Determinant factors of Book-Tax Differences

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Article information

Abstract

This article aims to identify institutional and non-institutional factors that determine Book-Tax Differences (BTD) of Brazilian public companies. The research sample is composed of 124 companies, with data available for the period 2010-2015. The results indicate that total BTD have positive relationship with the variables profitability, liquidity and lagged BTD. When the types of BTD are dismembered, profitability and lagged BTD are positively associated with temporary BTD; and profitability and liquidity are positively associated with permanent BTD. Therefore, the results suggest that profitability is associated with all types of BTD (total, temporary and permanent), that is, the most profitable companies show greater difference between book income and taxable income. In addition, the results suggest that the segregation of BTD by type (temporary and permanent) is relevant to the analysis of determinants of this variable.

1 INTRODUCTION

The differences between book income and taxable income are called book-tax differences (BTD) (Ferreira, Matinez, Costa, & Passamani, 2012). Book income is determined in accordance with corporate regulations, which allow accounting choices and the application of responsible subjectivism, which may make the calculation of this profit more subjective (Ferreira et al., 2012). On the other hand, taxable income is determined in accordance with objective and strict fiscal rules, for income tax purposes (Niyama & Silva, 2011).

BTD come from these differences between rules, and it also may be caused by both results management and tax management (Desai, 2005). The manager, in order to maximize his/her interests, is motivated to adopt accounting policies that allow increasing book income with the objective of attracting investors, also choosing fiscal policies that minimize taxable income in order to avoid taxes (Long, Ye, & Lv, 2013). For these authors, both the book and taxable earnings management can lead to BTD magnification in abnormal manner. Thus, BTD can be product of both institutional factors (normal BTD) and non-institutional factors (abnormal BTD) (Manzon & Plesko, 2002, Long et al., 2013, Kouba & Anis, 2015).

Long et al. (2013) investigated the relationship between non-institutional factors and BTD, using a sample of Chinese public companies. These authors identified a negative relationship between BTD and the following factors: relation price to earnings ratio, price to book value ratio, liquidity, leverage and earnings per share growth rate. There is a positive relation between BTD, institutional investor rate and company's size. Kouba and Anis (2015) verified the relation between institutional factors (profitability, sales growth and fixed assets growth) and non-institutional ones (accruals, price to book value ratio, liquidity, leverage, institutional stock rate and lagged BTD) and BTD, using a sample of twenty-eight Tunisian companies with data from 2005 to 2012. The results suggest that profitability, sales growth, accruals, leverage and the price to book value ratio are related to BTD.

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Manzon and Plesko (2002) and Long et al. (2013) emphasize that there are few studies in academic literature that seek to identify the factors that determine BTD. Long et al. (2013) investigated the BTD determinant factors using a sample of companies from China, country with a mixed legal system (code law and common law), while Koubaa and Anis (2015) analyzed companies from Tunisia, common law country. The conjuncture of Brazil, a code law country known for the high level of connection between corporate and tax accounting, may affect BTD behavior (Marques, Costa, & Silva, 2016) and the relation of the factors that determine these differences.

Besides, Long et al. (2013) and Koubaa and Anis (2015) analyzed only total BTD. Wahab and Holland (2014), Costa and Lopes (2015), Marques et al. (2016) and Santos, Costa and Silva (2016) affirm that the analysis of BTD by type (permanent and temporary) may provide additional information on the connection between financial and tax accounting. Temporary BTD may be more associated with results management than permanent BTD (Martinez & Passamani, 2014). Permanent BTD may bring relevant information on tax evasion activities (Wilson, 2009) and strategic tax management (Frank, Lynch, & Rego, 2009).

In this sense, considering the lack of research on the subject of this study, the research problem is: what are the determinant factors of the types of book-tax differences in Brazil? The objective is to identify institutional and non-institutional factors that determine the types of book-tax differences of Brazilian public companies. The study sample is composed of 124 Brazilian public companies with data available for the period from 2010 to 2015.

The results of this study may contribute to literature on BTD, since the analysis of determinants that influence BTD is considered recent and innovative (Koubaa & Anis, 2015). Koubaa and Anis (2015) indicate that there are a few studies on the subject of this research. In Brazil, no research was found to identify the determinants of BTD in public companies. Most studies are conducted with samples from common law countries' companies, and focusing only on total BTD. This study is carried out using a sample of Brazil's companies, a code law country, analyzing total, permanent and temporary BTD. Temporary BTD may be more related to results management, while permanent BTD may be connected to earnings management (Wilson, 2009, Costa & Lopes, 2015). Moreover , the results of this research may be useful for investors, regulators, analysts and standard-setters to know the profile of Brazilian public companies regarding the connection between corporate and tax accounting.

