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Firm Life Cycle, Book-Tax Differences and Earnings Persistence

Abstract

The objective in this study is to show if the life cycle explains the relation between the Book-Tax Differences (BTDs) and earnings persistence, as well as to inform on the future gains and their relation with the BTDs. Therefore, univariate tests were applied to verify the differences between the mean BTDS, life cycle stages and regression coefficient for the Earnings Before Income Tax (EBIT). The study focused on Brazilian publicly traded companies between 2009 and 2013. The results indicated that the control of earnings persistence was related with the stages of the life cycle. The information relevance of the life cycle and the Book-Tax Differences for earnings persistence is registered. In conclusion, the firm life cycle should be included in the analysis of the relation between the BTDs and earnings persistence. The evidence registered here is crucial to identify the quality of the earnings and incorporate them into earnings valuation models.

Key words: Life cycle. Book-tax differences. Earnings persistence.

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1. Introduction

The study assumes that the information on the life cycle of companies is crucial to the understanding of the requirements for the quality of earnings. In turn, it is known that, on the basis of accounting information, it is possible to identify the life cycle stage a particular company is in. This cycle has distinct phases that result in changing cash flow patterns, resulting from strategic activities developed by a company (Dickinson, 2011).

An efficient and economic means to identify the stage in the company's life cycle is the use of cash flow patterns. The patterns provide indicators of the stage in the life cycle in uniform distributions. The Return on Assets (ROA) and the profit margin are examples of these patterns (Dickinson, 2011).

According to Drake (2013), the literature tries to find a better explanation for the association between Book-Tax diferences (BTDS) and persistence in earnings. Understanding this relationship is attractive to researchers and investors because, empirically, it is known that BTDS can explain the quality of accounting information.

Ferreira, Martinez, Costa and Passamani (2012) demonstrate that the accounting results cause changes in the perceptions of investors, auditors, regulators and other users of financial information. The Book-Tax Differences help investors to assess and evaluate the importance of the financial statements and, at the same time, allow regulators to conduct a more targeted control, according to the characteristics of the company's BTDs.

The analysis of the financial statements relates cash flow, the stage of the business life cycle, differences between book income and taxable income (BTDs) and persistence of earnings in developing predictions about a certain firm. This issue has been debated in the United States (US) from the 1990s. In Brazil, this issue began to be discussed in the work of Passamani, Martinez and Teixeira (2012). Recently, the life cycle was included in the analysis. In this sense, Dickinson (2011), Drake (2013) and Atwood, Drake and Myers (2010) stand out.

According to Drake (2013), the BTDs stem from several factors, including the inherent differences between taxable income and accounting income. It also confirms that the Life Cycle theory provides a partial explanation for why the BTDs are associated with future returns.

This study seeks to answer the following research question: Does the firm life cycle explain the relationship between Book-Tax Differences and persistence of earnings? The objective of this work is to: diagnose BTDs of Brazilian companies, basing on the studies by Hanlon (2005), Dickinson (2011) and Drake (2013); and, additionally, verify that the life cycle partially explains the relationship between Book-Tax Differences and persistence of earnings, documented in the studies by Drake (2013). The specific objectives are: i) analyze the BTDs in the firm life cycle; ii) to verify the persistence of earnings in the stages of the life cycle; and iii) analyze the relationship between large BTDs and persistence of earnings in the stages of the life cycle, based on the study by Drake (2013).

According to the different stages of the life cycle, there is a nonlinear relationship between BTDs and firm life cycles. Thus, according to Drake's work (2013), the following hypotheses are formulated:

H1a: During the phases of introduction and growth of the firm life cycle, the difference between the accounting profit before tax (Lair) and taxable income is greater than during the mature phase (positive BTDS);

H1b: During phases of stagnation and decline of the life cycle of a company, the difference between the accounting profit before tax and taxable profit will be lower than during the maturity phase (negative BTDS).

On the other hand, when the BTDs vary predictably throughout the life cycle stage, both the BTDs and the life cycle stage are associated with the persistence of earnings. In this sense, we propose the following hypothesis:

H2: Controlling the effect of the company's life cycle in the persistence of the earnings weakens the links between major differences in accounting earnings and positive taxable income and large differences between accounting earnings and taxable profits and low persistence in earnings.

It is emphasized that the results of this study can be potentially instructive, both for professionals (investors, creditors, analysts, auditors and regulators) and researchers in the following contexts: (1) to a better assessment of growth rates and forecast horizons in valuation models; (2) to better understand how economic fundamentals affecting the level of properties of future profitability convergence; (3) identify companies with potential risk factors based on different stages of the life cycle; and (4) to identify a control variable for different economic characteristics, related to the life cycle of companies and that may affect performance (Dickinson, 2011).

This work presents a literature review on the informational importance of BTDS, followed by the presentation of the database, assumptions and models adapted to Brazilian companies. Next, the analyses are presented. The study is closed off with a presentation of the key findings and recommendations for possible future studies.

2. Theoretical Framework

2.1 Firm Life Cycle

The first researchers to submit a financial accounting study on the use of the life cycle of a company were Anthony and Ramesch (1992). They sought to explain the performance of the market in function of the life cycle. However, their sample period ended before the cash flow statement became mandatory.

Drake (2013) states that the theory of the firm life cycle describes how it grows, matures and declines, unlike a product Life Cycle, which focuses on goods and services and how they would be received in the market. The purpose of studying the life cycle is to analyze the variables above, including incentives and strategies throughout the stages of the company's life. In short, the life cycle provides the alternative economic framework for the study and analysis of companies.

