.34	103.78	-6.2%	-3.3%	110.1%	116.6%
BE	57.99	54.82	155.33	142.72	-5.5%	-8.1%	167.9%	160.3%
BG	17.02	15.23	35.48	38.54	-10.5%	8.6%	108.5%	152.9%
CY	19.81	21.55	48.70	48.10	8.8%	-1.2%	145.8%	123.2%
CZ	31.53	28.57	73.45	70.64	-9.4%	-3.8%	132.9%	147.3%
DE	53.64	49.83	129.83	126.97	-7.1%	-2.2%	142.1%	154.8%
DK	39.10	36.07	104.34	97.22	-7.7%	-6.8%	166.9%	169.5%
EE	32.96	32.96	81.45	81.45	0.0%	0.0%	147.1%	147.1%
EL	49.89	46.01	129.53	117.89	-7.8%	-9.0%	159.6%	156.2%
ES	50.80	48.01	118.70	117.77	-5.5%	-0.8%	133.6%	145.3%
FI	34.79	31.90	84.87	83.50	-8.3%	-1.6%	144.0%	161.7%
FR	76.27	73.09	186.08	178.87	-4.2%	-3.9%	144.0%	144.7%
HR	29.21	26.73	61.47	65.37	-8.5%	6.3%	110.4%	144.5%
HU	53.15	52.50	99.70	95.89	-1.2%	-3.8%	87.6%	82.7%
IE	21.01	18.97	49.99	46.86	-9.7%	-6.3%	138.0%	146.9%
IT	45.03	43.95	114.17	116.69	-2.4%	2.2%	153.5%	165.5%
LT	28.23	26.15	71.56	75.79	-7.4%	5.9%	153.4%	189.8%
LU	47.62	43.80	106.68	105.63	-8.0%	-1.0%	124.0%	141.2%
LV	27.29	25.15	68.50	69.94	-7.8%	2.1%	151.0%	178.1%
MT	40.99	52.99	107.33	128.89	29.3%	20.1%	161.8%	143.2%
NL	41.46	37.81	97.21	94.42	-8.8%	-2.9%	134.5%	149.7%
PL	32.85	30.04	81.38	77.88	-8.5%	-4.3%	147.8%	159.3%
PT	41.23	39.94	100.84	102.21	-3.1%	1.4%	144.6%	155.9%
RO	27.31	24.81	63.00	63.98	-9.2%	1.6%	130.7%	157.9%
SE	36.86	33.64	84.38	84.64	-8.7%	0.3%	129.0%	151.6%
SI	31.32	28.47	70.71	68.92	-9.1%	-2.5%	125.7%	142.1%
SK	35.97	33.09	85.37	85.24	-8.0%	-0.2%	137.3%	157.6%
UK	35.34	32.63	96.21	92.66	-7.7%	-3.7%	172.2%	184.0%
Average	**38.92**	**37.02**	**93.34**	**92.23**	**-5.1%**	**-0.6%**	**139.4%**	**151.1%**

Note: Effective tax burden as the model firm's total tax payment over ten simulation periods in million Euro, rounded to two decimals. [A]: status quo (current national tax accounting rules as of 2017) for a large average model corporation. [B]: full CCTB for a large average model corporation. [C] and [D]: repetition of both scenarios for a large model corporation in the energy sector. Deviation for individual countries: comparison of unrounded tax burdens. [B] vs. [A]: percentage deviation between [A] and [B], defined as ([B]-[A])/[A]. [D] vs. [C], [C] vs. [A] and [D] vs. [B] calculated as ([D]-[C])/[C], ([C]-[A])/[A] and ([D]-[B])/[B]. Average is the simple arithmetic average.