2   THEORETICAL FRAMEWORK

2.1 Book-Tax Differences

The differences between book income and taxable income are called book-tax differences (BTD). There are at least three reasons for which book income differs from taxable income. First, because of the differences between accounting standards and tax rules (Niyama & Silva, 2011). Book income is calculated based on generally accepted accounting principles (GAAP) and on reliable representation, and may contain accounting choices and subjectivism, whereas the calculation of taxable income follows fiscal rules, more objective than corporate norms (Ferreira et al., 2012). Differences between these standards may result in calculation of book income different from taxable income, which results in BTD (Ferreira, et al., 2012).

According to Kvaal and Nobes (2013), some countries provide a greater decoupling between accounting norms and tax norms, as common law countries, where economic substance prevails over legal form; they are based on principles and not on detailed rules, presenting greater BTD. In code law countries, on the other hand, legal form prevails over economic essence, and more detailed rules require greater conformity between the two systems, thus the BTD is smaller (Niyama, 2005).

The second reason for the origin of BTD is the earnings management . Corporate accounting allows alternative criteria for recording, measurement and/or verification of an economic event in an objective and verifiable manner. Managers can manipulate book income to meet financial market objectives and influence the credible representation of the company's real situation (Nakao, 2012). On the other hand, tax accounting reduces the number of criteria for the measurement of tax results, requiring greater objectivity in the recording of economic events. Thus, these results may be different, resulting in BTD (Marques et al., 2016).

The third reason for BTD to appear is tax management (Desai, 2005). Tax management occurs when managers manipulate the ambiguities and uncertainties of tax laws, with the objective of reducing tax burden and smoothing tax payment (Formigoni, Antunes, & Paulo, 2009). This practice is mostly used to reduce tax income (Formigoni et al., 2009).

BTD can be classified into two types: permanent and temporary (Ferreira et al., 2012). Permanent differences occur when an event (expense or income) is recognized in the accounting system, but has no tax effect, and therefore it is not recognized in the tax system (Formigoni et al., 2009). Temporary differences, in turn, occur when accounting and tax systems recognize the same revenues and expenses, but differ on the moment of recognition (Ferreira et al., 2012). That is, at some point in the future, the temporary BTD will be canceled.

Tang (2006) affirms that the higher the earnings management   registered by the company, the lower the quality of the information disclosed in financial statements. According to Tang and Firth (2011), in Chinese companies, the earnings management   may explain part of the amount of BTD. Hanlon (2005) identified that firms with greater BTD show a low profit persistence compared to firms with smaller BTD, which suggests that high BTD values are related to low profit quality.

2.2 Factors determining book-tax differences and research hypotheses

Studies that seek to identify the determinants of BTD are recent (Koubaa & Anis, 2015). In Brazil, no studies that analyze this theme were found. Some studies performed in the United States (for instance, Manzon & Plesko, 2002, Mills, Newberry, & Trautman, 2002, Plesko, 2004) verified BTD growth throughout the 1990's and concluded that this growth cannot be explained exclusively by institutional factors, and other non-institutional factors have to be considered as well. According to Long, Ye and Lv (2013), institutional differences refer to BTD that result from differences between accounting and tax rules, whereas non-institutional differences arise from other factors, such as earnings management . Thus, the determinants of BTD can be classified as institutional (profitability, sales growth, fixed assets, institutional ownership) and non-institutional (accruals, stock returns, liquidity, company's size and leverage) (Koubaa, & Anis, 2015).

Long et al. (2013) investigated the relationship between non-institutional factors and BTD, using a sample of Chinese public companies, from 2008 to 2010. These authors identified a negative relationship between BTD and the following factors: price to earnings ratio, price to book value ratio, liquidity, leverage and earnings per share growth rate. They also found there is positive relation between BTD, institutional investor rate and company's size.

On the other hand, Koubaa and Anis (2015) verified the relationship between BTD and institutional and non-institutional factors, using a sample of twenty-eight Tunisian companies with data from 2005 to 2012. The results suggest a significant and positive relationship between BTD and the following variables: profitability, sales growth, liquidity and lagged BTD, and also a significant and negative relationship between BTD, leverage and company's size. The results are important to reduce the degree of information asymmetry (Koubaa, & Anis, 2015).

