BOOK-TAX DIFFERENCES AND CORPORATE TAX CONVERGENCE IN EUROPE

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ABSTRACT

Recent legislation on Minimum Taxation (Pillar 2 and the GloBE Rules) and the BEFIT proposal from the EU Commission have brought attention to the differences in Effective Tax Rates (ETRs) across individual companies, corporate groups, and countries. Consequently, this growing pressure for fiscal convergence has also rekindled interest among academics and regulators in the relationship between book income and taxable income, commonly referred to as Book-Tax Differences (BTD). Our research contributes to this debate by examining the current European context, analyzing the financial statements of over 420,000 companies and assessing the BTDs and ETRs across 23 countries, revealing significant differences. The factors influencing these differences across countries seem to stem from the interaction between the accounting and financial reporting practices adopted in each State, which, in turn, derive from their respective national fiscal policies. In our view, this study may support scholars and regulators to further explore the potential for corporate tax convergence in Europe through the progressive alignment of ETRs. This "soft approach" could offer substantial benefits: it allows companies to continue preparing their financial statements in accordance with national accounting principles, which are subsequently reconciled through BTDs. Simultaneously; it enables individual countries to maintain autonomy in their fiscal policies, primarily by setting their own nominal Tax Rates (TRs) and implementing various incentives by the regulation of BTDs. JEL classification: M41; H26

Keywords: Effective tax rate (ETR); Book-tax differences (BDT); Accounting income; Accounting standards Fiscal convergence; Fiscal sovereignty European fiscal policy; BEFIT.

INTRODUCTION

Recent legislation on Minimum Taxation (Pillar 2 and the GloBE rules) and the European Commission's BEFIT proposal have sparked renewed interest, both from institutions and scholars, in examining the differences between accounting income and taxable income (Book-Tax Differences or "BTD") as a potential lever for harmonizing effective tax rates (ETR).

The debate on the interaction between accounting principles and taxation, with the alleged merits and drawbacks of book-tax conformity (BTC), is not new and originated primarily in the United States, gaining momentum following the accounting scandals that emerged in the early 2000s.

In that context, (Desai, 2005) argued that the relative independence of corporate accounting from tax accounting allowed firms to artificially inflate profits for capital markets while concurrently underreporting earnings to tax authorities. Consequently, the implementation of full BTC could force managers to navigate a trade-off: reporting lower profits to reduce taxes or declaring higher profits to benefit from capital markets, at the expense of increased taxation. Furthermore, as hypothesised by (Whitaker, 2005) and corroborated by subsequent empirical studies, a strengthened BTC framework could reduce corporate compliance costs and facilitate more efficient tax oversight.

Around the same time, Europe introduced Regulation 1606/02, which required listed European companies to adopt International Financial Reporting Standards (IFRS) for their

consolidated financial statements.

This reform had the potential to widen the gap between financial statements prepared in accordance with international standards and taxable income determined under national tax laws. Consequently, American scholars regarded this regulatory change as a quasi-natural experiment to test their theoretical frameworks (Wartrin et al., 2014), leading to a surge of research on Book-Tax Differences (BTD) and Book-Tax Conformity (BTC) within the European context.

Nevertheless, the broad application of studies that employed the interpretative framework of American models to the markedly different European context requires careful consideration and critical evaluation.

Firstly, most European nations exhibit characteristics of 'Rhenish' capitalism (Albert, 1993), where banking institutions play a pivotal role in corporate financing, while stock market valuations influence only a select cohort of entities.

Secondly, the impact of this regulation on BTDs, particularly concerning consolidated financial statements, is comparatively less pronounced in Europe than it would have been in the United States. This disparity arises from divergent tax frameworks: while the US tax base relies on group financial statements, Europe predominantly utilizes individual financial statements (Watrin et al., 2014). Although some European Member States permit group taxation, income assessment occurs at the individual entity level prior to group consolidation.

Thirdly, within the European context, numerous jurisdictions maintain both national accounting standards and IFRS, complicating the dichotomy between financial accounting and tax accounts. This multiplicity of standards introduces additional layers of complexity to the analysis (Deloitte, 2010).

Finally, unlike US Generally Accepted Accounting Principles (GAAP), IFRS places greater emphasis on the principle of prudence, which could potentially minimize the tax burden (Conceptual Framework Revised 2018). Consequently, the impact of IFRS adoption on BTC remains ambiguous.

However, even within the European context, the study of BTD and ETR has consistently garnered significant attention, albeit for fundamentally different reasons.

In Europe, differences between accounting income and taxable income are increasingly analyzed at the Member State level, as BTDs and nominal tax rates (TR) play a key role in shaping each country's effective tax rates (ETRs). Consequently, these elements represent the primary levers for achieving progressive EU tax harmonization.

This focus stems from the challenges posed by the free movement of capital within Europe, which enables corporations to strategically circumvent corporate income tax through the strategic reallocation of investments to low-tax jurisdictions.

This phenomenon, extensively examined since the seminal work of Diamond and Mirrlees (1971), triggers a cascade of tax competition among Member States, which disproportionately impacts less mobile factors of production, such as labour, to the advantage of lower taxation on mobile income, such as capital earnings (Razin & Sadka, 1991) further developed by (Fuest, Huber & Mintz, 2005).

As highlighted in the European Commission's Annual Report on Taxation (2024), in 2022, although the share of taxes on capital in the overall tax mix increased to 22.1% (with significant differences across countries; see (European Commission, 2005)), it still remained significantly lower than the share of labour taxes, which accounted for 50.6% of total tax revenues (European Commission, 2001).

Over the years, Community institutions have addressed this issue on multiple occasions, and numerous studies have been conducted, including the Neumark report of 1962 and the Tempel report of 1970. Nevertheless, substantive action was limited until the advent of the single market in 1993 exacerbated these challenges.

The rise of liberalization has intensified inter-state competition, while the introduction of the single currency has imposed rigid budget constraints and eliminated monetary policy autonomy. Consequently, fiscal policy remains the primary tool for Member States to manage their finances within EU parameters. This has engendered a pronounced attachment to fiscal sovereignty, as it represents the last significant lever of economic autonomy.

