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Book-tax conformity in Polish private companies

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Abstract

The purpose of this paper is to identify whether financial income differs significantly from the tax base in Poland and what determines these differences between accounting and taxable results in Polish private entities that are not listed on the stock exchange. In this paper, besides examining the level of book-tax conformity in Poland, we investigate the determinants of book-tax differences in the one-book and two-book accounting systems, with deferred income tax. We use the single factor ANOVA variance analysis, robust fixed effects estimator and the fixed effects linear model with an AR(1) disturbance estimator for panel data of 26,657 private limited liability and non-public joint-stock companies for the period of 2003–2014 (177,667 firm-year observations). The originality of this paper results from the deep quantitative analysis of the determinants of book-tax conformity on a novel dataset of Polish private firms. We confirm a strong significant influence of tax law on the shape of the one-book accounting system in Poland. Larger enterprises show fewer book-tax differences. Book-tax conformity is lower in private companies that incur financial losses and in private companies conducting the one-book accounting system. Family-owned companies have higher mean and median book-tax conformity than business groups members, due to higher demand for information from their accounts to support stewardship functions and to monitor the activities of the management board in the business groups.

Keywords: tax accounting, book-tax conformity, book-tax differences, one-book system, two-book system.

Streszczenie

Zgodność wyniku rachunkowego z wynikiem podatkowym w polskich prywatnych przedsiębiorstwach

Celem artykułu jest zdiagnozowanie, czy wynik finansowy istotnie różni się od podstawy opodatkowania i co determinuje różnice między wynikiem rachunkowym i podatkowym w polskich przedsiębiorstwach prywatnych, które nie są notowane na giełdzie papierów wartościowych. W artykule, oprócz rozpoznania poziomu zgodności ksiąg rachunkowych z księgami podatkowymi w Polsce, badano determinanty różnic między wynikiem rachunkowym a podatkowym w systemie jednoksięgowym i dwuksięgowym, z uwzględnieniem odroczonego podatku dochodowego. W badaniu wykorzystano jednoczynnikową analizę wariancji ANOVA, odporny estymator efektów stałych i estymator efektów stałych z autokorelacją pierwszego

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rzędu dla danych panelowych 26 657 prywatnych spółek z ograniczoną odpowiedzialnością i niepublicznych spółek akcyjnych za lata 2003–2014 (177 667 obserwacji). Oryginalność tego artykułu wynika z pogłębionej analizy ilościowej determinant zgodności wyniku rachunkowego z podatkowym z wykorzystaniem nowej bazy danych polskich firm prywatnych. Uzyskane wyniki potwierdzają silny istotny wpływ prawa podatkowego na kształt jednoksięgowego systemu rachunkowości w Polsce. Większe przedsiębiorstwa wykazują mniejsze różnice między wynikiem rachunkowym a podatkowym. Zgodność ksiąg rachunkowych i podatkowych jest mniejsza w prywatnych firmach, które ponoszą straty finansowe, i jednostkach prowadzących rachunkowość w systemie jednoksięgowym. Firmy rodzinne mają wyższą średnią i medianę zgodności wyniku księgowego z dochodem podatkowym niż członkowie grup kapitałowych, ze względu na większe zapotrzebowanie na informacje z ksiąg rachunkowych na potrzeby wsparcia funkcji zarządczej *stewardship* i monitorowania działań zarządu w grupach kapitałowych.

Słowa kluczowe: rachunkowość podatkowa, zgodność wyniku rachunkowego z wynikiem podatkowym, różnice księgowo-podatkowe, system jednoksięgowy, system dwuksięgowy.

Introduction

A one-book system allows tax authorities to further control reported earnings and can lead to a decrease in opportunistic behaviour by managers (Desai, 2005; Desai, Dharmapala, 2009). High book-tax conformity in the one-book system reduces compliance costs (Desai, Dharmapala, 2006) and limits earnings management (Watrin et al., 2014). Under these conditions, tax policymakers are likely to intervene in the standard-setting process. Earnings persistence and the association between earnings and future cash flows are lower when book-tax conformity is higher (Atwood et al., 2010).

The dominance of one-book accounting observed for Polish private companies shows that earnings quality does not play a substantial role in addressing the agency theory and asymmetric information. Consequently, relying on tax-reporting rather than accounting principles strongly influences the internal decision-making processes. The use of accounting for the internal decision-making process tends to be overlooked by standard setters and also seems to play only a minor role in the current debates around the Conceptual Framework. Especially in settings where managerial accounting and internal reporting systems are underdeveloped, as in firms operating in developing and emerging economies and in smaller entities, financial accounting may perform a highly influential role in guiding business decisions (Cascino et al., 2014). This issue was partially addressed by the Accounting Act of 2000, when Polish accounting shifted from being a tax-oriented system towards becoming a tool for decision making by implementing a substance over form principle (Dobija, Klimczak, 2010). However, the increase in the limit for no accounts in 2008 suppressed its positive impact. In 2010, only 9% of active entities did bookkeeping (9.7% in the previous year), while 65.1% of the business sector conducted ledgers of revenue and expense. These ledgers allow us to compute solely taxable income, and record revenue (sales of goods and services and other revenue) and costs (categorised into trade goods and materials at purchasing prices, purchase-related costs and payroll-related expenses and other cost items). The

remaining entities in Poland recorded only revenue for tax purposes or did not record either revenue or cost due to paying tax in the amount calculated by the tax office according to the tax card (GUS, 2011–2013; Białek-Jaworska, Matusiewicz, 2015).