The differences in results between the studies of Long et al. (2013) and Koubaa and Anis (2015) may be related to the fact that, in 2006, China issued new accounting standards in accordance with the International Financial Reporting Standards (IFRS); the research sample was taken from Chinese companies in agriculture, livestock forestry and fisheries sectors, for which, according to the new legislation, it would be difficult to calculate BTD.

It is noticed that there is no consensus among the results found by Long et al. (2013) and Koubaa and Anis (2015) regarding the relation between institutional and non-institutional factors and BTD. This lack of consensus suggests need of more research on the subject. Thus, the hypotheses that will be tested in this research and the main theoretical bases used to test them are summarized in Table 1.

Table 1. Determinants of BTD

	Factors	Sign expected	Author
Institutional	Profitability	(+)	Manzon e Plesko (2002), Sodan (2012), Koubaa e Anis (2015)
	Sales growth	(+)	Manzon e Plesko (2002), Koubaa e Anis (2015)
	Fixed assets	(+)	Manzon e Plesko (2002)
Non-Institutional	Accruals	(+)	Koubaa e Anis(2015), Ferreira et al. (2012)
	Stock return	(-)	Koubaa e Anis (2015)
	Liquidity	(+)	Costa e Lopes (2015), Koubaa e Anis (2015)
Control Variables	Company's size	(-)	Chan, Lin e Mo (2010), Koubaa e Anis (2015)
	Leverage	(+)	Koubaa e Anis (2015)

Source: Elaborated by the authors.

Highly profitable companies have a positive and significant relationship with BTD, as these companies can effectively extend tax deductions and credits to enjoy the benefits from tax exemptions, reducing taxable income (Manzon, & Plesko, 2002, Sodan, 2012, Koubaa , & Anis, 2015). Managers use tax benefits in an attempt to reduce taxes to be paid, thereby magnifying BTDs (Sodan, 2012). In this context, the first research hypothesis is as follows:

H₁: The profitability of Brazilian public companies has a positive relationship with BTD.

Manzon and Plesko (2002) argue that there is a positive correlation between sales growth and BTD as, with increasing revenues, developing companies tend to manage results to reduce tax burden. According to Koubaa and Anis (2015), one of the ways to reduce sales revenues is the   classification of estimated losses with uncollectible account, which are immediately recognized as losses in financial statements, for reduction of annual revenue – consequently, reduction in book income. Thus, the second research hypothesis is:

H₂: There is a positive relationship between sales growth and BTD of Brazilian public companies.

Fixed assets investment growth is positively related to BTD, because, for corporate accounting, there are more criteria for managers to determine depreciation, such as, for example, linear or accelerated depreciation, different from the tax rules in which depreciation will be according to the tax legislation (Manzon, & Plesko, 2002, Costa, & Lopes, 2015). According to Mills and Newberry (2001), companies with greater investments in fixed assets have greater incentive to choose accounting practices that increase book income, and then a positive relationship between BTD and fixed assets is expected. In this scenario, the third research hypothesis appears:

H₃: There is a positive relationship between sales growth and BTD of Brazilian public companies.

BTD can be partly explained by the management practices employed by the companies that aim at earnings management , in which managers are often encouraged to increase their book income while, at the same time, aim at reducing tax burden (Koubaa, & Anis, 2015). Therefore, this manipulation may lead to increased BTD, suggesting that accruals have a positive relationship with BTD (Koubaa, & Anis, 2015), which leads to the fourth research hypothesis.

H₄: Accruals have a positive relationship with BTD of Brazilian public companies.

Shares return may be related to BDT level, because the higher the BDT level, the lower the shares return, since BDT higher volume can signalize to investors possibility of earnings management   (Tang, 2006). Investors use BTD information to evaluate the future performance of companies, that is, investors underestimate expectations and future returns for decision-making (Hanlon, 2005). From this perspective, the fifth research hypothesis is established:

H₅: There is a negative relationship between shares return and BTD of Brazilian public companies.

Costa and Lopes (2015) suggest that liquidity can positively affect BTD, since companies with low liquidity are more prone to earnings management . On the other hand, in companies with high revenues, managers seek a reduction in the tax base to pay lower taxes (Koubaa, & Anis, 2015). Therefore, the sixth research hypothesis appears:

H₆: Company's liquidity has a positive relationship with BTD of Brazilian public companies.