A resurgence of fiscal integration occurred with the Lisbon Council (March 2000), where the Union established a new strategic objective: "to become the most competitive and dynamic knowledge-based economy in the world" (European Council, 2022).

The EU's efforts have been mainly directed at contrasting tax avoidance by multinational groups, with the aim of ensuring they contribute fairly and proportionately to the tax systems of the Member States in which they operate.

Subsequent initiatives have primarily addressed the issue of uniform taxation of corporate income by consolidating the tax bases of companies within a group (the "Common Consolidated Corporate Tax Base" - CCCTB (COM(2001) 582)), considering both the derivation option and independence from shared accounting standards such as IFRS (European Commission, 2003). COM (2003) 726 states: "if EU companies are reporting profits according to a common standard, why not use this common measure of profitability as a starting point for taxation purposes?" It also reassures that "the IFRS accounts would represent at most a starting point for arriving at a tax base, and not the tax base itself."

The CCCTB initiative, first proposed in 2011, encountered significant resistance by the Councildespite assurances of limited scope. Subsequent attempts in 2015 and 2016 to revive the project as the Common Corporate Tax Base (CCTB) similarly failed to gain traction (European Commission, 2015).

A paradigm shift occurred in 2021 with the OECD's introduction of "Pillar 2" and the Model Global Anti-Base Erosion (GloBE) Rules. This marked a pivotal moment in international tax policy, garnering widespread support from over 135 member countries. The GloBE Rules established a coordinated tax system aimed at ensuring large multinational enterprise (MNE) groups pay a minimum effective tax rate (ETR) of 15% in each jurisdiction where they operate (European Commission, 2021).

ETR is calculated as:

$\label{eq:ETR} \mathrm{ETR} = \frac{\mathrm{Adjusted\ Covered\ Taxes}}{\mathrm{GloBE\ Income\ (Qualifying\ Income)}}$

Where covered taxes include all current and deferred taxes on income that are effectively paid or accrued by a Constituent Entity and adjustments are made to exclude taxes attributable to excluded income or income not taxable under the GloBE Rules. The GloBE Income refers to the Financial Accounting Net Income or Loss (FANIL) of the Constituent Entity, derived from consolidated financial accounting net income prepared under IFRS or local GAAP, and adjusted for exclusions, non-deductible expenses, and other BTDs.

The European Union implemented this international agreement through Directive 2022/2523 in December 2022. As of the time of writing, eighteen EU Member States have completed the necessary internal legislative procedures to implement the EU Minimum Tax Directive.

Building upon this newfound consensus, the European Commission has proposed the Business in Europe: Framework for Income Taxation (BEFIT) project. This initiative aims to establish a harmonised framework for calculating the tax base of large corporate groups, while preserving Member States' autonomy over tax rates and enforcement policies. The BEFIT proposal aligns with Pillar 2 in utilising financial accounting results as a starting point, subsequently calculating taxable income through Book-Tax Differences (BTD) (European Commission, 2016).

At this pivotal juncture, exploring the current landscape across countries in terms of BTDs,

ETRs, and TRs emerges as a particularly significant area of inquiry. This moment presents a unique opportunity for the European Union to advance a process of tax harmonisation that transcends the scope of the BEFIT directive. By leveraging the principles of minimum taxation, now widely recognised at the international level, the EU could progressively align ETRs while preserving Member States' flexibility in designing their tax strategies through nominal corporate tax rates (TR) and BTDs (European Commission, 2024).

Our research contributes to this debate by exploring the role of differences between accounting income and taxable income (BTDs) in reshaping disparities in Effective Tax Rates (ETRs) among Member States, given the differing nominal corporate income tax rates (TR).

This study distinguishes itself in the international literature through both its qualitative approach and the breadth of its sample, encompassing a wide spectrum of enterprises predominantly preparing financial statements according to local GAAP standards.

To elucidate the measures required for fiscal convergence in Europe, it is imperative to analyse how Member States employ the available fiscal policy levers. Our research questions are thus formulated as follows:

1. What is the extent of variation among individual Member States regarding TR, ETR and BTD?

2. To what degree do individual states utilise tax leverage not only to establish nominal tax rates but also to implement fiscal policies that generate BTDs, resulting in diverse ETRs?

RELATED LITERATURE

Studies specifically examining the potential convergence in effective income taxation (ETR) through the use of two key levers by Member States namely, the nominal tax rate (TR) and the differences between taxable income and accounting income (BTD) are fragmented, driven by diverse objectives, and generally lacking in comprehensive analysis.

An initial strand of research does not focus on examining implications for fiscal convergence but rather on the effects of compliance on financial statement policies. For instance, as Gjesdal (1981) points out, absolute Book-Tax Conformity (BTC) is neither possible nor desirable, since different tasks necessitate varied types of accounting information. Financial reporting standards such as IFRS, required by stock exchanges, highlight what investors are interested in: an estimate of the future ability to produce income (Barth 2000; 2006; 2007). Tax rules aim to be as objective as possible in determining taxable income, on which taxes will be paid. For each accounting role, a different definition of income is necessary, and the existence of accounting choices is a necessary condition to satisfy the information and contractual demands of counterparties (Lambert 2001).

Following the American financial scandals, there has been a veritable explosion of studies investigating the merits and drawbacks of Book-Tax Conformity (BTC) in relation to earnings management. Given their abundance, it is nearly impossible to provide an exhaustive representation here. For a more comprehensive treatment, readers are referred to more specific literature reviews, such as those by (Procházka & Molín, 2016).

Other studies, as anticipated in the introduction, have focused predominantly on the effects of Regulation 1606/02 when exploring the book-tax gap (BTD) in Europe. Consequently, their scope was confined to a less than representative sample, consisting solely of listed companies.

To cite some studies concerning the mandatory adoption of IFRS in Europe, Deloitte (2010) underscores that numerous jurisdictions, while adopting IFRS for the preparation and presentation of financial statements, still require the use of local GAAP as the foundation for tax calculation.

