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Indicators of Working Capital Management before and after the adoption of the International Accounting Standards in Brazil

Abstract

The issues concerning the adoption of the international standards in Accounting have been frequently discussed, seeking to understand the possible impacts perceived in companies after the enactment of Law No. 11.638 / 2007. In this context, although appropriate working capital management is crucial to the life of organizations, few studies have been conducted. Thus, this study aimed to compare the indicators of working capital management before and after the adoption of the law, these being: Net Working Capital (NWC), Working Capital Requirement (WCR), Cash Balance (CB) and Liquidity Ratio (LR). Therefore, a descriptive study was conducted using document analysis of financial statements with a quantitative approach. The study sample consisted of 35 economic sectors, calculating the indicators of all companies in these sectors for the period from 2004 till 2013, which permitted the comparison of a four-year period before and four years after the adoption of the international standards. In order to identify significant changes in the indicators, we used the nonparametric Mann-Whitney test. The results showed significant changes in the indicators NWC, CB and LR, without significant change in the WCR, which suggests that the financial assets and liabilities have undergone more changes than the operating assets and liabilities.

Key words: Law No. 11.638/07, Working Capital Need, Cash Balance, Liquidity, IFRS.

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1. Introduction

The enactment of Law No. 11.638/2007 in Brazil entailed several changes in the elaboration process of the financial statements, including the recognition, measuring and registering of equity elements. Thus, the adoption of the *International Financial Reporting Standards (*IFRS) caused changes in accounting practice and potentially in financial statements analysis.

Considering the internationalization process, Silva, Mamede, Nogueira and Tavares (2011) affirm that the IFRS standard is being rapidly accepted in different developed markets and that, therefore, it can turn into the only existing accounting language. The authors highlight that, despite the difficulties and the long term, accounting convergence is the way to achieve harmonization towards a global standard.

Accounting harmonization is essential in the financial analysis of companies, as clearer and more understandable information reduces the information asymmetry and contributes to the decision process. It should be highlighted, however, that if the changes are not clear to their users, they can cause difficulties in the interpretation of the financial analysis (Barbosa, Dias & Pinheiro, 2009).

Antunes, Grecco, Formigoni and Mendonça (2012) affirm that the adoption of the international standards entails different reflexes for the accounting practices, affecting the financial information and its analysis. According to the authors, these standards affect the accounting process, and can therefore influence the economic-financial indicators deriving from the financial statements. Therefore, it is fundamental to investigate the consequences for the comparability of the financial statements, with a view to an appropriate interpretation and analysis of the financial statements (Barbosa *et al.,* 2009).

When discussing the issue of the changes that can affect the analysis process of a company's financial statements, the analysis of the financial situation stands out. In that sense, some authors affirm that the finance literature is focused on studies about long-term financial decisions. Nevertheless, they highlight that the short-term elements are relevant with regard to the total assets and need to be analyzed, as they can even affect the profitability of the business (Garcia-Teruel & Martinez-Solano, 2007; Nazir & Afza, 2009; Kasiran, Mohamed & Chin, 2016).

In view of these observations, in this context of convergence, it is relevant to assess the analysis process of the companies' economic and financial situation, with a view to verifying possible changes in the levels of the indicators. Therefore, the managers need to focus on the management of the working capital as, in the search to maximize its profits, the company can end up facing liquidity problems, which can lead to its bankruptcy (Raheman & Nasr, 2007).

In the management of the working capital, the Fleuriet model stands out, proposing a classification for the current asset and liability accounts, according to their financial or operating characteristics. This segregation is fundamental to assess the working capital requirements and the management of short-term resources (Nascimento, Espejo, Voese & Pfitscher, 2012).

In view of the above, the following question is raised: **did indicators of working capital management undergo significant changes after the adoption of the international accounting standards in Brazil?**

Hence, the general objective in this study is to compare the indicators Working Capital Requirement (WCR), Cash Balance (CB), Net Working Capital (NWC) and the Liquidity Ratio (LR_{WCR}) before and after the adoption of the international accounting standards. Therefore, initially, the changes deriving from Law 11.638/2007 were identified, as well as the possible impacts in the indicators of working capital management. Then, the financial statements were analyzed, calculating the indicators for the purpose of comparing the four-year period before and after the publication of that law.

The adoption of the international accounting standards entailed challenges, resulting in a search for greater quality in the financial information. Thus, the research is justified because it identifies the impacts in the companies' working capital management, which can currently be considered fundamental in the economic-financial analysis of enterprises.