This paper aims to identify whether financial income differs significantly from the tax base in Poland and what determines the differences between accounting and taxable results in Polish private entities that are not listed on the stock exchange. For this purpose, we apply Watrin et al. (2014) measure of book-tax differences for different groups of companies and we conduct the single factor ANOVA variance analysis and additional tests to validate results, because of unfulfilled assumption of normality. In this paper, besides examining the level of the book-tax conformity in Polish private entities, we highlight the determinants of book-tax differences in the one-book and two-book accounting systems, with deferred income tax. To measure book-tax conformity we apply the research approach proposed by Watrin et al. (2014), where a lower book-tax difference indicates higher book-tax conformity. We conduct panel model estimation with the use of a robust fixed effects estimator and the fixed effects linear model with an AR(1) (first-order autoregressive) disturbance estimator for panel data of 26,657 private limited liability and non-public joint-stock companies for the period of 2003–2014 (177,667 firm-year observations). We contribute to the literature not only by analyzing the novel dataset of private firms but also by providing a deep insight into the determinants of book-tax conformity in Polish private firms and the comparison of book-tax differences between companies with a one-book and a two-book system.

The rest of the paper is constructed as follows: in section 1 we present a literature review on book-tax conformity in private entities and family firms, in section 2 we formulate hypotheses, and then characterise the data in section 3. Section 4 describes the methodology and results, and we conclude in the last section.

1. Literature review on book-tax conformity

Our research concentrates on the characteristics of the accounting system of private companies whose shareholders take a more active role in management, which reduces their reliance on financial statements for monitoring managers. The financial reporting of private companies is more likely to be influenced by income tax policies, retained earnings and dividend policy. Relative to public companies, the demand for financial reporting in private companies arises more from tax, dividend and compensation payment policies and less from reducing information asymmetry between managers and other parties: lenders, shareholders, suppliers and customers (Ball, Shivakumar, 2005). The influence of tax policy on private firms' financial reporting arises from the lower benefit, relative to the cost, of keeping separate tax and financial reporting records. Managers and auditors of private firms implicitly or explicitly contract for a lower level of financial reporting quality, facing lower litigation costs for supplying it (Burgstahler et al., 2006), have higher quality accruals and a lower propensity to manage earnings to meet performance benchmarks (Givoly et al., 2010).

Within the accounting approach that emphasises the use of the prudence principle in presenting the true and fair view of a company's financial position and the result of operations, unrealised gains cannot be included in the measurement of income, and the valuation criteria are closely related to historical costs. The realisation principle is commonly accepted in the design of the modern tax systems and the legal form approach meets tax requirements. Taxation law tends to focus on the legal form of transactions, as opposed to their economic substance. This reduces the need for tax authorities' judgment when verifying the proper tax recognition of business transactions.

The principle of the prevalence of substance over legal form and fair value accounting, which entailed a significant degree of judgment, would have brought an excessive volatility to the tax base and would have reduced the certainty of tax law (Gavana et al., 2013). As far as valuation criteria are concerned, tax rules take precedence over IFRS and GAAP rules. The fiscal limits for depreciation, provisions and valuations are still in force, and the fiscal criteria concerning dividends treated on a cash basis override the accounting ones for tax purposes (Gavana et al., 2013). Because tax rules allow for less managerial judgment than accounting rules, managers may be less able to engage in earnings management, even if they have the same incentives to manage earnings (Hanlon, Shevlin, 2005). On the other hand, there is a need for more debt financing, as the cost of equity capital is likely to increase the incentive for income smoothing to reduce taxes in a one-book system (Hanlon et al., 2005, 2008).

Proponents of high book-tax conformity argue that increased book-tax conformity simultaneously reduces aggressive financial reporting and abusive corporate tax sheltering, thereby improving earnings quality and increasing tax compliance (Desai, 2005; Whitaker, 2006). A one-book system can lead to a decrease in opportunistic behavior by managers and allow tax authorities to further control reported earnings (Desai, Dharmapala, 2009). Opponents claim that the information required by financial statement users is substantially different from that required by tax offices. It leads to lower quality of earnings because tax authorities are likely to control rulemaking and it brings about a decrease in the information on which the financial markets are based, thus generating substantial costs to investors (Hanlon et al., 2005, 2008). Atwood et al. (2010) find that the persistence of earnings and earnings quality is lower when the level of book-tax conformity is higher. Accounting earnings are less value relevant in countries with high book-tax conformity (Ali, Hwang, 2000). Earnings persistence (considered by Schipper and Vincent (2003) to be an indicator of earnings quality), and the relationship between current earnings and future cash flows, decreases as book-tax conformity increases. Movement toward book-tax conformity may result in reported accounting earnings that are less persistent and less closely related to future cash flows (Atwood et al., 2010). However, on average, when the home country requires higher book-tax conformity, firms avoid fewer taxes (Atwood et al., 2012).

The one-book system reduces compliance costs (Desai, Dharmapala, 2006) and limits earnings management (Watrin et al., 2014). Under high book-tax conformity, tax policymakers are likely to intervene in the standard-setting process (Atwood et al., 2010).

Hung (2001) measures book-tax conformity using five factors derived from international tax and accounting summaries: the existence of deferred taxes; whether additional accelerated depreciation is allowed; whether amortization periods depend on tax laws; whether lease capitalization depends on tax laws; and a subjective determination of the relationship between book and tax income. Although the above-mentioned factors may be suggestive, many other factors result in differences between accounting earnings and taxable income in countries with low book-tax conformity requirement. Richardson et al. (2016) consider large book-tax differences as typical for greater tax avoidance behavior. They confirm a U-shaped association between ownership concentration and tax avoidance (the entrenchment effect at a lower level and the alignment effect beyond the lowest level required for effective control).

Earnings persistence and the association between earnings and future cash flows are lower when book-tax conformity is higher (Atwood et al., 2010). As current earnings are managed to a lesser degree in countries with two-book systems than in countries with one-book systems, book-tax conformity can have an adverse effect on financial accounting quality (Watrin et al., 2014). Family-owned firms are more timely in reporting bad news and have higher quality earnings (Ali et al., 2007), lower abnormal accruals, greater earnings informativeness, and lower persistence of transitory loss components in earnings (Wang, 2006). Because controlling shareholders, in family-owned companies, can monitor management without public disclosures, there may be less governance-related demand for high quality financial reporting, thereby allowing controlling shareholders to protect proprietary information through less transparent reporting (Fan, Wong, 2002; Francis et al., 2005; Armstrong et al., 2010). Firms with concentrated ownership have access to privately obtained information and, consequently, are less likely to demand high-quality and timely disclosures (Ajinkya et al., 2005).