Consequently, research by (Chan, Lin & Mo, 2010), (Chen, Gavious, & Yosef, 2013), and (Karampinis & Hevas, 2013) indicates that following the adoption of IFRS, there was a disconnect between financial statements intended for general purposes and those tailored for tax purposes. De

(Simone, 2016), utilizing data on separate financial statements from 2001 to 2010, identified a significant tax change of 16.2% in reported pre-tax earnings following the adoption of IFRS by multinational entities, compared to no material change in the opportunistic tax behavior of non-adopters.

Kager, Schanz, and Niemann (2011) and Kager and Niemann (2013), in their reconstruction of the tax statements of Austrian, German, and Dutch companies, estimate that the introduction of IFRS would increase the tax burden. The main sources of increase are intangible fixed assets and provisions, whereas inventories, receivables, and payables have no significant impact on the change in taxation.

Consistent findings were obtained in a study conducted by Gavana, Guggiola, and Marenzi (2015) involving a sample of Italian listed companies. The research indicates that the adoption of IFRS led to a substantial increase in the tax base, amounting to approximately 11%.

The possibility of mitigating tax competition through the implementation of a minimum tax, as proposed in the Ruding Report (1992), has been more specifically analyzed by De Mooij (2004). He argues that a minimum tax rate can set a floor that prevents a harmful race to the bottom in tax rates, while simultaneously preserving the disciplining effect of corporate taxes, provided the rate is not excessively high. Similarly, Klemm (2004) suggests that a minimum tax would be advantageous, as it would reduce distortions in capital allocation and counteract tax avoidance through profit shifting to low-tax jurisdictions.

Additional strands of research can be identified by expanding our review to include studies on tax competition among states within the economic literature, a topic that has undoubtedly received increased attention.

Various economic theories on tax competition align with the theoretical framework of the prisoner's dilemma (Tucker, 1950).

There is substantial consensus around the idea that, while tax competition can enhance overall efficiency by curbing the expansion of a "Leviathan State" (Frey and Eichenberger, 1996; Brülhart and Jametti, 2019; Parry, 2003), it inevitably shifts taxation away from capital and towards less mobile factors such as labour. The model by (Zodrow & Mieszkowski, 1986) for instance, illustrates that as the number of jurisdictions increases and each perceives its inability to influence capital returns, there is an inevitable transfer of taxes from mobile capital to immobile local factors of production. This concept is further developed and supported by (Gordon, 1986), (Razin & Sadka, 1991), and (Wellisch, 2004).

When comparing large and small jurisdictions, a more complex form of "asymmetric tax competition" arises (Wilson, 1991), (Bucovetsky, 1991) wherein larger jurisdictions, due to their ability to influence capital returns, are able to maintain higher tax rates compared to smaller ones. This is also evidenced in the findings of Heyndels and Vuchelen (1998).

The study of tax competition among advanced economies, particularly in Europe, highlights another layer of complexity: the correlation between tax competition and the welfare levels of individual States. (Baldwin & Krugman, 2004) argue that agglomeration economies result in the concentration of high-value manufacturing and service industries in advanced, high-income "core countries." Residents of these countries demand high levels of public services, leading to relatively high capital tax rates. Conversely, Grubert (2000) observes that the lowest tax rates are found in small, open, and relatively poor countries, which are more vulnerable to the effects of tax competition.

This raises concerns that smaller economies with lower tax rates could undermine the welfare and social benefits of larger economies. Diamond & Mirrlees, 1971, (Oates, 1972), and (Tanzi & Bovenberg, 1990) highlight the negative effects of tax differentials on capital allocation and the downward pressure on public expenditure caused by tax competition. Similar concerns are echoed by

Sinn (1990, 1994), Sørensen (2001), and (Zodrow, 2003).

METHODOLOGY AND DATASET

As mentioned earlier, the primary focus of our research revolves around key variables such as effective tax rates (ETRs), nominal tax rates (TRs), and book-tax differences (BTDs). These are calculated using the financial statements of over 420,000 companies across 23 EU countries for the year 2022.

The data was acquired from both institutional sources and commercial databases.

To ensure consistency, only companies with complete financial data for the entire period were included.

The analysis employs regression models to examine the relationship between these variables while controlling for various firm-specific factors.

Robustness checks are conducted using alternative specifications and sub-sample analyses to assess the robustness of the results.

In light of varying European accounting practices, we compute book-tax differences (BTD) by comparing taxable income with financial accounting income at the entity level.

Given that tax declarations are not publicly available, we estimate taxable income by calculating the ratio of accrued taxes to the nominal tax rate, a method employed in prior studies such as (Watrin et al., 2014)

taxable income=Tax/TR

This leads us to consider only the "permanent" accounting-tax differences, which we believe are more indicative for our investigation.

In general, a book-tax difference, can be classified as either temporary or permanent (Donohoe and McGill 2011; Barragato and Weiden 2004). Under temporary book-tax differences, the effect of the divergence will reverse in the future (Comprix, Graham, and Moore 2011) But this shift in tax payments, whether anticipated or deferred, has no effect on their accrual. These taxes will continue to be included in the income statement corresponding to the income that produced them without creating book-tax differences (BTD). All the items that are exclusively included in either financial income or taxable income indicate permanent differences (Hanlon and Shevlin 2005; Poterba, Rao, and Seidman 2011). Consequently, by calculating the gap between taxable income and income in individual financial statements we focus on the permanent accounting-tax differences In European law, for example, in Germany, internally generated intangible assets must not be balanced in the tax statement but can be considered in the single financial Statement. By setting these intangibles as assets in the single financial Statement, income is increased without increasing taxable income (and, therefore, the tax burden).

The BTD is measured for each company as the difference between taxable income (Tax/TR) and book income (PBT), expressed relative to the value of book income (PBT).

$$BTD = \frac{\frac{Tax}{TR} - PBT}{PBT}$$
(1)

Since the Effective Tax Rate is given by the ratio between the book values of taxes and income (ETR=Tax/PBT):

$$BTD = \frac{ETR}{TR} - 1 \tag{2}$$

Where BTD takes on the value:

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- zero when there are no differences between accounting income and tax income and ETR=TR;

positive, as a percentage increase in accounting income to obtain taxable income ETR>TR;
negative, as a percentage decrease in accounting income to obtain taxable income ETR<TR.