Table A. 8: Implemented R&D tax incentives in the EU Member States[134]

Country	Reduction in tax base (depreciation, allowances and deductions)	Reduction in tax liability (tax credits)
AT	-	12% volume-based tax credit for capital expenditure, personnel, current costs
BE	33.33% accelerated depreciation for plant and machinery 13.5% volume-based deduction for capital expenditure in tangibles and intangibles EUR 15,660 deduction per qualified scientific employee	Instead of the investment deduction, a tax credit that is equal to the resulting tax benefit can be applied
BG	-	-
CY	-	-
CZ	100% volume-based additional deduction (i.e. in total 200%) for personnel, depreciation, operating costs 110% incremental deduction for personnel, depreciation, operating costs for R&D expenses in excess of the expenses incurred during the previous period	-
DE	-	-
DK	-	-
EE	-	-
EL	33.33% accelerated depreciation for machinery, furniture and equipment 30% volume-based additional deduction (i.e. in total 130%) for personnel and current costs	-
ES	10% accelerated depreciation on buildings	8% volume-based tax credit for capital expenditure on movable tangible assets and intangibles 17% tax credit for personnel engaged in R&D Tax credit on current costs, depreciation (volume-based (25%) and incremental (42%) for expenses in excess of the average of the

[134] The classification of R&D tax incentives follows VVA Consulting/ZEW (2015), Annex 1, pp. 76-98.

		previous 2 years) If sum of tax credits > 10% tax due: 50% of all tax credits are usable If sum of tax credits < 10% tax due: 25% of all tax credits are usable Overall cap on tax credits: EUR 3 million Carry-forward for unused tax credits available (18 years)
FI	20% accelerated depreciation for industrial and office buildings used for R&D purposes	-
FR	Accelerated depreciation for machinery, equipment, furniture, intangibles: declining balance with 150%, 200% or 250% of the regular straight line rate (depending on useful life: 3-4 years, 5-6 years or more)	30% volume-based tax credit for personnel, current costs, depreciation up to EUR 100 million and 5% on the excess amount (40% and 35% instead of 30% apply for the first and the second year of a five-year period during which the company did not benefit from the tax credit)
HR	125% volume-based deduction (i.e. in total 225%) for personnel, current costs, depreciation	-
HU	-	-
IE	100% immediate depreciation on machinery, equipment, intangibles, land and buildings	25% volume-based credit on capital expenditure, personnel, current costs Carryback (1 year) or carry-forward (indefinite) 25% volume-based credit on costs related to construction and refurbishment of buildings if used for R&D by 35% for 4 years
IT	IRAP: personnel costs related to R&D employees are deductible	-
LT	200% volume-based additional deduction (i.e. in total 300%) for personnel and current costs	-
LU	40% (or four times the straight line rate) accelerated depreciation for machinery, equipment, furniture, intangibles with special rates for the declining balance method	-
LV	1.5 times accelerated depreciation for machinery 200% volume-based additional deduction (i.e. in total 300%) for personnel costs	-

MT	50% volume-based additional deduction (i.e. in total 150%) of current expenses	15% volume-based tax credit (large enterprise) for capital expenditure in preceding period
NL	-	32% volume-based tax credit against wage withholding tax with respect to salaries paid to employees who carry out certain R&D activities up to wage expenses of EUR 350,000; 16% for wage costs that exceed EUR 350,000
PL	50% volume-based additional deduction (i.e. in total 150%) for personnel costs 30% volume-based additional deduction (i.e. in total 130%) for other qualifying expenses (current costs and depreciation)	-
PT	-	32.5% volume-based tax credit for capital expenditure on personnel and other costs 50% incremental tax credit for expenses in excess of the average of the previous 2 years, max. EUR 1.5 million
RO	Accelerated depreciation (declining balance) available for patents 50% volume-based additional deduction (i.e. in total 150%) for personnel and current costs	-
SE	-	-
SI	100% volume-based deduction (i.e. in total 200%) on capital expenditures for tangible and intangible assets, personnel, current costs	-
SK	25% volume-based additional deduction (i.e. in total 125%) for wages, depreciation and other current costs 25% incremental deduction for expenses in excess of the expenses incurred during the previous period	-
UK	100% immediate depreciation on machinery, equipment, furniture, buildings, intangibles	11% volume-based tax credit on personnel and current costs (only for large enterprises)

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