2. Hypotheses development

In almost every country, accounting results are the natural starting point for the computation of taxable income. However, the degree of the connection between taxation and financial reporting greatly differs between countries because of the type and the number of adjustments to accounting profit required by tax law (Gavana et al., 2013). The extent of the departure from accounting results mainly depends on the differing purposes assigned to financial reporting by each national accounting system (Norberg, 2007). Accounting and taxation rules tend to be more aligned within creditor protection-oriented accounting systems than in accounting systems which are mainly designed to satisfy the financial information needs of investors (Nobes, 2008). As a background, we analysed the descriptive statistics of book-tax differences for different groups: panel data for Polish public companies for fiscal years 1995–2014 (6,058 firm-year observations retrieved from Compustat), Polish private enterprises for fiscal years 2003–2014 (177,667 firm-year observations), firms conducting a one-book system or

two-book system, family firms, members of business groups, those with losses, and distress firms with negative equity. We observe the lowest book-tax differences (the highest book-tax conformity) for firms conducting the two-book system with a mean equal to 0.0584 and a median of 0.0172 of total assets, even lower than for public companies (Table 2). As predicted, it is due to the deferred income tax and lower tax optimization. The group conducting the one-book system has higher book-tax differences than family firms, but lower than members of business groups. The lowest book-tax conformity can be observed for distress firms and companies with financial losses (Table 1).

Table 1. Descriptive statistics of book-tax differences for Polish enterprises

Groups	Number of observations	Percentile 10	Quartile 1	Mean	Median	Quartile 3	Percentile 90
Polish public companies	6,058	0.0020	0.0061	0.0620	0.0181	0.0541	0.1595
Total private firms	177,667	0.0015	0.0068	0.1237	0.0246	0.0848	0.2514
One-book	135,303	0.0012	0.0071	0.1441	0.0285	0.1008	0.2991
Two-book	42,364	0.0022	0.0063	0.0584	0.0172	0.0485	0.1247
Family firms	77,022	0.0011	0.0065	0.1346	0.0254	0.0909	0.2784
Business groups	79,976	0.0019	0.0082	0.1485	0.0300	0.1019	0.3027
Firms with loss	51,788	0.0103	0.0324	0.2947	0.0948	0.2601	0.6594
Distress firms	19,474	0.0139	0.0562	0.5157	0.1776	0.4983	1.2671

* all descriptive statistics after removing outlier observations

Source: own elaboration.

Based on the above comparative analysis of book-tax differences for different groups of companies and a literature review, we formulated the following hypotheses:

- H1:** Book-tax conformity is lower in private companies conducting the one-book accounting system than in private companies conducting two-book accounting systems (with deferred income tax). This means that we expect the following
- H1A:** There is a positive relationship between book-tax differences and the one-book accounting system.
- H2:** Book-tax conformity is lower in private companies that incur financial losses.
- H3:** Larger companies have lower book-tax conformity (higher book-tax differences).

3. Variables and data sources

We use data retrieved from the financial statements of private non-financial limited liability companies and joint stock companies that operate in Poland. The database used for the analysis contains 26,657 private limited liability and non-public joint-stock companies' financial statements for the period 2003–2014 (177,667 firm-year observations). Among the determinants of book-tax conformity, we additionally consider corporate governance data, retrieved from database of the National Court Register, in our single-factor ANOVA analysis. Table 2 presents a complete description of the variables used in the single-factor ANOVA and in the panel analysis of book-tax conformity measured with lower book-tax differences. Before conducting the panel analysis, descriptive statistics of variables were determined (Table 6) and Spearman's correlation between explanatory variables was estimated. Detailed outcomes of the correlation of the explanatory variables are presented in Table 7.

Table 2. Definitions of variables used in the panel analysis of book-tax conformity measured by lower book-tax differences (*permbtd*)

Variable	Definition of variable
permbtd	the absolute values of permanent book-tax difference of firm <i>i</i> in year <i>t</i> scaled by total assets calculated as: $\text{permbtd}_{i,t} = \text{ptbi}_{i,t} - (\text{taxation}_{i,t} / \text{tax rate}_{k,t})$ We apply the research approach proposed by Watrin et al. (2014). A higher book-tax difference (<i>permbtd</i>) indicates lower book-tax conformity. A lower book-tax difference (<i>permbtd</i>) indicates higher book-tax conformity.
ptbi	the value of pre-tax book income of firm <i>i</i> in year <i>t</i> scaled by total assets
taxation	total taxation (current and deferred) of firm <i>i</i> in year <i>t</i> scaled by total assets
tax rate	tax rate of country in year <i>t</i> , for Poland the CIT rate equals 19% for the period 2004–2014, 27% in 2003, and 28% in 2002
acc	accruals initially are measured as change in inventory + change in debtors + change in other current assets – change in creditors – change in other current liabilities – depreciation, scaled by total assets = $[\Delta \text{inventory} + \Delta \text{short term receivables} + \Delta (\text{other long term deferred costs} + \text{short term deferred costs}) - \Delta (\text{short term liabilities} - \text{short term bank loans and borrowings} - \text{short term liabilities due to corporate bonds issue} - \text{other short term financial liabilities}) - \text{deferred income and accruals} - \text{depreciation}] / \text{total assets}$
ip_exposure	the percentage of firm <i>i</i> 's total assets, including investment property fair values for year <i>t</i> that are investment properties

Table 2 (cont.)