Costa, Macedo, Câmara and Batista (2013) affirm that working capital management is evidenced as a means to achieve financial balance, essential for good business performance. Hence, it can be considered a tool that supports the short-term resource management and can favor the profitability of the business (Fonseca & Ceretta, 2012). In the same sense, Vieira (2008) affirms that working capital management is intended to maintain the financial balance of a company. Hence, it is considered that the changes in the investigated indicators can cause financial and economic influences in the business environment.

2. Theoretical Framework

2.1. Working Capital Management

Financial statement analysis permits knowing about the economic and financial situation of a company. Specifically regarding its financial situation, it is emphasized that this should be based on the study of indicators that reflect the decisions related to the working capital and its financial equilibrium (Assaf, 2010).

Hence, the objective of analyzing the financial statements would be to collect information on the economic and financial reality of a company to support decision making. It should be noted that the need and the type of information will vary according to the interests of each user (Martins, Miranda & Diniz, 2014).

Rogers, Rezende, Lemes, Melo and Almeida (2006) argue that the analysis of financial reporting is crucial to collectinformation on the performance and economic-financial situation of the company. However, the authors point out that the results of the companies may differ greatly according to the rules. Thus, the use of some indicators supports the analysis process.

In this sense, the indicators are relevant in the analysis of financial statements, since they contribute to understand the financial health of the entity. In addition, they can be considered as a numerical relationship between accounts, which allows us to understand the relationship between certain elements in the statements, clarifying their analysis (Martins et al., 2014).

Silva, Santos, Hein and Lyra (2012) point out that companies can use two ways to analyze the financial statements in order to evaluate liquidity and working capital. These forms are recognized as traditional analysis and dynamic analysis of working capital. Braga (1991) points out that the working capital management is dynamic and states that the traditional instruments for the analysis of the financial statements provide a static view and, thus, studies emerged with alternative approaches, especially Fleuriet.

The dynamic or advanced analysis of working capital, also known as the Fleuriet Model, aims to consider the dynamism of the business environment, since it presents the reclassification of balance sheet accounts according to the cycle, being cyclic and non-cyclic, or operational and financial (Silva et al., 2012)

For Martins et al. (2014), the net working capital, the working capital requirement and the cash balance indicators are relevant to maintain the balance in the financial situation of the company. Vieira (2008) states that there is yet another indicator (LRWCR) obtained by the ratio between CB and the module of WCR, also relevant for the financial analysis. The formulas to calculate these indicators are displayed in Picture 1.

Index	Formula
Net Working Capital (NWC)	(Net Assets – Net Liabilities)
Working Capital Requirements (WCR)	(Net Operating Assets – Net Operating Liabilities)
Cash Balance (CB)	(Net Financial Assets – Net Financial Liabilities)
Liquidity Ratio (LR_{WCR})	(Cash Balance / |WCR|)

Source: elaborated by the authors based on Martins *et al.* (2014) and Vieira (2008).

Picture 1. Indicators of working capital management

Martins *et al.* (2014) affirm that, if the NWC is positive, there are more applications in the company than funding sources. In the analysis of the NWC, Marques and Braga (1995) affirm that, when this indicator is positive, this means that the long-term origins supplanted the needs for long-term investments and were applied in the company's current assets.

Concerning the Working Capital Requirements, Martins *et al.* (2014) affirm that this indicator demonstrates the part of the operating assets that is not funded by operating liabilities. According to Matarazzo (1997), the WCR is essential not only for the sake of financial analysis, but also to analyze the treasury and funding, growth and profitability strategies. This reveals its importance in the economic-financial analyses of a company.

According to Assaf (2010), the operational deadlines and production and sales levels directly influence the WCR, that is, these variables can modify the investment in working capital. Thus, the WCR can be limited. Therefore, the author affirms that this indicator can be calculated in days of sales, making it less sensitive to changes in the company's activities. Therefore, it is sufficient to calculate the WCR as established in Picture 1, dividing it by the annual net revenues.

The Cash Balance, according to Marques and Braga (1995), can indicate the suitability of the financial policy the administration uses. When this balance is positive, it indicates that there are more resources than short-term debts and, when negative, it can demonstrate difficulties in the organization's financial situation.

Finally, there is the LR_{WCR}. According to Vieira (2008), the more negative this ratio is, the worse the company's financial situation will be. In other words, this ratio indicates the extent to which the CB is sufficient to cover the WCR.

According to Machado, Machado and Callado (2006), the question regarding the financing of working capital has gained ground and is often discussed. The authors state that the management of working capital is relevant and, at the same time, it is a challenge for managers. In accordance with this understanding, Silva et al. (2012) emphasize that the analysis of the company's financial statements, especially concerning working capital management, can support the users' decisions.