And it is easy to also verify that:

$$ETR = TR \times (1 + BTD)$$

(3)

In more detail, the data used comes from the Orbis database (provided by Bureau Van Dijk, a Moody's Analytics company).

The steps of the search strategy are summarized in Table 1.

Given the European tax system's primary focus on taxing individual legal entities rather than groups, only companies with standalone and separate financial statements were selected for analysis, thus excluding consolidated financial statements.

The analyzed European countries are 23: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden.

As regards the sector of activity, we have selected only "companies" according to the typologies of the database, excluding those defined as banking institute, finance company, insurance company, private equity fund, venture capital, hedge fund, mutual and pension fund/ Agent/Trust/Trustee, Foundation/Research Institute, Public body/State/Government, Marine vessels.

The legal forms of the sample are Joint Stock Company (JSCo) and Limited Liability Company (LTD).

We selected 2022 as it is the latest year with fully loaded financial statements in the database. Regarding the criteria for values, we included companies with pre-tax and net income exceeding 10k, taxes exceeding 1k, and with more than 10 employees.

In summary, our study is based on the analysis of data from a sample of 421,580 companies.

	Table 1 SEARCH STEP								
			Search result						
1.	Status	Active company	79,187,585						
2.	Source of date	Standalone and separate financial statements	19,733,937						
3.	Country	Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden	11,160,956						
4.	Type of company	Operating company (excluding banking and insurance companies)	10,770,692						
5.	Legal form	Joint Stock Company (JSCo), Limited Liability Company (LTD)	10,110,78						
6.	Year of availability	2022	7,057,381						
7.	Earning before tax	> 10k	2,558,994						
8.	Net Earning	> 10k	2,379,767						
9.	Number of employees	> 10 units	466,355						
10.	Tax	>01k	421,580						

Table 2 presents the descriptive statistics of the chosen sample.

Notably, the number of cases differs significantly across nations, ranging from 1,035 in Estonia to 109,883 in Italy. This variation is influenced not only by the number of companies in each country but also by the volume of financial statements uploaded to the database. For instance, there are 8,105 cases for Germany compared to 9,095 for Lithuania. However, we believe that the number

of cases per nation is sufficiently robust for the following considerations.

The "IFRS" column in Table 2 illustrates the proportion of financial statements within the sample that comply with international accounting standards. Most statements predominantly follow Local GAAP, with only marginal percentages for companies from Germany, Greece, Ireland, Italy, Poland, and Slovakia adopting IFRS. Portugal stands as the exception, with all its financial statements exclusively prepared in accordance with IFRS.

Table 2 DESCRIPTIVE STATISTICS											
Code	Country	Obs	IFRS	TR	Statistic	Tax/TA	LnTA	LnS	D/E	ROE	Emp
AT	Austria	4,118	-	25.00%	Mean s.d.	0,03 0,03	9.96 1.31	10.73 1.38	2.01 26.76	0.27 1.69	194.06 768.48
BE	Belgium	18,944	-	25.00%	Mean s.d.	0,03 0,07	8.44 1.47	10.06 1.30	7.87 363.95	0.94 46.50	59.27 331.50
CZ	Czechia	5,882	-	19.00%	Mean s.d.	0,03 0,04	8.12 1.41	8.55 1.25	1.75 10.95	0.23 0.56	81.10 519.58
DE	Germany	8,105	0.15%	29.94%	Mean s.d.	0,04 0,04	9.89 1.24	10.77 1.39	6.48 75.47	$0.74 \\ 7.11$	197.61 513.12
DK	Denmark	13,936	-	22.00%	Mean s.d.	0,04 0,04	7.99 1.46	10.72 1.59	1.35 172.74	0.40 6.75	48.60 185.98
EE	Estonia	1,821	-	25.00%	Mean s.d.	0,03 0,04	7.51 1.45	8.19 1.27	0.99 2.40	0.37 0.54	43.89 103.83
ES	Spain	78,903	-	25.00%	Mean s.d.	0,03 0,03	7.80 1.41	8.15 1.27	4.67 546.53	0.46 59.08	58.09 541.54
FI	Finland	9,690	-	20.00%	Mean s.d.	0,05 0,07	7.78 1.44	8.52 1.32	2.71 32.06	0.34 1.11	55.85 217.02
FR	France	6,853	-	25.83%	Mean s.d.	0,03 0,04	8.83 1.73	9.26 1.62	5.34 223.57	0.46 14.35	149.14 1272.75
GR	Greece	6,398	7.06%	22.00%	Mean s.d.	0,03	8.47 1.32	8.66 1.28	2.23 35.29	$\begin{array}{c} 0.28 \\ 0.99 \end{array}$	65.72 240.89
HU	Hungary	24,500	-	9.0%	Mean s.d.	0,02 0,03	7.21 1.48	7.66 1.37	1.69 17.08	0.35 2.32	53.83 206.39
IE	Ireland	1,639	5.86%	12.50%	Mean s.d.	0,02 0,03	9.80 1.61	10.05 1.45	6.92 98.13	0.63 8.27	223.42 2856.13
IS	Iceland	1,035	-	20.00%	Mean s.d.	0,04 0,04	7.90 1.47	8.58 1.25	0.77 54.11	0.42 1.51	39.79 73.13
IT	Italy	109,883	0.58%	27.81%	Mean s.d.	0,03 0,04	8.26 1.38	8.44 1.28	4.47 136.72	0.29 11.05	43.68 210.16
LT	Lithuania	9,095	-	15.00%	Mean s.d.	0,04 0,05	7.06 1.47	7.82 1.35	1.84 32.10	0.31 7.16	57.66 188.00
LV	Latvia	2,603	-	20.00%	Mean s.d.	0,05 0,20	7.35 1.62	8.14 1.43	0.31 51.57	0.30 2.55	70.02 230.25
NL	Netherlands	4,258	-	25.80%	Mean s.d.	0,04 0,05	9.91 1.29	11.14 1.43	25.27 679.33	9.87 327.24	138.15 304.43
NO	Norway	20,352	-	22.00%	Mean s.d.	0,04 0,04	7.50 1.52	8.27 1.35	6.79 52.90	1.35 13.16	51.15 198.67
PL	Poland	24,954	2.00%	19.00%	Mean s.d.	0,03 0,07	7.94 1.65	8.58 1.51	1.25 173.19	0.47 13.11	109.65 621.79
РТ	Portugal	30,745	100.00%	31.50%	Mean s.d.	0,02 0,03	7.52 1.39	7.79 1.27	2.76 39.06	0.28 4.52	50.28 256.29
SE	Sweden	25,734	-	20.60%	Mean s.d.	0,04 0,03	7.71 1.45	8.46 1.28	3.98 224.83	0.65 5.12	53.28 306.48
SI	Slovenia	5,530	-	19.00%	Mean s.d.	0,02 0,03	7.82 1.46	8.29 1.29	2.05 8.29	0.24 0.97	53.03 171.65
SK	Slovakia	6,602	0.05%	21.00%	Mean s.d.	0,03 0,03	7.73 1.46	8.31 1.43	1.87 59.38	0.24 3.06	70.25 220.02