Variable	Definition of variable
onebook	indicator variable of firm i in year t equal to 1 if a company employs a one-book system (when there is neither deferred tax assets nor deferred tax liabilities), 0 otherwise
gaap_first	(pensions (provisions for employee benefits) + other provisions + revaluation of non-financial assets (included in other operating costs) + negative effects of revaluation of financial investments (included in financial costs)) / total assets
tax_first	(depreciation of property, plant, and equipment + amortization of intangibles + other long-term deferred costs + short-term deferred costs + other accruals (unearned revenue, deferred revenue)) / total assets
leverage	leverage of firm i in year t calculated as the sum of liabilities divided by equity
loss	indicator variable of firm i in year t equal to 1 if a company reports a loss after tax, 0 otherwise
size	size of firm i in year t calculated as the natural logarithm of the firm's total assets
distress	an indicator variable equal to 1 if firm i exhibits negative equity in year t , and 0 otherwise
assets productivity	sales of firm i in year t / total assets
family firms	family companies i.e. with people with the same surname among the board and the owners of the company, based on data retrieved from the database of the National Court Register
business group	a company belonging to a Polish or foreign business group, owned by the company, with the abbreviation: „spółka”, „b.v.”, „a.s”, „a/s”, „s.p.a.”, „inc.”, „s.a.r.l.”, „ltd.”, „gmbh”, „bvba”, „ag”, „skf”, „bv”, „sarl”, „sas”, „zrt.”, „limited”, in the name of the owners, based on data retrieved from the database of the National Court Register

There is an asymmetry of information provided by the two different categories of deferred tax components: *gaap first* and *tax first*. While the *gaap first* category, which contains deferred tax assets and liabilities, is associated with future tax-related cash flows that are realised upon reversal, the *tax first* category, which covers deferred tax assets and liabilities, is treated in a different way. New originating temporary differences do not offset the tax effects of reversing temporary differences (Guenther, Sansing, 2004; Laux, 2013).

Table 3. Structure of categories of deferred tax components: *gaap first* and *tax first*

GAAP FIRST	TAX FIRST
Employee Benefits <ul style="list-style-type: none"> • pension • deferred compensation • employee benefits 	Depreciation <ul style="list-style-type: none"> • depreciation of property, plant, and equipment • amortization of intangibles
Accrued Expenses <ul style="list-style-type: none"> • accrued vacation • product warranty reserves, etc. • litigation and environmental reserves • restructuring charges 	Accruals <ul style="list-style-type: none"> • prepaid assets • prepaid insurance
Other <ul style="list-style-type: none"> • asset impairments, bad debt expenses 	Other Accruals <ul style="list-style-type: none"> • unearned revenue, deferred revenue

Source: own elaboration based on Laux (2013, pp. 1357–1383).

4. Results of book-tax conformity analysis

Table 4 presents the results of the single factor ANOVA analysis of book-tax conformity measured with lower book-tax differences, while Table 5 shows the book-tax conformity panel model estimation, with book-tax conformity measured by the differences between accounting profit and tax base (scaled by total assets). In the case of enterprises conducting the one-book accounting system, the result of *taxation* divided by the *tax rate* equals the current taxable base. However, in the case of companies conducting the two-book accounting system and recording deferred tax in their accounting books and financial statements, the relation of *taxation* (current and deferred income tax) divided by the *tax rate* equals the taxable base corrected by negative or positive temporary differences, i.e. adjusted for transition differences between the financial result and taxable income. Due to the high skewness and high values of the observations of absolute values of the permanent book-tax difference (*abs_permbtd*), we have excluded from our sample the outliers with values above the 99th percentile of the population and below the 1st percentile of this group. In this paper, we analysed a sample after removing the outlier observations. Since our data set of the book-tax differences does not have a normal distribution, we also conducted additional tests to validate the ANOVA analysis results. The two-sample Kolmogorov-Smirnov test outcomes show that the compared groups do not have equal distribution functions. The Wilcoxon-Mann-Whitney test results reject the hypothesis of the equality of means in each of the two analysed groups. The results of the additional tests support the following conclusions from the ANOVA analysis (Table 4). The single factor ANOVA analysis of variance indicated significant differences in the book-tax differences (scaled by total assets) between companies

conducting the one-book accounting system and those conducting the two-book accounting system, including deferred tax. This shows no basis to reject the **H1 hypothesis** because book-tax conformity is lower in private companies that conduct the one-book accounting system rather than the two-book accounting system (with deferred income tax).

Similarly, the significant differences between accounting profit and tax base (scaled by total assets), confirmed by the single factor ANOVA analysis, occur between: companies bearing a financial loss and enterprises that generate profits; firms that exhibit negative equity and those with positive equity; family-owned firms and other private companies; and members of business groups and companies outside the capital groups. The average book-tax differences in our database (0.1237), containing 177,667 Polish firm-year observations from single financial statements for years 2003–2014, are almost twice higher than the mean of the absolute value of permanent book-tax differences over the sample period 2004–2011 for 1,665 Polish companies (0.0660) in the international study of Watrin et al. (2014). The mean value of the book-tax differences in the case of the two-book accounting system subsample is a little bit lower and equals 0.0584. These findings from such a comparison allow us to observe that the two-book accounting system, even in the case of private companies, exhibits similar book-tax differences to public companies with separate and consolidated financial statements together. Family firms (with people with the same surname among the board and the owners of the company) have a slightly lower difference between the accounting result and the taxable income and higher book-tax conformity (Table 4). The high share of family companies in Poland indirectly explains the low percentage of active entities conducting accounts due to the low demand for financial information from the two-book accounting system. For family firms, accounting does not play a stewardship function due to the weak principal-agent relationship and the owner's full (or at least wide) knowledge of the company without the need to monitor the activities of the board. On the other hand, Steijvers and Niskanen (2014) indicate that private family firms with a higher CEO ownership stake are less eager to engage in tax aggressive behavior. By contrast, members of the business group with foreign or national capital show greater average differences between accounting and tax result (lower book-tax conformity), mainly due to a higher demand for information from the accounting system in support of the stewardship function (Table 4).