Frank et al. (2009) came to the conclusion that companies with relatively high levels of debt were encouraged to manage results to avoid breach of contracts. Companies with high financial leverage tend to present lower quality of information in financial statements, that is, increase the practice of earnings management   and, consequently, increase BTD, which suggests the seventh research hypothesis:

H$_7$: There is a positive relationship between leverage levels and BTD of Brazilian public companies.

Total assets have been used as proxy to measure company's size (Chan et al., 2010). Chan et al. (2010) identified a negative relationship between company's size and BTD, and they argue that large firms tend to comply more with tax regulations because they are more closely monitored by regulators. Thus, the eighth research hypothesis arises:

H$_8$: There is a negative relationship between company's size and BTD of Brazilian public companies.

According to Table 1, a positive relationship is expected between BTD and profitability, sales growth, fixed assets, accruals, liquidity and leverage. On the other hand, a negative relationship is expected between BTD, stock return and companies' size.

3   METODOLOGIA

The initial research sample consisted of 352 active non-financial companies listed on BM&FBovespa in the period from 2009 to 2015 (Table 2). Data for the year 2009 were excluded, since this period was used only for the calculation of lagged variables. There was exclusion also of companies that did not have data for calculation of all variables of the models specified in Equations 1 and 2. Thus, the valid sample of the study is 124 Brazilian public companies with data for the period from 2010 to 2015.

Table 2. Sample composition

Description	Number of companies	Number of observations
Initial sample - accounting information consolidated on Economática®	352	2,464
Sample after exclusion of observations of 2009	352	2,112
Exclusion of companies that did not have available data	228	1,368
Final sample	124	744

Source: Elaborated by the authors

Table 3 shows the composition of the sample divided into eighteen sectors of activity established in Economática®. The sectors with the largest participation in the study were 'Other', 'Energy', 'Construction' and 'Commerce', with 17.7%, 16.1%, 9.7% and 8.9%, respectively. The 'Other' sector is composed of companies from various fields of activity, such as business and administration companies, railway transport and education.

Table 3. Sample composition per sector

Sector	Number of observations	%
Food and Beverages	42	5.6%
Commerce	66	8.9%
Construction	72	9.7%
Electronics	6	0.8%
Electricity	120	16.1%
Industrial Equipment	18	2.4%
Mining	6	0.8%
Non-metallic minerals	12	1.6%
Others	132	17.7%
Paper and Cellulose	18	2.4%
Oil and Gas	12	1.6%
Chemistry	18	2.4%
Steelmaking & Metallurgy	48	6.5%
Software and data	12	1.6%
Telecommunications	12	1.6%
Textile	54	7.3%
Transportation	54	7.3%
Vehicles and parts	42	5.6%
Total	744	100%

Source: Elaborated by the authors

The models presented in Equations 1 and 2 will be used to identify the determinants of BTD. These models were proposed by Koubaa and Anis (2015) and were adapted for this research through the removal of the variable "Institutional actions", since this variable was not available in the statements published by the companies and did not present significant results in these authors' study. Moreover, the control variables "SECTOR" and "YEAR" were included. Tax rules and some corporate rules may be different in some sectors, which may affect BTD. The adoption of full IFRS in Brazil occurred in 2010; however, the practical adoption may occur over time due to the learning curve.

$$D_{it} = \beta_0 + \beta_1 RENT_{it} + \beta_2 REV_{it} + \beta_3 IMOB_{it} + \beta_4 AD_{it} + \beta_5 IPL_{it} + \beta_6 LIQ_{it} + \beta_7 LEV_{it} + \\ + \beta_8 SIZE_{it} + \beta_9 YEAR_{it} + \beta_{10} SECTOR_{it} + \varepsilon \tag{1}$$

$$D_{it} = \beta_0 + \beta_1 RENT_{it} + \beta_2 REV_{it} + \beta_3 IMOB_{it} + \beta_4 AD_{it} + \beta_5 IPL_{it} + \beta_6 LIQ_{it} + \beta_7 LEV_{it} + \\ + \beta_8 SIZE_{it} + \beta_9 YEAR_{it} + \beta_{10} SECTOR_{it} + \beta_{11} LAGBTD_{it} + \varepsilon \tag{2}$$

Equations 1 and 2 will be tested three times, one for each type of BTD: total (BTD), temporary (TEBTD) and permanent (PBTD). The description of the variables is presented in Table 4.