For Gill, Biger and Mathur (2010), the management of working capital should be carried out more efficiently, because it can improve the profitability of a company. In the same way, the studies by Garcia-Teruel and Martinez-Solano (2007) and Nazir and Afza (2009) also point to the existence of the relationship between the management of working capital and profitability.

The analysis of the relevance of working capital indicators reveals that changes in these indicators can influence the financial analysis of the company. Thus, in the next topic, it is discussed how the adoption of international standards may have affected the indicators mentioned above and the analysis process of the financial statements.

2.2. The Management of Working Capital and the Changes Resulting from the Adoption of the International Accounting Standards

Based on the current context, in view of the changes after the enactment of Law 11.638/2007, it is relevant to understand what affects the analysis process of the companies' financial statements. In that sense, some studies are presented in which this aspect is discussed (Miranda, 2008; Barbosa *et al.,* 2009; Martins & Paulo, 2010; Silva *et al.,* 2011, Braga, Araújo, Macedo & Corrar, 2011; Cunha, Santos, Hein & Lyra, 2013; Ribeiro, Carlesso, Lemes & Tavares, 2013; Silva, 2014).

Miranda (2008) investigated the possible impacts the use of the international standards causes in the economic-financial indicators of banks from countries in the European Union. The study calculated the indices before and after the adoption of the IFRS for the sake of comparison. Next, the quantitative analysis was elaborated, which appointed that the international standards influence the indicators. The authors affirm that the results demonstrate that the international standards can significantly change the banks' economic-financial indicators.

In the Brazilian context, Barbosa *et al.* (2009) investigated six companies, classified under the corporate governance level of the São Paulo Stock Exchange, which had published their financial statements for 2008 under the Brazilian standards and the IFRS standards. These were: Eternit, Gol, Lupatech, Renar, São Carlos and UOL. The authors found no significant changes in the economic-financial indicators after the adoption of the IFRS, which according to them demonstrates that no information asymmetry exists in those companies.

Also seeking to identify the impact the adoption of the IFRS causes in the performance indicators, Martins and Paul (2010) analyzed 13 companies listed on BM & FBOVESPA, which published their statements between 2007 and 2009, according to the Brazilian standards and also in accordance with IFRS, which are: Ambev, Eternit, Goal Lupatech, Mangels, Positivo, Renner, Romi, Santander, São Carlos, Souza Cruz, TAM and UOL. The authors concluded that the adoption of IFRS has been reflected in the performance analysis of companies through positive changes in indicators of financial dependence, indebtedness, return on assets and return on equity, and negative variations in immobilisation indicators of permanent resources, general liquidity and current liquidity. The results show, however, that these differences between the two standards (BR GAAP and IFRS) have decreased, especially as a result of Brazil's increased convergence with the international standards.

Analyzing the main financial indicators, Silva et al. (2011) sought to identify possible variations caused by the adoption of international standards. The authors investigated 54 companies on BM & FBOVESPA, listed on the Ibovespa index in the first quarter of 2011. The authors found a significant difference only in the debt composition index, and the change resulting from the adoption of the IFRS was positive.

The study by Braga et al. (2011) in 75 companies listed on Bovespa, which republished their statements for 2007, pointed out that some economic and financial indicators, the fixed assets and net income results were similar, except for the debt ratio, which showed a significant change (increase).

Cunha et al. (2013), under the new law, researched on the reflections of the financial indicators, which are: Return on Equity, Return on Assets, Sales Growth, Current Liquidity, Debt Composition, Net Margin and Asset Turnover. These authors analyzed 16 companies in the consumer staples sector, textiles subsector, which had all the statements for the period 2000 to 2008 and concluded that there were no significant changes, i.e. Law 11638 / 2007 did not change these indicators.

Regarding the financial situation of the companies, as a result of the enactment of Law 11638 / 2007, Silva (2014) identified, based on a study in thirty-five economic sectors, an upward trend in current and dry liquidity indicators. The results show that international standards have led to the increase of these indicators.

For Tonetto and Fregonesi (2010), the use of international accounting standards involves significant changes in the recognition and measuring of assets and liabilities. These authors also emphasize that these recognition and measuring changes may change the capital structure of companies.

Considering the studies cited, one can see that the adoption of international standards has led to changes in the indicators used in the analysis process of the financial statements. In this sense, as the relevance of working capital management in this analysis is clearly shown, it is important to pay attention to the aspects that have caused changes that may interfere in the users' decision.