Table 4. The single factor ANOVA analysis and additional tests of book-tax conformity measured by lower book-tax differences (*permbtd*)

Groups	Single factor ANOVA					K-S			W-M-W	
	Source	SS	df	MS	F	Mean	D (0)	D (1)	z	
One-book	Between	237.0830	1	237.083	1,331.57	1	0.1441	0.0499	-0.1091	16.686
	Within	31,632.819	177,665	0.1780	p-value	0	0.0584	p-value	p-value	p-value
	Total	31,869.902	177,666	0.1794	0.0000			0.0000	0.0000	0.0000

Groups	Single factor ANOVA					K-S			W-M-W	
	Source	SS	df	MS	F	Mean	D (0)	D (1)	z	
Family firms	Between	0.9081	1	0.9081	6.87	1	0.1346	0.0268	-0.0215	-2.272
	Within	17,955.883	135,787	0.1322	p-value	0	0.1366	p-value	p-value	p-value
	Total	17,956.791	135,788	0.1322	0.0088			0.0000	0.0000	0.0231
Business groups	Between	0.9489	1	0.9489	7.11	1	0.1485	0.0188	-0.0372	6.271
	Within	18,185.621	136,261	0.1335	p-value	0	0.1277	p-value	p-value	p-value
	Total	18,186.57	136,262	0.1335	0.0077			0.0000	0.0000	0.0000
Loss	Between	2,138.668	1	2,138.668	12,780.05	1	0.2947	0.0000	-0.6201	262.763
	Within	29,731.234	177,665	0.1673	p-value	0	0.0533	p-value	p-value	p-value
	Total	31,869.902	177,666	0.1794	0.0000			1.000	0.0000	0.0000
Distress	Between	3,361.835	1	3,361.835	20,951.28	1	0.5157	0.0538	-0.4291	91.466
	Within	28,508.067	177,665	0.1605	p-value	0	0.0754	p-value	p-value	p-value
	Total	31,869.902	177,666	0.1794	0.0000			0.0000	0.0000	0.0000

* after removing outlier observations, the lower number of degrees of freedom for family companies and business groups is due to the limited availability of archival data of the National Court Register

1 – analysed group, 0 – others; K-S – two-sample Kolmogorov-Smirnov test for equality of distribution functions, W-M-W – Wilcoxon-Mann-Whitney test for the equality of means in two independent samples

Then, in the study we use both robust fixed effects and random effects estimators and, finally, after the diagnosis of the models, we estimate models with use of the fixed effects with an AR(1) disturbance and the robust fixed effects estimator. The Hausman specification test – fixed versus random effects – shows us that we should choose the fixed effect estimator. The Wooldridge test for autocorrelation in panel data confirms that there is a problem with first-order autocorrelation in the case of the total sample and both the one-book system and the two-book system subsamples. However, White's test for homoscedasticity shows heteroscedasticity in the panel data. The final results are shown in Table 5. In this research, we use a measure of book-tax conformity, based on the absolute values of permanent book-tax differences, proposed by Watrin et al. (2014). A higher book-tax difference (*permbtd*) indicates lower book-tax conformity. A lower book-tax difference indicates higher book-tax conformity.

The model estimation results (Table 5) indicate that differences between accounting profit and taxable income are higher and conformity of the accounting system with the

tax system is lower in enterprises that conduct the one-book accounting system (the *onebook* control variable). This positive coefficient of the *onebook* variable confirms the **H1A hypothesis**.

If enterprises conduct accounting books on the strict basis of accounting standards and the principles of prudence and matching (affecting the recognition of pensions and other provisions, write-downs for impairment of non-financial assets and investments – the *gaap_first* variable), they present higher differences between the financial result and the tax base. Consequently, their book-tax conformity, measuring the compatibility of the accounting system with the tax system, decreases with a coefficient of 0.1685–0.3994 depending on the model (Table 5). On the other hand, the recognition of business operations in accordance with tax regulations (the *tax_first* variable) through amortization, deferred costs (prepayments) and deferred income, less positively influences the differences between the accounting result and taxable income. This is due to lower coefficients of 0.0503–0.1166, depending on the model for the total sample and for the one-book system subsample. In the case of the two-book accounting system, the *tax_first* variable has the lowest impact and almost triple lower coefficients than in the case of the *gaap_first* variable. This confirms that companies using two-book accounting systems follow accounting standards rather than tax law. Additionally, the results indicate a strong influence of tax law on the shape of the one-book accounting system due to numerous exemptions of accounting costs and some exclusions of revenues from costs and revenues recognized for tax purposes. In the case of the two-book system, the lower book-tax differences result from use of deferred income tax, which excludes the temporary differences and leaves only the permanent ones. Only 26% of enterprises recognized deferred tax in our research sample. For the one-book accounting system, the book-tax differences contain temporary as well as permanent differences between accounting financial profit and taxable income. Both for the one-book accounting system and the two-book accounting system, the results point to a significant year effect, however, it is stronger (and significant for a longer period) for the two-book system than for one-book accounts.