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The "TR" column shows the official corporate income tax rate for 2022 taken from the official OECD website and defined as Combined Corporate Income Tax Rate, which includes the combined statutory corporate income tax rates at both central and sub -central levels. This rate comprises the central government rate, adjusted for deductions related to sub-national taxes, as well as the sub-central rate.

The "Tax/TA" column represents the ratio between accrued taxes and total assets, both of which are entries in the financial statement. As for the subsequent columns, we report the sample mean above and the standard deviation (s.d.) below.

The average size of companies is described both in terms of investments as the natural logarithm of total assets (LnTA) and as turnover flow (LnS).

Finally, the last three columns report the debt expressed by the ratio between debts and equity (D/E), profitability (ROE) and as a further indicator of the production structure the number of employees (Emp).

To investigate whether differences exist among various European countries with differing nominal tax rates (TR) in terms of determinations of taxable bases compared to bookable incomes (BDT), resulting in variations in Effective Tax Rates (ETR) and TR, we initially computed the averages of ETR and BDT for each country. remembering the link that unites them: $ETR=TR\times(1+BTD)$.

Therefore, the greater the BTD, the greater the difference between ETR and TR. In particular, with positive BTDs we will have ETR>TR and with negative BTDs ETR<TR. And consequently, if BTB=0, then ETR=TR.

However, we also want to highlight how much, for each country, the determination of the taxable amount follows different rules from the accounting ones. This is quantified for each company by BTD but cannot be captured by calculating the average per country where even very high differences, but opposite signs would compensate. We therefore believe it is interesting to calculate the average on the absolute values of BTD called "BTDabs".

We subsequently conducted appropriate statistical tests to assess the significance of any differences between the means.

In conclusion, we examined whether disparities between tax and accounting income (BTD and BTDabs) could be attributed to varying national policies. To this end, we employed several proxies selected from the variables described earlier: Tax/TA for tax progressivity, LnTA for investment capital support incentives, ROE for business income policies, and Emp for incentives supporting employment investments. Additionally, IFRS served as a dummy variable to control for financial statements prepared in accordance with international accounting principles.

The regression models for each country used are as follows:

 $BTD_{Country} = \alpha_0 + \alpha_1 \cdot Tax/TA + \alpha_2 \cdot LnTA + \alpha_3 \cdot ROE + \alpha_4 \cdot Emp + \alpha_5 \cdot IFRS + \epsilon_1$

 $BTD_{abs/Country} = \beta_0 + \beta_1 \cdot Tax/TA + \beta_2 \cdot LnTA + \beta_3 \cdot ROE + \beta_4 \cdot Emp + \beta_5 \cdot IFRS + \epsilon_2$

These models allowed us to explore how tax policies and financial practices influence the disparities between taxable and bookable incomes in each country, providing valuable insights into the factors driving these differences.

RESULT AND DISCUSSION

First and foremost, considering the averages of ETR, BTD, and BTDabs as observed in Table 3, the average declared TR is 0.218 with a standard deviation of 0.053, and the ETR calculated from individual financial statements is very similar overall, with an average of 0.209 and a standard deviation of 0.051.

Table 3 DESCRIPTIVE STATISTICS										
Code	Country	Obs	TF	Statistic	ETR	BTD	BTD _{abs}			
AT	Austria	4,118	0.2	5 Mean	0.23	-0.09	0.25			
BE	Belgium	18.944	0.2	5 S.d. Mean	0.11	0.42	0.35			
C7	Czachia	5 997	0.10	s.d. Mean	0.13 0.20	0.51 0.05	0.37 0.21			
	Czeenna	5,002	0.1	s.d. Mean	0.08	0.42 -0.08	0.37 0.34			
DE	Germany	8,105	0.30) s.d. Mean	0.15	0.50	0.37			
DK	Denmark	13,936	0.22	2 s.d.	0.22	0.01	0.10			
EE	Estonia	1,821	0.2	5 Mean s.d.	0.13 0.12	-0.36 0.60	0.59 0.37			
ES	Spain	78,903	0.2	5 Mean s.d.	0.24 0.07	-0.05 0.27	0.14 0.24			
FI	Finland	9,690	0.20) Mean	0.26	0.30	0.41			
FR	France	6 853	0.2	5 Mean	0.19	0.93	0.89			
GP	Graaca	6 308	0.2	s.d. Mean	0.14 0.23	0.54 0.04	0.39 0.23			
UK	Uleece	0,598	0.2	s.d. Mean	0.09 0.11	0.40 0.24	0.34 0.67			
ΗU	Hungary	24,500	0.0	s.d. Mean	0.11	1.22	1.05			
IE	Ireland	1,639	0.12	2 s.d.	0.09	0.20	0.64			
IS	Iceland	1,035	0.20) Mean s.d.	0.20	-0.01 0.31	0.12 0.29			
IT	Italy	109,883	0.23	B Mean s.d.	0.31 0.14	0.10 0.52	0.37 0.38			
LT	Lithuania	9,095	0.1	5 Mean	0.19	0.24	0.47			
LV	Latvia	2,603	0.20) Mean	0.13	-0.37	0.71			
NL	Netherlands	4,258	0.2	5 Mean	0.23	-0.13	0.19			
NO	Norway	20.352	0.2	2. S.d. Mean	0.08	0.29	0.25			
DI	Poland	24.054	0.10	s.d. Mean	0.05 0.18	0.25 -0.06	0.23 0.38			
		24,954	0.1	s.d. Mean	0.11 0.21	0.56 -0.35	0.42 0.42			
PI	Portugal	30,745	0.3	I s.d. Mean	0.11	0.34	0.25			
SE	Sweden	25,734	0.2	l s.d.	0.09	0.45	0.35			
SI	Slovenia	5,530	0.19	s.d.	0.16	-0.14	0.34			
SK	Slovakia	6,602	0.2	l Mean s.d.	0.23	0.08	0.23			
	Total	421.580	Mean 0.22 s.d. 0.0	2 5	0.21 0.05	-0.02 0.18	0.33 0.17			