For Jenkins, Kane and Velury (2004), the different stages of its life cycle play a fundamental role in defining the accounting information quality. The stages of the firm life cycle would be: (i) growth; (ii) maturity; and (iii) stagnation.

Dickinson (2011) identifies five stages of the life cycle of an enterprise: the introduction phase; growth stage; mature stage; turbulent phase (shake-out); and decline phase. These cycles are attributed to year-long periods of the companies, identified by the signs of the components of the cash flow statement. Using this measure, the author documents the expected variation in performance measures of the company (profit margin, the persistence of earnings and asset turnover), in all stages of the life cycle of a firm, and compares the persistence of earnings with the stage of the life cycle of a company and the convergence of the earnings profitability, identifying the return on net operating assets.

Drake (2013) aims to expand the literature on the life cycle, examining the relationship between the life cycle of a company and the Book-Tax Differences, and this study examines several points, such as: strategies, incentives and stock returns.

2.2 Book-Tax Differences

The work by Ferreira et al. (2012) shows the relationship between two important issues discussed in the accounting literature: earnings management and the Book-Tax differences - divergence between taxable income and accounting income. The authors say the earnings management is associated with discretionary practices used by the manager to direct the accounting information in accordance with the tax and economic incentives. BTDs, then, are basically related to the difference between the accounting rules and tax rules.

The companies report financial results for investors according to the GAAP (generally accepted accounting principles), and the tax authorities based on regulations established by law. One of the characteristics of the GAAP is conservatism, i.e. recognizing losses when probable and measurable, using estimates and future vision to establish reserves (Drake, 2013).

Heltzer (2009) examined the possibility of variations in BTDs disclosing conservative features in the accounting reports, dividing conservatism between conditional (subject to an economic event) and unconditional (not conditioned to an economic event). The samples indicate that a ratio between BTDs and conservatism varies according to the value of the BTDs. Companies with positive BTDs (negative) are less (more) willing to properly recognize losses (gains) on accounting earnings and thus have little quality in the earnings.

There are several reasons for the differences between the tax and accounting results, including, among others, that the accounting rules are generally based on conservatism and its principles, while tax accounting is primarily based on the payment capacity, as described in Atwood et al. (2010).

Drake (2013) reports that, in addition to the requirements in the different reports of each system, the BTDs are affected by the earnings cycles of companies, which define their positions in terms of strategic planning. The inherent differences between the tax result and the financial results disclosed to shareholders and other external users give rise to the BTDs. Researchers have difficulties to interpret the economic significance of firms' BTDs and the means to relate them to future earnings.

The time differences the accounting and tax rules have in common influence the persistence of the earnings. The differences give rise to positive BTDs, where net income is greater than the taxable income; or negative BTDs, in which the taxable income is higher than the accounting income (Raedy, Seidman & Shackelford, 2011).

Therefore, the BTDs may be composed of two variables: (i) normal differences resulting from the misalignment of the joint accounting and taxation rules; and (ii) abnormal differences by discretionary practices of managers (management practices on net income and / or management practices on taxable income) (Ferreira et al., 2012).

Companies engage in fundamentally different operational and financial activities, depending on their life cycle stage and, because of these activities, financial and tax reports are affected unequally. Thus, it is reasonable to anticipate that BTDs will change in the course of a company's life cycle. In this sense, the life cycle should partially explain the variation of earnings persistence through BTDs (Drake, 2013).

2.3 Earnings Persistence

An investigation carried out between large Book-Tax Differences, both positive and negative, and persistence in earnings found that these are less persistent than the earnings of companies with small BTDs (Hanlon, 2005). According to Dickinson (2011), using the persistence of earnings as a means to validate the rating flow of the life cycle of cash components hypothesizes that the maturity stage is associated with the highest level of earnings persistence. The author also describes that all the other stages are negatively related to future changes in profitability, and its results are consistent with the importance of the life cycle. Creating a link between the company's strategy and the persistence of earnings is relevant to infer potential returns in the stock market. Thus, it is emphasized that the companies have different strategic actions in the stages of growth, maturity and stagnation (Jenkins, Kane & Velury, 2004).

Drake (2013), given the persistence of the earnings for the companies in the introduction and growth phase, counts on the link, created by Jenkins, Kane and Velury (2004), between the company's strategy and the market valuation. Market participants assess companies based on the expected trust in future earnings. Value relevance studies identify sales and cash flows as more relevant than the profitability in the growth phase. In the maturity stage, companies focus on minimizing costs and profitability; they have higher earnings than in the growth phase; have smaller sets of investment opportunities and a declining investment rate (Grullon, Michaely & Swaminathan, 2002); and, according to Dickinson (2011), have the highest levels of earnings persistence after taxes.

Companies in the maturity and growth phase behave contrary to the companies in the shake-out or declining phase, as they focus their goals on recovery or survival (Drake, 2013). Administrators often seek efficiency and cost minimization strategies after restructuring operations (Jenkins, Kane, & Velury (2004). The decline of companies reveals low profit margins and low wages, whose investors are again focused on cash flows as a sign of future profitability (Black, 1998; Miller & Friesen, 1984).

3. Method

The sample used in this study consists of Brazilian companies with shares listed on the São Paulo Stock Exchange (BOVESPA) during the period 2009 to 2013. We used the information from the financial statements of the Economática database. After adjustments related to regression models, 1,308 observations were used for the "t" tests between the stages of the business life cycle; and 1,131 observations for the persistence of the earnings and the relationship between the BTDs and the life cycle, incorporating the same data used in the study by Hanlon (2005), Dickinson (2011) and Drake (2013).