Table 5. Results of the panel analysis of determinants of book-tax conformity (*permbtd*)

	Total sample		One-book		Two-book	
	FE robust	FE AR(1)	FE robust	FE AR(1)	FE robust	FE AR(1)
acc	−0.0677***	−0.0685***	−0.0718***	−0.0824***	−0.0308***	−0.0341***
	(0.0031)	(0.0016)	(0.0035)	(0.0021)	(0.0058)	(0.0030)
ip_exposure	0.0140	0.0287**	0.0151	0.0265*	0.0073	0.0251**
	(0.0138)	(0.0123)	(0.0193)	(0.0151)	(0.0145)	(0.0128)

	Total sample		One-book		Two-book	
	FE robust	FE AR(1)	FE robust	FE AR(1)	FE robust	FE AR(1)
onebook	0.0004	0.0269***				
	(0.0019)	(0.0022)				
gaap_first	0.2635***	0.3356***	0.3811***	0.3994***	0.1721***	0.1685***
	(0.0238)	(0.0206)	(0.0393)	(0.0312)	(0.0265)	(0.0177)
tax_first	0.1001***	0.1166***	0.1106***	0.1011***	0.0645***	0.0503***
	(0.0086)	(0.0062)	(0.0103)	(0.0069)	(0.0126)	(0.0083)
leverage	-0.0005***	-0.0007***	-0.0004***	-0.0006***	-0.0004*	-0.0004***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)
loss	0.0807***	0.0843***	0.0916***	0.0964***	0.0397***	0.0452***
	(0.0013)	(0.0010)	(0.0015)	(0.0012)	(0.0019)	(0.0014)
size	-0.0503***	-0.0107***	-0.0545***	-0.0318***	-0.0368***	-0.0213***
	(0.0015)	(0.0004)	(0.0018)	(0.0007)	(0.0036)	(0.0010)
distress	0.1010***	0.1087***	0.1015***	0.1050***	0.0899***	0.0956***
	(0.0042)	(0.0025)	(0.0049)	(0.0028)	(0.0089)	(0.0037)
assets productivity	0.0099***	0.0178***	0.0110***	0.0143***	0.0020	0.0040***
	(0.0008)	(0.0005)	(0.0009)	(0.0005)	(0.0018)	(0.0009)
2004	0.0803##				0.0676*	
	(0.0537)				(0.0380)	
2005	0.0805##		0.0031		0.0641*	
	(0.0537)		(0.0027)		(0.0380)	
2006	0.0790##		0.0008		0.0661*	
	(0.0537)		(0.0027)		(0.0380)	
2007	0.0864##		0.0093***		0.0692*	
	(0.0537)		(0.0028)		(0.0381)	
2008	0.0931*		0.0173***		0.0729*	
	(0.0537)		(0.0029)		(0.0381)	
2009	0.0971*		0.0209***		0.0789**	
	(0.0537)		(0.0030)		(0.0381)	

Table 5 (cont.)

	Total sample		One-book		Two-book	
	FE robust	FE AR(1)	FE robust	FE AR(1)	FE robust	FE AR(1)
2010	0.0963*		0.0199***		0.0761**	
	(0.0537)		(0.0030)		(0.0382)	
2011	0.0999*		0.0243***		0.0756**	
	(0.0537)		(0.0030)		(0.0382)	
2012	0.1000*		0.0235***		0.0785**	
	(0.0537)		(0.0031)		(0.0382)	
2013	0.1021*		0.0254***		0.0792**	
	(0.0537)		(0.0032)		(0.0382)	
2014	0.1027*		0.0242***		0.0840**	
	(0.0537)		(0.0035)		(0.0383)	
_cons	0.6619***	0.1406***	0.7641***	0.4512***	0.5663***	0.3752***
	(0.0580)	(0.0043)	(0.0251)	(0.0111)	(0.0705)	(0.0183)
Number of obs	167,137	140,778	126,688	103,769	40,449	32,966
Number of groups	26,359	25,599	22,919	21,451	7,483	6,338
R ² : within	0.1639	0.1326	0.1757	0.1712	0.1064	0.1114
	0.2491	0.3011	0.2462	0.2893	0.1493	0.2034
	0.1752	0.2247	0.1925	0.2312	0.1122	0.1509
Test F	327.74***	1760.19***	327.43***	1888.57***	42.10***	370.74***
corr(u _i , Xb)	-0.5092	0.0005	-0.3975	-0.1358	-0.4658	-0.2157
F test that all u _i =0:	3.70***	1.91***	3.38***	3.74***	3.72***	3.73***
Wald test	41,588.42***		49,585.20***		5,718.53***	
Hausman test	2,431.22***		1,969.80***		356.89***	
White's test	21,659.45***		16,523.30***		3,839.51***	
Wooldridge test	107.773***		90.186***		29.312***	

Significant at 1% – ***, 5% – **, 10% – *, 15% – #, standard errors in brackets below the estimated coefficients

For the total sample, a significant year effect on the p-value level below 6% occurs only for 2013 and 2014, while for the two-book accounting system it is more significant for the period starting from 2009. The results of the estimation of our model showed that accruals reduce the differences between the accounting result and taxable income but increase book-tax conformity. However, they have the lowest impact for the two-book accounting system subsample. We adapt the approach of Dechow (1994) and Guay et al. (1996) to measure accruals that incorporate the recognition of unrealized gains and losses and mitigate noise in operating cash flow. We measure accruals as changes in fixed assets (depreciation), current assets, including inventories and receivables, and changes in short-term liabilities other than bank loans and borrowings, including changes in trade credit due to payables. In the case of the two-book system, deferred income tax plays a similar role to accruals, resulting in a weaker (lower coefficients) relationship between accruals and book-tax differences.

Larger enterprises (the *size* variable) exhibit lower differences between the accounting result and the taxable income. This result indicates **H3 hypothesis should be rejected**. Contrary to our assumptions, larger companies have higher book-tax conformity (lower book-tax differences) than smaller entities. It could be explained by the observation that larger private companies in Poland are less likely to use aggressive optimization of taxation.

Investment properties (real estate) increase the differences between the accounting and tax result (positive coefficients of the *ip_exposure* variable in the models estimated by fixed effects estimator with adjustments for first-order autocorrelation) and decrease the book-tax conformity. This can be explained by there being an opportunity to use the fair value model among Polish private companies or differences between depreciation for accounting and tax purpose.