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Citation Information: Cecchi, M. (2025). Book-Tax Differences and Corporate Tax Convergence in Europe. Academy of Accounting and Financial Studies Journal, 29(2), 1-16. Particularly, Eastern European countries, the most recent entrants to the EU, demonstrate the most substantial reductions in Nominal Tax Rates (TR) through Book-Tax Differences (BTDs). For example, in Estonia, a TR of 0.25 is adjusted by BTDs of -0.36, resulting in an Effective Tax Rate (ETR) of 0.13; in Latvia, a TR of 0.20 is reduced by -0.37 BTDs to an ETR of 0.13; and in Slovenia, a TR of 0.19 is decreased by -0.14 BTDs to an ETR of 0.16. Although Hungary presents an anomaly with positive BTDs of 0.24, this still leads to an ETR of 0.11, the lowest among the countries examined.

Other significant examples include Sweden, where an average TR of 0.21 is reduced to an ETR of 0.18 through BTDs of -0.14. Similarly, in Portugal, despite starting with a higher TR of 0.31, negative BTDs decrease the ETR to 0.21.

Regarding Norway, where the Book-Tax Basis (BTB) is zero, the ETR directly corresponds to the TR.

The comparison of means appears notably significant across various cases. In general, the ANOVA test conducted shows that there is a significant difference between the means of the groups (countries) with respect to the considered variable, since the p-value (Prob>F) is very close to zero. This suggests that the means among the countries are statistically different.

Subsequently, we delved deeper into these findings by performing a Tukey test to compare means pairwise across various groups. The results underscore statistical significance (p < .005) for all comparisons, except for the following pairs:

ETR: (AT vs DK, GR, NL, SK); (DE vs GR); (DK vs NL); (EE vs LV); (GR vs NL, SK); (IS vs LT, PT); (NL vs NO, SK); (PL vs SE).

BTD: (AT vs DE, NL, PL); (BE vs DK, FR, GR, IS, NO); (CZ vs FR, GR, IS, SK); (DE vs ES, PL); (DK vs FR, GR, IS, NO); (EE vs LV, PT); (ES vs IS, PL); (FR vs GR, IS,; (GR vs IS); (HU vs IE, LT); (IE vs LT); (IS vs NO, PL); (IT vs SK); (LV vs PT); (NL vs SE, SI); (SE vs SI).

BTDabs: (AT vs GR, SK); (BE vs DE, FR, IE, IT, SI); (CZ vs GR, NL, SK); (DE vs IE, SI); (DK vs IS, NO);); (ES vs IS); (FI vs IE, PT); (FR vs IE, IT, PL); (GR vs SK); (IE vs IT, PL, SI); (IS vs NO); (SE vs SI).

These differences led us to investigate the possible causes by setting, again for each country, a regression between the dependent variables BTD and BTDabs and the independent variables Tax/TA, LnTA, ROE and Emp. IFRS is a dummy variable which for each financial statement has a value of 0 when Local GAAP is used and 1 if IFRS is used.

To ensure the absence of collinearity, we conducted correlation tests for each country among the independent variables. The results, obtained once again through Stata pairwise correlations, indicate consistently low correlation values. However, due to space constraints, we refrain from presenting the 23 correlation tables.

As previously described, the regression model applied to each country is:

 $BTD_{Country} = \alpha_0 + \alpha_1 \cdot Tax/TA + \alpha_2 \cdot LnTA + \alpha_3 \cdot ROE + \alpha_4 \cdot Emp + \alpha_5 \cdot IFRS + \epsilon_1$

But simple regression in some cases presents heteroskedasticity problems. By operating robust regressions for each country, we obtain the results reported in Table 4.

Although the F-test values indicate overall significance, regression models reveal highly varied results across individual countries.

The R2 values are in some cases very high, such as for LV, SE, IT, HU, BE and EE. In others, however, they are nearly null, such as for CZ, FI, GR, IE, NO, ES, DK, SK, and LT.

The constant term $\alpha 0$, with the sole exception of BE, is almost always highly significant and negative, ranging from -0.919 of PL to 0.403 of IT.

The coefficient $\alpha 1$ associated with the Tax/TA is also consistently highly significant, with the sole exception of NO, and varies between -0.044 for IT and 0.086 for PL.

The coefficient a2 associated with the LnTA is not significant for DK, ES, FI, GR, IE, NL

and SK, and varies between -0.721 for EE and 0 for NO.

The coefficient α 3 associated with ROE is statistically significant except for CZ, LT, LV, NL and SI; however, it is close to zero with the slight exception of EE.

The coefficient $\alpha 4$ associated with Emp is statistically significant except for CZ, ES, and IE; almost always positive and ranges from -0.472 in SK to 22.666 in HU.

The coefficient $\alpha 5$ associated with IFRS is a dummy variable. It is highly significant and negative only in the case of SK. In nearly all countries in the sample, financial statements are prepared using Local GAAP, except for PT, where all financial statements are prepared using IFRS. Therefore, for all these nations, $\alpha 5$ is omitted by due to collinearity.