Table 4. Variables description

Variable	Formula	Description
BTD	$BTD_{it} = (EBIT_{it} - LT_{it})/AT_{it-1}$	BDT is the total difference between earnings before interest and taxes (EBIT) and the taxable income (TI); AT is the lagged total assets. TI is the result of the division of income tax expense by the maximum tax rate (34%).
RENT		RENT is a binary variable with value 1 when the EBIT is positive, and 0 otherwise
REV	$REV = (REC_{it} - REC_{it-1})/AT_{it-1}$	REV is the change in sales net revenue (REC) of companies between years t - 1 and t; divided by the lagged AT.
IMOB	$IMOB_{it} = (IMOB_{it} - IMOB_{it-1})/AT_{it-1}$	IMOB is the change in gross fixed assets between years t - 1 and t; divided by the lagged AT
AD	$AD = (EBIT_{it} - CxOP)/AT_{it-1}$	AD is the EBIT minus the cash flow of operations (CxOP) divided by the lagged total assets.
IPL	$IPL_{it} = COTATION_{it}/EPS_{it}$	IPL is the share price divided by the earnings per share (EPS) in year t; COTATION is the closing price of shares
LIQ	$LIQ_{it} = CA_{it}/CL_{it}$	LIQ is the ratio between current assets (CA) and current liabilities (CL) of the company i in year t
LEV	$LEV = [(NP + PA) * AT / (NE + PA)]/(NP + PA - FR)$	LEV is the financial leverage of companies; it is the net profit (NP); plus the minority shareholding (PA); multiplied by AT; divided by the sum of shareholders' net equity (NE) and the PA; divided by the sum of NP plus PA, minus the financial result (FR)
SIZE	$SIZE_{it} = LN*(AT_{it})$	SIZE is the natural logarithm of AT
LAGBTD		LAGBTD is the lagged BTD
YEAR		Dummy for the period studied: 2009 to 2015
SECTOR		Dummy for the eighteen sectors illustrated in Table 3
TEBTD	$TEBTD_{it} = (DIT_{it}/A_t)/AT_{it-1}$	TEBTD is temporary BTD; DIT is the deferred income tax; A is the maximum income tax rate (34%); divided by the AT
PBTD	$PBTD_{it} = BTD_{it} - TEBTD_{it}$	PBTD is the permanent BTD

Source: Elaborated by the authors

The dependent and independent variables were winsorized at 1%, with the aim of correcting possible outliers, reducing the standard deviation of the variables and the dispersion around the median (Vieira, Arruda, Lucena, & Sena, 2015). For the purpose of comparison with the results of Koubaa and Anis (2015), the analysis involves regression in Ordinary Least Squares (OLS) for panel data. These authors presented the results using pooled independent cross-sections (POLS), which will also be performed in this study.

4   ANALYSIS OF THE RESULTS

Table 5 presents the descriptive statistics. The results found for BTD (0.004), TEBTD (-0.004) and PBTD (0.008) medians are close to those found by Marques et al. (2016) in public companies of five Latin American countries, and by Costa and Lopes (2015) for Brazil.

Table 5. Descriptive analysis

Variable	Median	Standard Deviation	Minimum	Maximum	Average
BTD	0.004	0.073	-0.316	0.228	0.006
RENT	0.780	0.415	0.000	1.000	1.000
REV	0.058	0.128	-0.367	0.466	0.048
IMOB	0.001	0.104	-0.568	0.252	0.003
AD	-0.055	0.061	-0.330	0.104	-0.051
IPL	12.263	23.526	-58.194	131.816	9.173
LIQ	1.846	1.114	0.302	6.930	1.650
LEV	1.289	7.244	-42.800	28.200	1.700
SIZE	15.212	1.509	12.475	19.559	15.163
LAGBTD	0.007	0.072	-0.316	0.193	0.014
TEDBTD	-0.004	0.038	-0.150	0.131	-0.001
PBTD	0.008	0.079	-0.316	0.264	0.013

Source: Elaborated by the authors

Table 6 shows the correlations between the research variables. The variable BTD (Table 6) shows a positive and significant correlation with the variable profitability (RENT), change in sales revenue (REV), and liquidity (LIQ), similar to the results of Koubaa and Anis (2015). What was already expected, as explained in Table 1, is that highly profitable companies with variations in sales revenues and high liquidity indexes try to enjoy benefits from the ambiguities of the tax legislation, in attempt to reduce the tax base, thus paying lower taxes and increasing BTD.