The study started after the implementation of law 11.638 / 2007 and 11.941 / 2009 and the Transition Tax Regimen (RTT), since the statement of cash flow was only required from those laws onwards. In this perspective, the research period begins in 2009, as a basis to explain 2010, considering that the obligation of the statements was established from 2010. This criterion ensured consistent accounting for Book-Tax Differences in the sample period (Drake, 2013). Financial companies were excluded from the sample, as these present specific accounting regulations and different accounting and tax rules from other sectors, facts that could harm the financial interpretation of the other companies.

Dickinson (2011) shows the life cycle stage models based on the three components of the cash flow statement: the cash flow patterns from operations, investment and financing. According to Drake (2013), the cash flow model is based on the combination of the signal of each of the three cash flow components, in order to classify the companies in one of the five stages of the life cycle: introduction, growth, maturity, shake-out and decline.

As exemplified by Drake (2013), companies in the introduction phase are associated with a negative cash flow in the operational component; negative in investments; and positive in financing activities. Growth stage companies have a positive cash flow in the operational component; negative in investments; and positive in funding. Companies in the maturity stage are positive in the operational cash flow; negative in the investment; and negative in the financing cash flow.

Similarly, the phase of shake-out has three verification possibilities: 1st) negative operating cash flow, negative in investment cash flow and negative in financing cash flow; 2nd) positive operating cash flow, positive in investment cash flow and positive in the financing cash flow; 3rd) positive in operating cash flow, positive in the investment cash flow and negative in the financing cash flow.

There are two possibilities for the analysis of the decline phase: 1st) negative operating cash flow, positive investment cash flow and positive in the financing cash flow; 2nd) negative operating cash flow, positive in the investment and negative in the financing cash flow. Table 1 briefly presents the stages of the life cycle and the signs of the cash flows.

Table 1
Life Cycle Measures

	Intro	grow	Mat	Shake	shake	shake	Decl	Decl
F.C.O	-	+	+	-	+	+	-	-
F.C.I	-	-	-	-	+	+	+	+
F.C F	+	+	-	-	+	-	+	-

Where: O.C.F. = Operational Cash Flow; I.C.F. = Investment Cash Flow; F.C.F. = Financing Cash Flow.

Source: Dickinson (2011).

At first, a test of differences of means was applied ("t") for the total BTDs, in order to check the variations between the stages of the life cycle of a business ("t" test for introduction and growth, "t "for growth and maturity; "t" test for maturity and shake-out; "t" for shake-out and decline, and "t" for growth and shake-out). These tests were used to evaluate the statistical significance between two sample means. This research was carried out and hypotheses were tested based on information described by Hanlon (2005), and then tested by Drake (2013), using the averages of the assets to allow comparability between companies and the use of the "t" test, seeking to identify if there is variation in the means between the life cycle groups.

In the second phase, we tested the hypothesis of earnings persistence, which is basically a replica of Hanlon (2005), in which the Pre-Tax Book Income (PTB) was replaced by the Earnings Before Income Tax (EBIT) and Social Contribution on Net Income (CSLL). As an initial parameter for the tests, we used p-value of the independent variable Lairt. In order to predict the future earnings from existing information, a model was designed with the premise of earnings persistence and the stages of the firm life cycle.

Explaining: Life Cycle (LC) as an indicator, variables defined as 1 if the observation of the company is in a particular category of the life cycle, and 0 otherwise. Using Life Cycle as a category: 1 for business in the "Introduction" phase; 2 for "growth" phase; 3 in the "Maturity" phase; 4 in the "Shake-out" phase; and 5 in the stage of "Decline". Omitting the stage "Maturity" (3), the coefficients are all shown relative to the maturity phase.

For the control of the relationship between large BTDs and earnings persistence through the stages of the business life cycle, we used the model offered by Hanlon (2005), which showed a negative relationship between large BTDs with less persistence in earnings.

Drake (2013) describes the large positive BTD (LPBTD) which will be used as indicator 1 if the company in the observation period has a higher quartile of the BTDs scale, and zero otherwise. The second group consists of a lower quartile, large negative BTD (LNBTD), which is an indicator equal to 1 when the observation period is in the lowest quartile of the BTD scale, and zero otherwise.

Next, the following was investigated: when controlled by the stages of the life cycle, the impact of the relationship between large positive and negative differences (large BTDs) and lower earnings persistence in model 4. It is noteworthy that the life cycle is an indicator variable set to 1 if the company is observed in a particular category of the life cycle, and 0 otherwise. In this form, the interest in capturing the earnings persistence and the coefficients are all relative to the maturity phase (Drake, 2013).

In the test of hypothesis H2, the results of the data were equated, involving variables in all stages of the life cycle. A regression was developed of the participation of all stages of the life cycle, and less accurate own coefficients were estimated in the comparison of the earnings persistence in all stages of the life cycle, anticipating that, if the BTD is a function of the life cycle, the coefficients vary within the BTD group.

Tests were analyzed based on the panel data model (Chow, Breush-Pagar and Hausmann), given that this model provides an analysis in time series for each cross section and less collinearity between the variables, plus a higher degree of freedom and efficiency (Gujarat, 2006). The information was obtained using Stata software.