Table 4											
BTD REGRESSION ANALYSIS											
BTD		Cost	Tax/TA	LnTA	ROE	Emp	IFRS	Obs	F-test	Prob	\mathbf{R}^2
AT	Coef	0.033*	-0.005***	-0.032***	0***	0.403***	-	4,117	126,962	0.00	0.11
BE	Coef	-0.026	-0.012***	-0.175***	-7.75 0***	5.0 4.849***	-	18,941	27666,183	0.00	0.85
CZ	t-value Coef	-1.38 -0.005	-5.79 0.003***	-331.20 -0.009***	8.16 0	0.052	-	5,876	4,976	0.00	0.00
DE	t-value Coef	-0.59 -0.484***	2.89 0.017***	-2.99 -0.012***	0.31 0***	1.29 3.481***	0.087	8,100	299,971	0.00	0.16
DK	t-value Coef	-4.05 0.051***	4.60 -0.004***	-19.24 0	-5.16 0***	34.11 -0.092***	0.77	13,934	137,175	0.00	0.04
EE	t-value	29.14	-21.84	-0.50	3.50	-12.43		1 810	1052 210	0.00	0.70
EE	t-value	-0.222	-0.040***	-0.721	12.31	58.94	-	1,019	1055,519	0.00	0.70
ES	Coef t-value	0.038*** 30.23	-0.006*** -39.64	0 0.14	0*** 6.05	-0.001 -0.14	-	78,901	413,476	0.00	0.02
FI	Coef	0.021***	-0.001	-0.001	0*** 7.43	-0.024**	-	9,687	15,898	0.00	0.01
FR	Coef	-0.798***	0.064***	-0.005***	0***	6.053***	-	6,849	536,844	0.00	0.24
GR	Coef	-30.83 0.058***	0.001	-0.002	-3.74 0***	-0.275***	-0.02***	6,398	15,855	0.00	0.01
HU	t-value Coef	3.34 0.127***	0.34 -0.034***	-0.94 -1.114***	6.03 0***	-3.77 22.666***	-2.70	24,499	46443,529	0.00	0.88
IE	t-value Coef	7.98 0.152***	-16.42 -0.007**	-381.18 -0.003	3.95 0***	223.09 0.115	-0.024	1,637	2,207	0.05	0.01
IS	t-value Coef	3.46 0.007***	-2.00 -0.001***	-1.29 -0.004***	2.66 0**	0.49 0.009*	-1.06	1.034	340,707	0.00	0.57
IT	t-value	5.83	-4.62	-36.82	2.10 0***	1.67 4 195***	-0.02	109 858	475000 266	0.00	0.96
11	t-value	19.70	-0.044 -44.18	-0.408	9.66	98.56	-1.13	109,050	475000,200	0.00	0.90
LT	Coef t-value	-0.282*** -11.77	0.035*** 10.51	-0.006*** -4.14	0 -0.66	2.362*** 23.47	-	9,092	151,977	0.00	0.06
LV	Coef t-value	-0.476*** -22.85	-0.033***	-0.406*** -156.65	0 1.27	11.597*** 386.82	-	2,601	44553,197	0.00	0.99
NL	Coef	-0.762***	0.061***	0	0	1.413***	-	4,257	717,541	0.00	0.40
NO	Coef	0.007***	43.27	-1.20 0**	-1.40 0***	-0.039***	-	20,351	53,959	0.00	0.01
PL	t-value Coef	12.61 -0.919***	0.66- ****0.086	2.49 -0.001***	2.93 0***	-14.22 4.351***	-0.013	24,947	2007.782	0.00	0.29
РТ	t-value Coef	-38.50 -0.578***	52.02 0.015***	-2.97 -0.002***	-6.26 0*	88.84 3.503***	-0.71	30,745	745.532	0.00	0.09
SE	t-value Coef	-59.73 0.273	12.33 -0.034***	-6.22 -0.516***	1.70 0*	54.14 6.023***	-0.186	25.722	399075,609	0.00	0.99
SI	t-value	1.00	-26.27	-1405.41 -0.358***	1.83	103.14 8 95***	-0.68	5 520	2349 204	0.00	0.63
	t-value	-10.44	-1.97	-86.90	-0.16	52.02	-	5,525	54.041	0.00	0.03
SK	Coef t-value	-0.802*** -10.65	-0.006*** -4.50	-0.001 -1.30	0*** 6.67	-0.4/2*** -8.96	0.913*** 12.29	6,580	54,841	0.00	0.04
*** [*** <i>p</i> <.01, ** <i>p</i> <.05, * <i>p</i> <.1										

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Similarly, for BTDabs the regression model for each country is:

 $BTD_{abs/Country} = \beta_0 + \beta_1 \cdot Tax/TA + \beta_2 \cdot LnTA + \beta_3 \cdot ROE + \beta_4 \cdot Emp + \beta_5 \cdot IFRS + \epsilon_2$

And again, to provide more reliable parameter estimates we use robust regressions. Results are reported in Table 5.

In this case too, simple regression sometimes presents heteroskedasticity problems. By conducting robust regressions for each country, we obtain the results reported in Table 4.