Table 6. Pearson Correlation

	BTD	RENT	REV	IMOB	AD	IPL	LIQ	LEV	SIZE	LBTD	TEBDT	PBDT
BTD	1.000											
RENT	0.369	1										
	0.000											
REV	0.099	0.205	1									
	0.007	0.000										
IMOB	-0.029	0.054	0.121	1								
	0.430	0.139	0.001									
AD	0.257	0.425	0.156	0.040	1							
	0.000	0.000	0.000	0.282								
IPL	0.072	0.373	0.030	0.066	0.059	1						
	0.049	0.000	0.414	0.073	0.107							
LIQ	0.197	0.180	-0.022	0.040	0.338	0.008	1					
	0.000	0.000	0.550	0.271	0.000	0.836						
LEV	0.097	0.161	0.008	0.006	0.191	0.053	0.032	1				
	0.008	0.000	0.819	0.872	0.000	0.152	0.392					
SIZE	0.021	0.058	0.051	-0.003	-0.120	0.021	-0.253	-0.018	1			
	0.564	0.115	0.165	0.946	0.001	0.562	0.000	0.617				
LBTD	0.475	0.653	0.241	-0.013	0.614	0.157	0.286	0.157	0.076	1		
	0.000	0.000	0.000	0.732	0.000	0.000	0.000	0.000	0.039			
TEBTD	0.165	0.213	-0.041	-0.017	0.073	0.058	0.048	0.019	0.041	0.310	1	
	0.000	0.000	0.266	0.645	0.048	0.117	0.195	0.599	0.261	0.000		
PBTD	0.850	0.236	0.117	-0.022	0.204	0.040	0.165	0.078	-0.005	0.288	-0.365	1
	0.000	0.000	0.001	0.550	0.000	0.279	0.000	0.033	0.898	0.000	0.000	

Source: Elaborated by the authors

The accruals (AD) present a positive and significant correlation with the variable BTD, that is, the higher the accruals, the larger the BTD. This result suggests that BTD can be used to detect earnings management practices, corroborating the study of Ferreira et al. (2012). The variable share price divided by earnings per share (EPS) also shows a positive and significant correlation with BTD, that is, the higher the share price divided by earnings per share, the higher the BTD. These results differ from those found by Koubaa and Anis (2015). The variable company's size (SIZE) did not indicate significant correlation with the variable BTD, which differs from the result found by Koubaa and Anis (2015) in Tunisian companies.

The variable leverage (LEV) presents a positive and significant correlation with the variable BTD, that is, the higher the level of indebtedness, the higher the BTD. This result suggests that leveraged firms make investor uncertainties to increase, and high indebtedness levels signal higher market risk. The variable LAGBTD was used as a control variable to indicate the effect of BTD at time t-1 on BTD at time t. It is worth mentioning that the variable LAGBTD (lagged BTD) presents a positive and significant correlation with the variable BTD, that is, the higher the BTD of the previous year, the higher the BDT, corroborating the studies of Koubaa and Anis (2015).

Table 7 shows regression results for the model specified in Equation 1 and Equation 2, with the dependent variable total BTD.

Table 7. Determinants of Total BTD

Variable	Equation 1			Equation 2		
	Coefficient	*t*	*p-value*	Coefficient	*t*	*p-value*
Institutional Factors						
RENT	0.058	7.46	0.000***	0.024	2.57	0.010**
REV	0.021	0.87	0.385	0.001	0.04	0.968
IMOB	-0.037	-1.92	0.055*	-0.021	-1.10	0.271
Non-Institutional Factors						
AD	0.083	1.20	0.230	-0.105	-1.48	0.140
IPL	0.000	-1.08	0.279	0.000	-0.81	0.416
LIQ	0.009	3.30	0.001***	0.006	2.24	0.025**
Control variables						
LEV	0.000	0.41	0.682	0.000	0.36	0.718
SIZE	0.001	0.62	0.532	-0.001	-0.65	0.516
YEAR	0.002	1.56	0.119	0.003	2.05	0.040**
SECTOR	-0.001	-2.33	0.020**	-0.001	-1.87	0.062*
LAGBTD				0.429	6.40	0.000***
Constant	-4.615	-1.58	0.114	-5.851	-2.06	0.040**
Number of observations	744			744		
F (prob)	11.02	(0.000)		11.81	(0.000)	
R-squared	0.176			0.249		
Root MSE	0.066			0.063		

Note: ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.
Source: Elaborated by the authors

The statistic F significant at 1% suggests adequacy of the model. The models tested in this study did not present high VIF statistics for any explanatory variable (all lower than 2.49), which suggests the lack of multicollinearity of these variables. The explanatory power of the independent variables is greater in Equation 2 (R-squared of 0.249), suggesting that the inclusion of the variable LAGBTD is adequate.