After the selection, we came to a total of 1,308 (one thousand three hundred eight) observations for the "t" tests with a view to determining whether the BTDs vary between the stages of the life cycle. For the regression model in the earnings persistence and the stages of the life cycle, 1,131 (one thousand one hundred and thirty-one) companies were observed for the verification of the relationship between large BTDs and earnings persistence throughout the stages of the life cycle.

4. Results

4.1 Consistency Analysis of Estimates

Figure 1 presents the means of the variables in the life cycle stages, using the "t" test to compare the significant stages between the stages of the life cycle. Initially, the aim was to test whether the BTDs vary between the stages of the life cycle. The "t" test was used to see if, on average, the cycles are the same. Model 1 shows how the tests were executed.

H1 argues that the means are different, that is, the BTDs do not vary between the stages. It is expected that, in the introduction and growth phases, the BTDs increase when compared to the maturity phase (H1a), and also that, in the shake-out and decline phases, a reduction occurs in the variable, always in relation to the maturity (H1b).

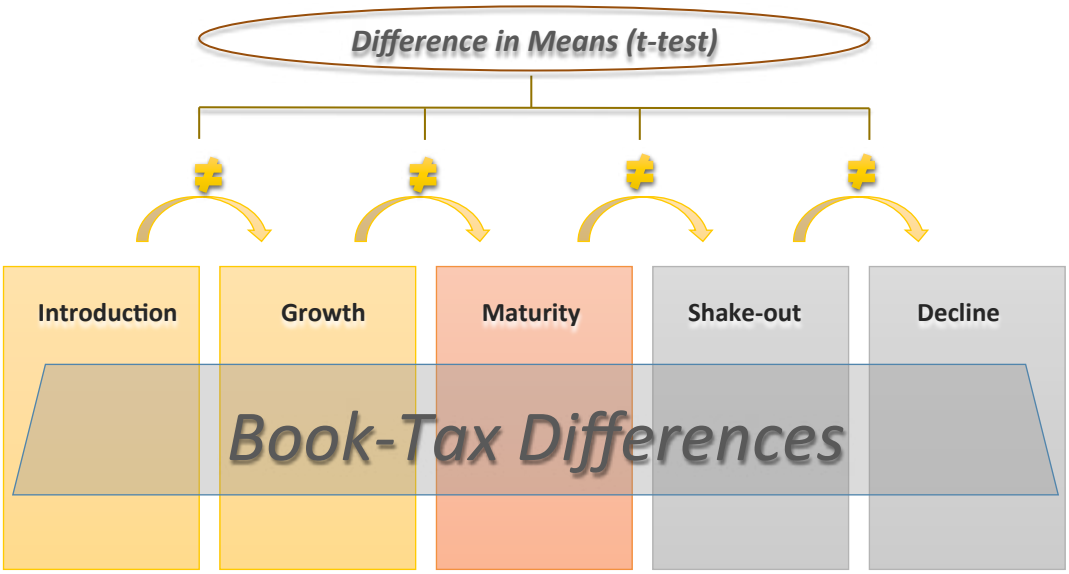

Figure 1. Scheme of Model 1

Source: Authors

Next, the tables present the tests of differences of means ("t") for the BTDs. Table 2 shows the descriptive statistics for the observation of differences between the BTDs-introduction and BTDS-growth, to compare the significance between the stages of the life cycle. The top of the tables shows the number of observations for each stage of the life cycle, the mean square errors, standard deviation and the confidence interval for an alpha of 5%. The bottom presents the p-values for possible alternative hypotheses (lower, different or higher). However, the aim of this model is to initially test only equality. Hence, only the middle column will be observed, highlighted in bold.

Table 2
"t" test for Introduction and Growth

Variable	Obs	*Mean*	Standard Error	Standard Deviation	[95% Confidence Interval]	
btd_int	1308	-5779.77	2475.12	89516.11	-10635.43	-924.1164
btd_grow	1308	72518.66	21223.54	767576.5	30882.73	114154.6
diff	1308	-78298.43	21352.36	772235.7	-120187.1	-36409.77
mean(diff) = *mean*(btd_int - btd_grow)						t = -3.6670
Ho: *mean*(diff) = 0						
Ha: *mean*(diff) < 0			**Ha: *mean*(diff) ≠ 0**		Ha: *mean*(diff) > 0	
Pr(T < t) = 0.0001			**Pr(|T| > |t|) = 0.0003**		Pr(T > t) = 0.9999	

Source: Authors

In the analysis of the "t" test results for introduction and growth, it was found that the results described with a statistical value of t = -3,6670 appointed the rejection of the equality of means. Thus, it is possible to infer the significance level of up to 1% and the average of the introduction stage is statistically different from the average of the growth stage.

Looking at the average of companies, in the initial phase, they have negative BTDs and, in the growth phase, a very high average. Table 3 shows the results of the test of difference of means for the stages of growth and maturity.

Table 3
"t" test for Growth and Maturity

Variable	Obs	*Mean*	Standard Error	Standard Deviation	[95% Confidence Interval]	
btd_grow	1308	72518.66	21223.54	767576.5	30882.73	114154.6
btd_mat	1308	72189.93	21933.44	793250.9	29161.33	115218.5
diff	1308	328.7288	30651.68	1108557	-59803.14	60460.59
mean(diff) = *mean*(btd_grow - btd_mat)						t = 0.0107
Ho: *mean*(diff) = 0						
Ha: *mean*(diff) < 0			**Ha: *mean*(diff) ≠ 0**		Ha: *mean*(diff) > 0	
Pr(T < t) = 0.5043			**Pr(|T| > |t|) = 0.9914**		Pr(T > t) = 0.4957	

Source: Authors

For the "t" test for growth and maturity, the data did not signal the rejection of equality of means. Thus, it is not possible to infer that the growth stage average is statistically different from the average of the maturity stage. Table 4 shows the results of the test of difference of means for the stages of maturity and shake-out.