The results show positive coefficients at the *loss* variable, which stands for companies generating a net financial loss in a given year. This shows higher differences between profit (loss) before tax and taxable income and, consequently, lower book-tax conformity, in accordance with the **H2 hypothesis**. This confirms that private companies that incur financial losses have lower book-tax conformity. It may result from the reduction in the tax base by tax losses previously incurred that have not been incorporated into the accounts due to a lack of deferred income tax. According to the tax law in Poland, tax losses can be deducted from taxable income over five years to a maximum of 50% of the tax loss in one year.

Based on the findings presented in Table 5, companies at risk of bankruptcy caused by negative equity (the *distress* variable) show higher differences between profit (loss) before tax and taxable income. This may result from a number of accounting cost exemptions from tax deductible expenses according to Polish tax law. This observation is also affected by a lack of deferred tax assets activated in the balance sheet due to a taxable loss that is deducted from the taxable income (during a maximum of five subsequent years) by 74% of enterprises that conduct the one-book accounting system.

Companies with a higher productivity of assets (higher relation of sales to total assets) show a higher variation between the accounting and tax system (i.e. between the

financial result and taxable income) and a lower book-tax conformity. In addition, the results of the models indicate a negative relationship between the external finance (the *leverage* variable), measuring the capital structure as a ratio of debt capital to equity, and differences between accounting and taxable income. It means that companies with a higher share of external capital (higher leverage) have lower book-tax differences and higher book-tax conformity.

Conclusions

Based on our results, we can say that the differences between financial income and the tax base in Poland range on average between 5.84% of total assets for the two-book system, 14.41% for the one-book system and 14.85% for members of business groups. In median, financial income differs from the tax base much less: 2.46% of total assets, and, in particular, 1.72% in the case of two-book system, 2.85% for one-book system, 2.54% for family firms and 17.76% of total assets for distress firms with negative equity. Armstrong et al. (2012) show that the mean book-tax gap of large, publicly traded firms for the period 2002–2006 is 5% of the total assets. We identified that the book-tax differences in Polish private entities are mainly determined by the use of the one-book system (without differed income tax), the role of accounting information in the internal decision-making processes (family firms have lower book-tax differences than members of business groups), and, most of all, financial losses and negative equity (distress firms). Our findings show that large private enterprises in Poland have lower differences between the accounting result and taxable income and higher book-tax conformity, due to the less probable use of aggressive optimization of taxation (especially in the one-book system). In the case of the total sample it could be also explained by the more probable use of the two-book system (with recognition of deferred tax). This leads us to reject the H3 hypothesis.

The significant positive and almost twice higher impact of the recognition of business operations in accordance with tax regulations (the *tax_first* variable) on the book-tax differences in the case of the one-book system than in the two-book system, indicates the strong influence of tax law on the shape of the one-book accounting system. It could be a result of high limits of the list of deductible expenses for tax law, which is a consequence of numerous, also temporary, exemptions of accounting costs from deductible costs for tax purposes. In just one article of the Corporate Income Tax Law in Poland, there are more than 60 accounting costs or expenditures excluded from deductible costs for tax purposes. The strong influence of tax law on the shape of the one-book accounting system does not necessarily mean high book-tax conformity. In the case of the two-book accounting system, book-tax conformity is higher due to use of the deferred income tax that excludes temporary differences and leaves only permanent ones.

Our results confirm that book-tax conformity is lower in private companies that incur financial losses than in those with financial profits (**H2**). This may result from the reduction in the tax base by tax losses previously incurred, and twchich have not been

incorporated into the accounts due to a lack of deferred income tax. Our findings also show the positive relationship between book-tax differences and the one-book accounting system (**H1A**). This means that book-tax conformity is lower in private companies that conduct the one-book accounting system than in private companies conducting two-book accounting systems (with deferred income tax). In companies that conduct the one-book accounting system, investment properties allowing the use of the fair value model also increase the differences between the accounting and the tax result. This can be explained by deferred tax not being used by these companies with the one-book accounts – in our research sample, only 26% of enterprises recognized deferred tax among Polish private companies.

As we confirmed with use of the ANOVA analysis, there are significant differences between average book-tax conformity for family-owned firms and other companies, as well as between members of business groups and individual firms. Family-owned companies have higher mean and median book-tax conformity in Poland in contrast to companies that belong to business groups. We can conclude that it results from the higher demand for information from the accounting system to support the stewardship functions and to monitor the activities of the management board in the business groups.

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Appendixes

Table 6. Descriptive statistics of variables used in the panel analyses of Book-Tax Conformity measured by lower book-tax differences (*permbtd*)

Total sample							
Variable	Number of observations	Percentile 10	Quartile 1	Mean	Median	Quartile 3	Percentile 90
abs_permbtd	177,667	0.0015	0.0068	0.1237	0.0246	0.0848	0.2514
acc	177,667	-0.2877	-0.1229	-0.0482	-0.0277	0.0515	0.1966
ip_exposure	177,667	0	0	0.0123	0	0	0.6275***
onebook	177,667	0	1	0.7615	1	1	1
gaap_first	177,651	0	0	0.0164	0	0.0024	0.0331
tax_first	177,667	0.0013	0.0219	0.1004	0.0561	0.1171	0.2243
leverage	177,667	0.0638	0.2419	2.7070	0.8287	2.2024	5.7417
loss	177,667	0	0	0.2915	0	1	1
size	177,667	11.6245	13.0326	14.5787	14.5946	16.1307	17.4481
distress	177,667	0	0	0.1096	0	0	1
assets productivity	177,667	0.0716	0.6193	2.0211	1.5128	2.6356	4.1640
Two-book subsample							
Variable	Number of observations	Percentile 10	Quartile 1	Mean	Median	Quartile 3	Percentile 90
abs_permbtd	42,364	0.0022	0.0063	0.0584	0.0172	0.0485	0.1247
acc	42,364	-0.2057	-0.1064	-0.0394	-0.0372	0.0268	0.1282
ip_exposure	42,364	0	0	0.0247	0	0	0.0373**
gaap_first	42,359	0	0	0.0318	0.0079	0.0336	0.0835
tax_first	42,364	0.0175	0.0393	0.1053	0.0721	0.1280	0.2237
leverage	42,364	0.1288	0.3265	2.6658	0.8930	2.2039	5.3517

Table 6 (cont.)