The positive and significant coefficients (at 1% level in Equation 1 and 5% in Equation 2) of the variables RENT and LIQ suggest that profitability and liquidity are directly related to BTD. The results corroborate the studies of Manzon and Plesko (2002) and Koubaa and Anis (2015). These results imply that highly profitable and with high liquidity companies seek to reduce the tax base aiming to reduce taxes to be paid and increasing BTD. These data confirm the hypotheses H1 and H6 of this research, that profitability and liquidity, respectively, positively affect BTD.

On the other hand, the negative (-0.037) and significant coefficient (at 10% level) of the variable IMOB in Equation 1 suggests that the lower the level of immobilization, the higher the BTD value. Contrary to the results found by Manzon and Plesko (2002), who found a positive and significant relation between the variable IMOB and BTD. Therefore, the hypothesis H3 established in this research is not confirmed. This variable, in Equation 2, does not reveal significance in relation to the variable BTD, a result that confirms what was found by Koubaa and Anis (2015). The divergent results in Equation 1 and 2, regarding the variable IMOB, may suggest that this variable may not be adequate for the analysis of BTD in Brazil. This may be due to the fact that most Brazilian companies still use the same depreciation methods, prior to the adoption of the IFRS (Telles, & Salotti, 2015). The positive and significant coefficient (at 1% level) of the variable LAGBTD (0.429) indicates that the higher the BTD of the previous year, the higher the BTD of the following year. This result suggests that managers can observe the value of BTD when preparing financial statements.

The variables sales growth (REV), accruals (AD), share price divided by earnings per share (EPS), leverage (LEV) and company's size (SIZE) did not present significant values in this research, that is, do not affect the variable BTD. Therefore, hypotheses H2, H4, H5, H7 and H8 established in the work were not confirmed. Contrary to the results found by Koubaa and Anis (2015), who found a positive and significant relation with the variables REV, AD and LEV, and a significant and negative relation with the variable IPL. The activity sector seems to be relevant in the analysis of BTD, once the coefficient of the variable SECTOR is significant in Equation 1 and 2, suggesting that BTD can vary among the sectors of activity. The variable YEAR presented a significant coefficient (at 10% level) only in Equation 2, allowing no inferences about this variable.

Table 8 shows the results for Equations 1 and 2 considering the dependent variable temporary BTD (TEBTD).

Table 8. Determinants of Temporary BTD (TEBTD)

Variable	Equation 1			Equation 2		
	Coefficient	t	p-value	Coefficient	t	p-value
Institutional Factors						
RENT	0.022	4.67	0.000***	0.019	3.90	0.000***
REV	-0.024	-1.57	0.116	-0.025	-1.39	0.165
IMOB	-0.005	-0.35	0.727	0.040	1.02	0.309
Non-Institutional Factors						
AD	-0.005	-0.12	0.903	0.005	0.13	0.899
IPL	0.000	-0.88	0.381	0.000	-0.78	0.438
LIQ	0.001	0.44	0.657	-0.001	-0.37	0.709
Control variables						
LEV	0.000	-0.39	0.700	0.000	-0.48	0.629
SIZE	0.001	0.92	0.357	0.000	-0.06	0.952
YEAR	0.000	-0.18	0.858	0.000	0.09	0.927
SECTOR	0.000	-0.17	0.869	0.000	-0.40	0.690
LAGBTDT				0.112	2.00	0.046**
Constant	0.290	0.16	0.872	-0.220	-0.10	0.923
Number of observations	744			744		
F (prob)	2,97	(0.000)		2.50	(0.000)	
R-squared	0.054			0.082		
Root MSE	0.037			0.037		

Note: ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.
Source: Elaborated by the authors

When the dependent variable is the TEBTD, only the variables profitability and (RENT) and lagged TEBTD (LAGBTDT) presented significant coefficient. The positive and significant coefficient (at 1% level) between the profitability variable (RENT) and TEBTD shows that the higher the company's profitability, the higher the BTDT level. Thus, the hypothesis H1 is accepted, that is, the higher the profitability, the higher the level of BTDT. It should be noted that there is a positive and significant coefficient (at 5% level) between TEBTD and the lagged variable LAGBDT, that is, the higher the TEBTD of the previous year, the higher the TEBTD of the year. Table 9 shows the results of Equations 1 and 2 to identify the determinants of the permanent BTD (PBTD).