Table 4
"t" test for Maturity and Shake-Out

Variable	Obs	Mean	Standard Error	Standard Deviation	[95% Confidence Interval	
btd_mat	1308	72189.93	21933.44	793250.9	29161.33	115218.5
btd_shake-out	1308	1146.24	2101.647	76008.77	-2976.72	5269.22
diff	1308	71043.68	22036.77	796988.1	27812.37	114275
mean(diff) = *mean*(btd_mat - btd_shake)						t = 3.2239
Ho: *mean*(diff) = 0						
Ha: *mean*(diff) < 0			**Ha: *mean*(diff) ≠ 0**		Ha: *mean*(diff) > 0	
Pr(T < t) = 0.9994			**Pr(|T| > |t|) = 0.0013**		Pr(T > t) = 0.0006	

Source: Authors

In the "t" test for maturity and shake-out, it could be inferred, with a significance level of up to 1%, that the average for the introduction stage is statistically different from the average of the growth stage, therefore rejecting the null hypothesis of equality. Table 5 presents the results of the test of difference of means for the shake-out and decline stages.

Table 5
"t" test for Shake-Out and Decline

Variable	Obs	Mean	Standard Error	Standard Deviation	[95% Confidence Interval]	
btd_shake	1308	1146.24	2101.64	76008.77	-2976.72	5269.22
btd_decl	1308	-4430.44	1444.59	52245.49	-7264.41	-1596.47
diff	1308	5576.69	2548.72	92177.87	576.652	10576.73
mean(diff) = *mean*(btd_mat - btd_shake)						t = 2.1880
Ho: *mean*(diff) = 0						
Ha: *mean*(diff) < 0			**Ha: *mean*(diff) ≠ 0**		Ha: *mean*(diff) > 0	
Pr(T < t) = 0.9856			**Pr(|T| > |t|) = 0.0288**		Pr(T > t) = 0.0144	

Source: Authors

For the "t" test for shake-out and decline, the data indicated the rejection of equality of means. Thus, for an alpha of 5%, we can say that the average of the shake-out stage is statistically different from the average of the decline stage. Table 6 shows the results of the test of difference of means for the shake-out and growth stages.

Table 6
"t" test for Growth and Shake-Out

Variable	Obs	Mean	Standard Error	Standard Deviation	[95% Confidence Interval]	
btd_grow	1308	72518.66	21223.54	767576.5	30882.73	114154.6
btd_shake	1308	1146.24	2101.64	76008.77	-2976.72	5269.22
diff	1308	71372.41	21330.32	771438.5	29526.99	113217.8
mean(diff) = *mean*(btd_mat - btd_shake)						t = 3.3461
Ho: *mean*(diff) = 0						
Ha: *mean*(diff) < 0			**Ha: *mean*(diff) ≠ 0**		Ha: *mean*(diff) > 0	
Pr(T < t) = 0.9996			**Pr(|T| > |t|) = 0.0008**		Pr(T > t) = 0.0004	

Source: Authors

The results of the test of difference of means for the shake-out and growth stages appoint the rejection of the equality of means. Thus, it is possible to infer, at a significance level of 1%, that the average of the growth stage is statistically different from the average of the shake-out stage. Table 7 summarizes the tests of difference of means between pairs of life cycle stages, according to Drake (2013). Additionally, the tests of difference of means are presented for temporary BTDs. A significance level = 10% *, ** and *** = 5% = 1% is indicated in the use of a two-tailed test.

Table 7
"t" tests for Pairs of Stages

Variable	BTD	BTD (temporary)
1-2 Introduction and Growth	***	***
2-3 Growth and Maturity		
3-4 Maturity and Shake-Out	**	***
4-5 Shake-Out and Decline	**	*
2-4 Growth and Shake-Out	***	***

Source: Authors

The "t" test for pairs of stages confirmed the prediction proposed by the literature, that is, the rejection of the null hypothesis of equality between the stages, except for the second test for growth and maturity, for the BTDs and temporary BTDs. Ferreira et al. (2012) describe that the temporary BTDs occur at the moment of the revenue and/or expenditure recognition that does not correspond to the rules.

It was established that, in the introduction and growth phases, the BTDs increased in relation to maturity, in accordance with H1a, or that, in the shake-out and decline, there was a reduction in the variable, also in relation to maturity (H1b), considering that there was a decrease between stage 2 (growth phase) and 3 (stage of maturity). Consistent with expectations, positive average BTDs were observed in the growth, maturity, and shake-out stages; and negative average BTDs in the introduction and decline. The coefficients of the variables were significant between the stages of the life cycle and the averages of the temporary BTDs in all stages of the life cycle were positive. Moreover, it is clear that mature companies are generally older than companies in the growth phase. However, as a result of the non-rejection of the null hypothesis of equality, it cannot be affirmed what appoints the lower average between phase 2 (growth phase) and 3 (maturity). Thus, it can be said that the hypotheses of Model 1 were satisfied.

Model 2: Persistence in the earnings

To examine the persistence in earnings, 1,131 observations were used, which contained all information variables. The regression model used in this study is basically a replication of what was done by Hanlon (2005), replacing the name Pre-Tax Book Income (PTBI) by earnings before income tax (EBIT). The year 2009 was taken as the base year to respond to 2010.