Table 5 BTD _{abs} REGRESSION ANALYSIS												
BTD _{abs}		Cost	Tax/TA	LnTA	ROE	Emp	IFRS	Obs	F-test	Prob	\mathbf{R}^2	
AT	Coef	0.059***	-1.034***	0.011***	0*** 7.60	-1.034***	-	4118	133,321	0,00	0,115	
BE	Coef t-value	0.617***	-3.694***	0.004***	0*** 9.87	-3.694***	-	18941	1196,641	0,00	0,202	
CZ	Coef t-value	0.132***	-0.807***	0	0 82	-0.807***	-	5875	83,017	0,00	0,054	
DE	Coef t-value	0.566***	-3.311***	0.003***	0*** 11.90	-3.311***	-0,107	8099	406,979	0,00	0,201	
DK	Coef	0.042***	-0.157***	0 43	0*** 12.98	-0.157***	-	13935	167,754	0,00	0,046	
EE	Coef	0.360***	-7.284***	0.411***	0***	-7.284***	-	1820	579,793	0,00	0,561	
ES	Coef t-value	0.005***	-0.171***	0	0***	-0.171***	-	78900	651,738	0,00	0,032	
FI	Coef t-value	0.063***	-0.36***	0.001**	0*** 19.60	-0.36***	-	9688	472,632	0,00	0,163	
FR	Coef t-value	0.248***	-2.039***	0	0** 2.22	-2.039***	-	6850	118,015	0,00	0,065	
GR	Coef t-value	0.207***	-1.348***	0.007***	0*** 8.85	-1.348***	-0,032*** -4.59	6398	105,126	0,00	0,076	
HU	Coef t-value	0.367***	-3.791*** -41.30	0.002	0	-3.791*** -41.3	-	24499	566,943	0,00	0,085	
IE	Coef t-value	0.281*** 7.42	-1.348***	0.001	0*** 2.80	-1.348***	-0,037* -1.87	1638	13,903	0,00	0,041	
IS	Coef t-value	0.007*** 6.71	-0.009* -1.90	0 -0.49	0 0.90	-0.009* -1.9	-	1034	5,146	0,00	0,02	
IT	Coef t-value	0.833*** 63.11	-3.437*** -125.10	0 -0.62	0*** 35.15	-3.437*** -125.1	-0,046*** -4,12	109859	3652,607	0,00	0,143	
LT	Coef t-value	0.311*** 18.28	-2.894*** -48.25	0 0.11	0 1.60	-2.894*** -48.25	-	9093	619,928	0,00	0,214	
LV	Coef t-value	0.594*** 26.40	-6.301*** -194.40	0 -0.03	0* -1.92	-6.301*** -194.4	-	2601	10306,736	0,00	0,941	
NL	Coef t-value	0.614*** 45.18	-1.377*** -36.75	0 1.60	0** 2.50	-1.377*** -36.75	-	4257	549,02	0,00	0,341	
NO	Coef t-value	0.014*** 24.35	-0.05*** -16.57	0 1.08	0*** 7.11	-0.05*** -16.57	-	20348	81,624	0,00	0,016	
PL	Coef t-value	0.880*** 53.87	-4.253*** -157.85	0*** 3.16	0*** 10.18	-4.253*** -157.85	-0,011 -0.88	24946	5231,338	0,00	0,512	
PT	Coef t-value	0.581*** 68.15	-3.23*** -56.69	0.002*** 6.30	0 -0.96	-3.23*** -56.69	-	30745	814,727	0,00	0,096	
SE	Coef t-value	0.107 0.49	-4.918*** -105.17	0.316*** 1077.15	0 0.69	-4.918*** -105.17	0,014 0,07	25722	235795,906	0,00	0,979	
SI	Coef t-value	0.481*** 23.69	-5.582*** -38.82	0.016*** 3.41	0** 2.02	-5.582*** -38.82	-	5528	381,843	0,00	0,217	
SK	Coef t-value	0.980*** 12.58	-1.218*** -22.39	-0.001* -1.80	0*** 5.98	-1.218*** -22.39	-0,733*** -9,55	6581	126,209	0,00	0,088	
*** p<.	$\begin{array}{c} 12.30 \\ + 22.39 \\ - 1.60 \\ - 22.39 \\ - 22.39 \\ - 9,33 \\ - 9,33 \\ - 9,33 \\ \end{array}$											

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Although the F-test values indicate overall significance, regression models reveal highly varied results across individual countries.

The R2 values are in some cases very high, such as for PT and LV. In others, however, they are nearly null, such as for NO, IS, ES and DK.

In summary, the analysis of BTD and BTDabs reveals notable fluctuations in taxable income across European countries. The statistical comparison of means through ANOVA tests confirms significant differences among countries, indicating diverse fiscal landscapes. Pairwise comparisons via Tukey tests reinforce these distinctions, with most comparisons showing statistical significance.

Further investigation through regression analysis highlights the multifaceted nature of these differences. Variables such as Tax/TA, LnTA, ROE, Emp and IFRS show consistently display statistical significance and varied effects on BTD and BTDabs across countries.

Overall, the analysis underscores the complex interaction of fiscal variables in shaping booktax differences across European countries. This attests that beyond the formal differences among the autonomously set nominal tax rates (TR) by Member states, book-tax differences are also actively utilized to implement distinct fiscal policies. Therefore, a convergence policy focused on a gradual alignment of effective tax rates (ETR) could be considered a progressive path toward alignment while maintaining sufficient autonomy for the fiscal policies of individual countries

CONCLUSIONS

In concluding our analysis of financial statements from over 400,000 European companies, we have identified significant disparities in the Effective Tax Rates (ETRs) derived from these statements. Although our theoretical framework suggests that it is possible to mitigate these differences through careful adjustments of nominal rates and Book-Tax Differences (BTDs) without substantially compromising fiscal sovereignty, such adjustments appear underutilized.

Our study reveals that while the average declared Nominal Tax Rate (TR) is 0.218 with a standard deviation of 0.053, the average ETR remains constant at 0.209 with a similarly unchanged standard deviation of 0.051. This indicates relative consistency in tax rates across broad datasets, yet a closer examination of specific regions, particularly in Eastern European countries, reveals a strategic use of BTDs to significantly lower tax liabilities compared to nominal rates. For instance, in Estonia, a nominal TR of 0.25, adjusted by BTDs of -0.36, results in an ETR of 0.13; Latvia sees a TR of 0.20 reduced by -0.37 BTDs to an ETR of 0.13; and Slovenia's TR of 0.19 is adjusted by -0.14 BTDs to achieve an ETR of 0.16.

And although Hungary shows that a positive adjustment of +0.24 by BTDs can only raise a TR of 0.09 to an ETR of 0.11, keeping it the lowest among the countries studied. Other particular situations to note include Sweden, where an average TR of 0.21 is reduced by BTDs of -0.14 to an ETR of 0.18, and Portugal, where a high TR of 0.31 is decreased by BTDs of -0.35 to an average ETR of 0.21.

These findings underscore the necessity of accurately examining the mechanisms driving the determination of taxable profits and the fiscal policies adopted by individual nations.

Our findings suggest that various factors, including tax progressivity, investment and employment incentives, and compliance with international accounting standards, may influence the disparities between taxable and accounting income. However, the relative effectiveness of these factors varies significantly from country to country, highlighting how BTDs serve as an effective tool for deciphering differing national fiscal policies.

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