Table 9. Determinants of Permanent BTD (PBDT)

Variable	Equation 1			Equation 2		
	Coefficient	*t*	*p-value*	Coefficient	*t*	*p-value*
Institutional Factors						
RENT	0.035	3.75	0.000***	0.036	2.95	0.003***
REV	0.049	1.56	0.118	0.055	1.50	0.135
IMOB	-0.035	-1.47	0.141	-0.060	-0.97	0.331
Non-Institutional Factors						
AD	0.087	1.07	0.285	0.110	1.27	0.203
IPL	0.000	-0.61	0.543	0.000	-0.97	0.331
LIQ	0.009	2.97	0.003***	0.008	2.52	0.012**
Control variables						
LEV	0.000	0.46	0.642	0.000	0.47	0.640
SIZE	0.000	0.04	0.968	0.001	0.26	0.793
YEAR	0.002	1.18	0.237	0.002	0.80	0.426
SETOR	-0.001	-2.13	0.033**	-0.001	-1.72	0.086*
LAGBTDP				-0.018	-0.20	0.845
Constant	-4.102	-1.19	0.234	-3.632	-0.81	0.421
Number of observations	744			744		
F (prob)	4.31	(0.000)		3.36	(0.000)	
R-squared	0.091			0.094		
Root MSE	0.075			0.078		

Nota: ***, ** e * denotam a significância estatística nos níveis de 1%, 5% e 10%, respectivamente.
Fonte: Elaborada pelas autoras.

Profitability is positively associated with PBTD, TEBTD and total BTD, that is, the higher the profitability, the higher the BTD level. These results are consistent with the results found by Koubaa and Anis (2015) and Manzon and Plesko (2002) for total BTD, that is, profitable companies seek to reduce the tax burden to pay lower taxes.

The variable liquidity (LIQ) is positively associated with the level of permanent BTD, that is, the higher the liquidity of the companies, the higher the level of permanent BTD. It is noticed that the variable LAGPBTD did not register significant values, that is, the BTD of the previous year does not influence the permanent BTD of the year. The results presented suggest that separating BTD by permanent and temporary types is relevant to identify the determinants of BTD. Besides, the activity sector seems to be a relevant control variable in this analysis.

5   FINAL CONSIDERATIONS

This article aims to identify institutional and non-institutional factors that determine book-tax differences (BTD) of Brazilian public companies. The research sample is composed of 124 companies, with data available for the period 2010-2015. The results indicate that the total BTD has a positive and significant coefficient with the variables profitability, liquidity and lagged BTD. When the types of BTD are dismembered, profitability and lagged BTD are positively associated with temporary BTD. Profitability and liquidity are positively associated with permanent BTD. Therefore, it is suggested that the higher the level of these variables, the greater the types of BTD.

Profitability (institutional factor) is associated with all types of BTD (total, temporary and permanent). This is the variable that most seems to imply in increased BTD, corroborating the study of Koubaa and Anis (2015), for which highly profitable companies generally take advantage of the ambiguities of the tax legislation to reduce taxes payment, increasing BTD. Differently from the results found by Koubaa and Anis (2015) for a sample of companies from a common law country, the variables sales growth, accruals and stock returns did not present significant coefficients. These results are unexpected, since better earnings management would be expected in Brazil for it to be a code law country.

The research approach is considered innovative, especially in Brazilian context, because few studies have sought to identify the factors that determine BTD, separating them into institutional and non-institutional. The work contributes to the dissemination of knowledge on the subject and to the possible clarification of questions about the factors that determine BTD in Brazilian public companies. The limited amount of previous research on the subject of this study can be configured as a limitation to the theoretical basis, delimiting this research as exploratory. For future research, it is suggested to increase the sample used, comparing it with other code law and common law countries' samples.

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