Table 8 shows the results of this model. Before performing the panel data regression, the Chow, LM Breusch-Pagan and Hausman tests will be applied, under the random effects approach. And to soften possible heteroscedasticity problems, the data were rotated with robust standard errors.

Table 8

Linear Regression – Earnings Persistence

EBIT_t+1	Coef.	Robust Std. Error.	z	P>|z|	[95% Confidence Interval]	
EBIT_t	0.8242344	0.0604687	13.63	0.000	0.7057179	0.942751
_cons	58897.58	43317.41	1.36	0.174	-26002.99	143798.1
R^2: *within* =	0.0071				*Number of obs* =	1131
between =	0.9767				*Wald* chi2(13) =	185.8
overall =	0.7395				Prob > chi2 =	0.0000

Source: Authors

Analyzing the points obtained with a confidence interval of 5%, with a degree of freedom of 13, and R^2 in an model adjustment measure with within (inside) of 0.71%; between (among models) of 97.67%; and overall (general), it can be said that 73.95% of the variation of income before taxes in t + 1 can be explained by earnings at time "t". And the coefficient of the EBIT variable "t" indicates that an increase by one real at time "t" would cause an average increase of 82 cents in the next period.

The results indicate that, first, the model is valid, since the p-value of the Wald test was very close to zero, indicating that the coefficient is statistically different from zero, meaning that the test rejected the null hypothesis that all the variables are jointly equal to zero. This permits pursuing the proposition of this work.

Model 3: Control of earnings persistence through life cycle stages

In the study, the same data as Drake (2013) employed were used as life cycle category: 1 for the introduction phase; 2 for the growth phase; 4 for the shake-out phase (turbulence); and 5 for the decline phase, and category 3 was omitted, which is the maturity phase. Thus, according to the author, the coefficients presented are all relative to mature companies. The purpose of this model is to verify that the persistence in earnings will also vary between the stages of the life cycle.

In the hypotheses H1a and H1b, it was expected that, by comparing the phases of introduction, growth, shake-out and decline with maturity, persistence would be higher in the latter. Therefore, dummy variables were included related to the life cycle stages in the underlying model. We chose to omit the dummy maturity stage, as well as its interaction with the EBIT "t", given that the interest of H1a and H1b mentions that stage. Thus, naturally, its result is reflected by the constant, which assumed the predicted signal as positive.

Table 9 shows the results of the above regression model. It should be noted that, also similar to the first model, we used the random effects approach, which entails the use of generalized least squares, besides, of course, the robust standard errors to solve the effects of heteroscedasticity.

Table 9

Multiple Linear Regression of Earnings Persistence with Coefficient Varying across Life Cycle Stages

EBIT_t+1	Expected signal	Coef.	Robust Std. Error.	Z	P>|z|
EBIT_t	+	0.6459365	0.808077	7.99	0.000
intro	–	-287249.9	58857.67	-4.88	0.000
grow	–	-216887.4	60522.93	-3.58	0.000
shake	–	-195692.2	56249.83	-3.48	0.001
decl	–	-267631.5	61348.98	-4.36	0.000
EBIT_int	–	-0.4787761	0.1865684	-2.57	0.010
EBIT_grow	–	0.3092576	0.138522	2.23	0.026
EBIT_shake	–	-0.3032496	0.0814679	-3.72	0.000
EBIT_decl	–	-0.2462685	0.2705762	-0.91	0.363
_cons	+	216064.8	51341.67	4.21	0.000
R^2: *within* =	0.0274			*Number of obs* =	1131
between =	0.9481			*Wald* chi2(13) =	2730.45
overall =	0.773			Prob > chi2 =	0.0000

Source: Authors

The following names are used in Table 9: *dummy intro* = introduction; *dummy grow* = growth; *dummy shake* = shake-out, treated as turbulence in this case; *dummy decl* = decline; EBIT_intro = earnings before income tax and introduction; EBIT_*grow* = earnings before income tax and growth; EBIT_*shake* = earnings before income tax and shake-out; EBIT_decl = earnings before income tax and decline and; cons = constant. In addition, the following variables are used: EBIT_t = earnings before income tax at time t; a dummy Inbtd = large negative Book-Tax Differences; a dummy *lpbtd* = large positive Book-Tax Differences; ln_EBIT = large negative an earnings before income tax; lp_EBIT = large positive and earnings before income tax, introduction, growth, shake-out (turbulence), decline; EBIT_int = earnings before income tax and introduction; EBIT_*grow* = earnings before income tax and growth; EBIT_*shake* = earnings before income tax and shake-out; and EBIT_decl = earnings before income tax and decline.

When inserting the control data related to the life cycle of a company, it was found that the coefficients that were significant at 1%, 5% and 10% were in the introduction, growth, shake-out and decline stages. The data assume the appropriateness of the results to what was predicted in the literature, that is, the interaction coefficients between the life cycle dummies and the EBIT were negative and significant. The only result that did not prove significant was the coefficient of the interaction variable between EBIT in the year "t" with the dummy of the decline stage (EBIT_decl). This suggests lower earnings persistence for the introduction, growth, shake-out and decline stages in relation to the maturity, represented by the constant (positive and significant signal).

Models 3 and 4: Control of relation between large BTDs and earnings persistance through life cycle stages

Based on this information, the hypotheses 1 and 2 are considered as confirmed. We investigated initially if, when controlled according to the stages of the life cycle, the relationship between large positive and negative differences (large BTDs) and lower earnings persistence is mitigated.