Two-book subsample							
Variable	Number of observations	Percentile 10	Quartile 1	Mean	Median	Quartile 3	Percentile 90
loss	42,364	0	0	0.2055	0	0	1
size	42,364	14.6968	15.8937	16.8103	16.8452	17.8257	18.8264
distress	42,364	0	0	0.0607	0	0	1
assets productivity	42,364	0.2466	0.8008	1.6901	1.4199	2.1941	3.2771
One-book subsample							
Variable	Number of observations	Percentile 10	Quartile 1	Mean	Median	Quartile 3	Percentile 90
abs_permbtd	135,303	0.0012	0.0071	0.1441	0.0285	0.1007	0.2991
acc	135,303	-0.3216	-0.1306	-0.0509	-0.0240	0.0611	0.2196
ip_exposure	135,303	0	0	0.0084	0	0	0.3005***
gaap_first	135,292	0	0	0.0116	0	0	0.0080
tax_first	135,303	0	0.0170	0.0989	0.0500	0.1126	0.2247
leverage	135,303	0.0488	0.2145	2.7199	0.8032	2.2020	5.8918
loss	135,303	0	0	0.3184	0	1	1
size	135,303	11.3197	12.5870	13.8800	13.9781	15.2213	16.2152
distress	135,303	0	0	0.1249	0	1	1
assets productivity	135,303	0.0321	0.5373	2.1247	1.5627	2.7948	4.4475

* all descriptive statistics before removing outlier observations

** 95th percentile

*** 99th percenti

Table 7. The Spearman's correlation matrix of explanatory variables used in the panel analyses of Book-Tax Conformity measured by lower book-tax differences

Total sample											
	abs permbtd	acc	ip_ exposure	onebook	gaap_ first	tax_ first	leverage	loss	size	distress	assets product
abs_per- mbt	1.0000										
acc	-0.1139*	1.0000									
ip_expo- sure	-0.0386*	0.0008	1.0000								
onebook	0.0917*	0.0316*	-0.1079*	1.0000							
gaap_first	0.0157*	-0.0353*	0.0730*	-0.5431*	1.0000						
tax_first	0.0734*	-0.2085*	-0.0136*	-0.1563*	0.1646*	1.0000					
leverage	0.1550*	-0.0832*	0.0126*	-0.0473*	0.0373*	0.1165*	1.0000				
loss	0.4382*	-0.2158*	-0.0104*	0.1027*	-0.0652*	-0.0539*	0.1252*	1.0000			
size	-0.2017*	-0.0157*	0.1541*	-0.5640*	0.4940*	0.1725*	0.1484*	-0.1649*	1.0000		
distress	0.2878*	-0.1076*	-0.0123*	0.0799*	-0.0475*	-0.0274*	0.3523*	0.3140*	-0.1335*	1.0000	
assets produc- tivity	0.0959*	0.0239*	-0.1077*	0.0213*	0.0219*	0.2518*	0.1921*	-0.2190*	-0.1648*	-0.0594*	1.0000
Two-book subsample											
	abs permbtd	acc	ip_ exposure	gaap_ first	tax_ first	leverage	loss	size	distress	assets product	
abs_per- mbtd	1.0000										
acc	-0.0522*	1.0000									
ip_expo- sure	-0.0323*	0.0137*	1.0000								
gaap_first	0.0979*	-0.0299*	-0.0148*	1.0000							
tax_first	0.0693*	-0.2352*	-0.0742*	0.1056*	1.0000						
leverage	0.1452*	-0.0516*	0.0096	-0.0813*	0.0332*	1.0000					
loss	0.3103*	-0.1986*	0.0244*	-0.0103*	0.0126*	0.2070*	1.0000				

Table 7 (cont.)

Two-book subsample										
	abs permbtd	acc	ip_ exposure	gaap_ first	tax_ first	leverage	loss	size	distress	assets product
size	-0.2102*	-0.0081	0.1320*	0.1691*	0.0011	0.0068	-0.0865*	1.0000		
distress	0.2058*	-0.0752*	0.0185*	-0.0373*	-0.0195*	0.2970*	0.3006*	-0.1010*	1.0000	
assets product- ivity	0.1548*	0.0542*	-0.1797*	0.1098*	0.1248*	0.2144*	-0.1321*	-0.2961*	-0.0361*	1.0000
One-book subsample										
	abs permbtd	acc	ip_ exposur	gaap_ first	tax_ first	leverage	loss	size	distress	assets product
abs_per- mbtd	1.0000									
acc	-0.1334*	1.0000								
ip_expo- sure	-0.0297*	0.0014	1.0000							
gaap_first	0.0820*	-0.0202*	0.0311*	1.0000						
tax_first	0.0905*	-0.1959*	-0.0124*	0.1005*	1.0000					
leverage	0.1630*	-0.0889*	0.0076*	0.0466*	0.1348*	1.0000				
loss	0.4628*	-0.2266*	-0.0100*	-0.0080*	-0.0561*	0.1100*	1.0000			
size	-0.1880*	0.0058*	0.1182*	0.2757*	0.1361*	0.1853*	-0.1451*	1.0000		
distress	0.3015*	-0.1176*	-0.0123*	0.0070*	-0.0171*	0.3698*	0.3109*	-0.1067*	1.0000	
assets product- ivity	0.0826*	0.0179*	-0.0828*	0.0269*	0.2947*	0.1932*	-0.2417*	-0.1524*	-0.0651*	1.0000

* Spearman's rank correlation coefficients significant at 0.05 level
all correlation coefficients after removing outlier observations