Table 10 shows the results of multiple linear regressions rotated by the method of generalized least squares in the random effects approach. The first model uses variables of large BTDs (large positive and large negative), as well as their interactions with the EBIT, in the year "t", to capture the relationship with earnings persistence. The second model adds the life cycle of variables, therefore showing the aim of this study. It is expected that the life cycle partially explains the relationship between BTD and earnings persistence.

The sample was divided between BTD groups, where LPBTD is the observation group with BTDs scale in the top quartile and LNBTD is the quartile of the group inferior to the annual observations.

By analyzing the effect of the life cycle in relation to the persistence of BTDs / earnings, it was observed that the results do not corroborate the findings of Hanlon (2005) and Drake (2013) regarding the negative relationship between large BTDs and earnings persistence because, although the signs of the coefficients of the interaction variables between lnbtd dummies and lpbtd with EBIT were both negative, there was no statistical significance. However, the constant that captures the small differences in information was significant at 5% with a positive sign, indicating a positive relationship between small BTDs and greater earnings persistence.

Moreover, the coefficients of the interaction variables lnbtd * EBIT and lpbtd * EBIT of the two models were compared between the columns in order to test hypothesis 3. Thus, the results found in Drake (2013) could not be maintained, since, based on the model, these coefficients did not show significance and, in the model to control the life cycle, the signals and the p-values remained not significant.

Some are the possible explanations for this result. The sample used in Drake (2013) covered a period of sixteen (16) years, totaling 4,638 companies with 22,415 observations, while this study covered only four (4) years and with a total of 1,131 observations. Thus, the segregation in four stages (omitting maturity) further reduces the number of observations in each stage. This is due to the recent change in corporate law (influenced by CPC 32 - Taxes on earnings), which influences the differences between the accounting and taxable earnings (BTDs).

Table

10 MLS regressions for Baseline Model and for Model with Life Cycle Control

Variable	Expected Signal	Coef.	Z	Sig	Expected Signal	Coef.	z	Sig
_cons	+	26221.66	2.24	**0.025****	+	163916	5.65	**0.000*****
EBIT_t	+	0.8165327	12.57	**0.000*****	+	0.63638	7.98	**0.000*****
Lnbtd	–	-67574.33	-0.75	0.453	–	-46402.58	-0.56	0.578
Lpbtd	–	236180.1	1.4	0.162	–	258726.9	1.86	**0.063***
ln_EBIT	–	-0.0071782	-0.85	0.398	?	-0.0141472	-1.36	0.173
lp_EBIT	–	-0.0016602	-0.72	0.472	?	-0.0013723	-0.5	0.621
Introduction	–				–	-235242.7	-4.9	**0.000*****
Growth	–				–	-220588.1	-3.81	**0.000*****
Shake-out	–				–	-168610.2	-3.54	**0.000*****
Decline	–				–	-219814.8	-4.23	**0.000*****
EBIT_int	–				–	-0.5294151	-3.54	**0.000*****
EBIT_grow	–				–	0.3120432	2.31	**0.021****
EBIT_shake	–				–	-0.2952794	-3.73	**0.000*****
EBIT_decl	–				–	-0.3699466	-1.31	0.189

Source: Authors

5. Conclusion

The aim of this study was to analyze if the life cycle theory can partially explain the negative relationship between BTDs and earnings persistence. To examine this hypothesis, first, a relationship was established between BTDs and the life cycle of a company.

Companies in different stages of the life cycle are involved in fundamentally different economic negotiations and these negotiations have different treatments in the publications of accounting and tax reports, which, in turn, provide explanations on whether the stage of the life cycle of a business is linked to its level of temporary BTDs.

It is described in the literature that the earnings persistence varies in the stage of the company life cycle and in the Book-Tax Differences. Establishing a relationship between BTDs and the company life cycle, it was observed that the life cycle provides an economic framework for the relation between the BTDs and earnings persistence.

The results showed a relationship between BDTs and earnings persistence, varying across the stages of the life cycle. Companies with large positive BTDs are associated with a change to the growth phase in the next period. These results in Brazil confirm the findings of Hanlon (2005) and Drake (2013). The models used by Hanlon (2005), improved by Drake (2013) and modified for Brazilian standards - changing the PTBI to EBIT under the Brazilian law - to document the life cycle partially explains the relation between BTDs and earnings persistence. The change is not significant, but only works as an adjustment to the concepts and terminology of Brazilian accounting.

The study provides an alternative explanation of why some companies try to avoid taxes more than others. If BTDs vary according to the life cycle, it is interesting to examine the effects of aggressive tax planning practices in the quality of financial results. Overall, this study provides an economic framework by considering BTDs, in general, together with the identification of the life cycle the company is in. The proposal is more advanced than to exclusively analyze the relationship between earnings persistence and BTDS.

The study stands out as the first study to focus on a reality other than the US - in this case Brazil, which focuses on analyzing, jointly and in an integrated manner, concepts like BTDs, earnings persistence and firm life cycle.

The results of this study indicate the need for further investigation, given that the period of this study was very small - five years -. Therefore, for further research, the analysis need to encompass a longer period, as all studies, such as Drake (2013), consider the period between 1994 and 2010; and Dickinson (2011), the period between 1998 and 2005.

References

Anthony, J & Ramesh, K. (1992). Association between accounting performance measures and stock prices: a test of the life cycle hypothesis. *Journal of Accounting and Economics*, *15*(2-3), pp. 203-227. doi: 10.1016/0165-4101(92)90018-W

Atwood, T.; Drake, M. S.; Myers, (2010) L. A. Book-tax conformity, earnings persistence and the association between earnings and future cash flows. *Journal of Accounting and Economics*, *50*(1), pp.111-125. doi: 10.1016/j.jacceco.2009.11.001

Black, E. (1998). Life-cycle impacts on the incremental value-relevance of earnings and cash flow measures. *Journal of Financial Statement Analysis*, *4*, pp. 40-57.

Dickinson, V. (2011), *Cash flow patterns as a proxy for firm life cycle*. The Accounting Review, *86*(6), pp.1969-1994. doi: 10.2308/accr-10130.

Drake, K. D. (2013) *Does firm life cycle explain the relation between book-tax differences and earnings persistence?* University of Arizona Eller College of Management Department of Accounting, Tucson, AZ.

Ferreira. F.R., Martinez, A. L. Costa, F. M. da,& Passamani, R. (2012). Book-tax differences e gerenciamento de resultados no mercado de ações do Brasil. *Revista de Administração de Empresas*. [online]. *52*(5), pp. 488-501.

Grullon. G.; Michaely, R.; Swaminathan, B. (2002) Are dividend changes a sign of firm maturity? *The Journal of Business*, *75*(3), pp. 387-424. DOI: 10.1086/339889

Gujarati, D. (2006) *Econometria básica***.** Maria José Cyhlar Monteiro (trad.). 4ª.ed. Rio de Janeiro: Elsevier.

Hanlon, M. (2005) The persistence and pricing of earnings, accruals, and cash flows when firms have large book-tax differences. *The Accounting Review*, *80*(1), pp.137-166. doi/pdf/10.2308/accr.**2005**.**80**.**1**.137

Heltzer, W. (2009) Conservatism and book-tax differences. *Journal of Accounting, Auditing and Finance*, *24*(3), pp. 469-504. doi:10.1177/0148558X0902400307

Jenkins, D., Kane, & Velury. U. (2004). The impact of the corporate life-cycle on the value-relevance of disaggregated earnings components**.** *Review of Accounting and Finance*, *3*(4), pp. 5-20. doi: http://dx.doi.org/10.1108/eb043411

Lei n. 11.638, de 28 de dezembro de 2007. (2007, 28 de dezembro). Altera e revoga dispositivos da Lei no 6.404, de 15 de dezembro de 1976, e da Lei no 6.385, de 7 de dezembro de 1976, e estende às sociedades de grande porte disposições relativas à elaboração e divulgação de demonstrações financeiras. *Diário Oficial da União*, seção 1

Lei n. 11.941, de 27 de maio de 2009. (2009, 28 de maio). Altera a legislação tributária federal relativa ao parcelamento ordinário de débitos tributários; concede remissão nos casos em que especifica; institui regime tributário de transição, alterando o Decreto no 70.235, de 6 de março de 1972, as Leis nos 8.212, de 24 de julho de 1991, 8.213, de 24 de julho de 1991, 8.218, de 29 de agosto de 1991, 9.249, de 26 de dezembro de 1995, 9.430, de 27 de dezembro de 1996, 9.469, de 10 de julho de 1997, 9.532, de 10 de dezembro de 1997, 10.426, de 24 de abril de 2002, 10.480, de 2 de julho de 2002, 10.522, de 19 de julho de 2002, 10.887, de 18 de junho de 2004, e 6.404, de 15 de dezembro de 1976, o Decreto-Lei no 1.598, de 26 de dezembro de 1977, e as Leis nos 8.981, de 20 de janeiro de 1995, 10.925, de 23 de julho de 2004, 10.637, de 30 de dezembro de 2002, 10.833, de 29 de dezembro de 2003, 11.116, de 18 de maio de 2005, 11.732, de 30 de junho de 2008, 10.260, de 12 de julho de 2001, 9.873, de 23 de novembro de 1999, 11.171, de 2 de setembro de 2005, 11.345, de 14 de setembro de 2006; prorroga a vigência da Lei no 8.989, de 24 de fevereiro de 1995; revoga dispositivos das Leis nos 8.383, de 30 de dezembro de 1991, e 8.620, de 5 de janeiro de 1993, do Decreto-Lei no 73, de 21 de novembro de 1966, das Leis nos 10.190, de 14 de fevereiro de 2001, 9.718, de 27 de novembro de 1998, e 6.938, de 31 de agosto de 1981, 9.964, de 10 de abril de 2000, e, a partir da instalação do Conselho Administrativo de Recursos Fiscais, os Decretos nos 83.304, de 28 de março de 1979, e 89.892, de 2 de julho de 1984, e o art. 112 da Lei no 11.196, de 21 de novembro de 2005; e dá outras providências. *Diário Oficial da União*, seção 1

Miller, D.; Friesen, P. (1984) A longitudinal study of the corporate life cycle. *Management Science*, *30*(10), pp. 1161-1183. doi: http://dx.doi.org/10.1287/mnsc.30.10.1161

Passamani, R. R.; Martinez, A. L.; Teirxeira, A. J. C. (2012). Book-tax differences e a relevância informacional no mercado de capitais no Brasil. *Anais do Congresso Brasileiro de Contabilidade*, Belém, PA, Brasil, 19.

Porteba, J.M., Rao, N & Seidman, J. (2011). Deferred tax positions and incentives for corporate behavior around corporate tax changes. *National Tax Journal*, *64*, pp. 27-58.

Raedy, J.; Seidman J.; Shackelford, D. (2011). Is there information content in the tax footnote: *Working paper*, University of North Carolina.