Analyzing the changes introduced by Law 11638 / 2007, Silva (2014) identified the changes that affected the current assets and liabilities accounts, classifying them into three types: changes in the classification of accounts, changes in the criteria for evaluating accounts and changes in the recognition or derecognition of accounts. The author subsequently sought to demonstrate the consequences of these changes in liquidity ratios.

Next, it is demonstrated how the changes introduced by Law 11638 / 07 influenced the indicators of working capital management, considering NWC, WCR and CB. Picture 2 shows these changes.

As noticed, Picture 2 shows the abovementioned changes in the classification of accounts. In addition, the accounts that underwent changes are described, showing the possible impacts on working capital indicators. Therefore, the signals are used "+", "-" and "n / a" are used, which indicate, respectively, that the account can change in a positive or negative sense or not undergo any changes.

Changes	Account	Up to 2007	After adoption of CPCs	NWC	WCR	CB
Account Classifications	Quick assets	1) Bank accounts with negative balance should be classified under current liabilities.	An exception was made for overdraft banking or guaranteed current accounts.	n/a	n/a	n/a
		2) Applications with maturity under 90 days were classified as immediate liquidity.	Items subject to significant value changes (e.g.: foreign currency or commodities) are not classified as quick assets.	n/a	n/a	n/a
	Accounts payable	3) The account "discounted bills", registered as a credit account, reducing the account of receivables.	The account discounted bills is registered under current liabilities.	n/a	n/a	n/a
	Special Assets and Anticipated Expenses	4) Long-term assets kept for sales or related to discontinued operations were not reclassified.	Non-current assets for sales or from discontinued operations are classified as circulating assets.	+/-	n/a	+/–
	Suppliers, tax obligations and other liabilities	5) Dividends payable classified under other liabilities and dividends proposed classified under provisions. These amounts had already been approved in the shareholders' assembly.	Dividends classified under Compulsory Dividends Payable. Only minimum compulsory dividend recognized in bylaws is disclosed. Additional amounts proposed should be registered in specific equity account.	+	n/a	+
	Loans and Funding, Debentures and Other Debt Securities	6) The financial charges account only consisted of interests from loans.	The composition of the financial charges include interests and all additional expenses (and revenues), such as fees, commissions, premiums, etc.).	_	n/a	_
		7) Non compliance with contractual clauses could cause reclassification of all debt to short term, except when agreed with funder.	Non compliance of contractual clauses obliges company to reclassify all debt to current assets. Exception only if agreed with creditor before balance sheet date.	–	n/a	–
		8) Spending on marketing of debentures or promissory notes was registered as anticipated expenses.	The spending on the marketing of debentures or promissory notes are part of effective funding costs and should be registered under financial charges.	+	n/a	+
		9) The premiums for the issuing of debentures or promissory notes were accounted for directly under equity, as a capital reserve.	Premiums for the issuing of debentures or promissory notes are registered as a liability account.	–	n/a	–
	Income Tax and Social Contribution Payable	10) Deferred taxes could be classified as current or long term, for assets as well as liabilities.	Deferred taxes can only be classified under liabilities or non-working assets.	+/–	+/–	n/a

Legend: "+" positive impact; "–" negative impact; "n/a" does not affect the indicator; "+ /–" impact can be positive or negative.

Source: adapted from Silva (2014).

Figure 2. Changes in account classifications and possible impacts on working capital management indicators

Based on Picture 2, one can identify changes in assets and liabilities that can change the working capital indicators, thus highlighting how the international convergence process has affected the analysis process in companies. It is noticed that the changes in the accounts "Cash" and "Accounts Receivable" cannot cause any impact in working capital indicators, as the changes were only reallocations within the same balance sheet groups.

In the other accounts, it should be noted that the adoption of the international standards affected most financial assets and liabilities, therefore changing the NWC and ST. These changes were related to the term, increasing or decreasing the current assets or liabilities, and also related to the reclassification. In the accounts "Special Assets and Prepaid Expenses", Silva (2014) uses the case of non-current assets held for sale, because this is the account that is closest to the group in question. The author adds that the reclassification causes an increase in current assets and liabilities. It is understood, therefore, that the changes may affect the NWC and WCR positively or negatively.

In the group "Suppliers, tax obligations and other liabilities", as defined by the standard, additional dividends are now classified under equity, leading to a reduction in current liabilities, which will positively affect the NWC and CB.

The account "Loans and Funding, Debentures and Other Debt Securities" shows the largest number of changes. Other items are included in the financial charges account, which leads to increased financial liabilities, while the NWC and CB will be affected negatively. In relation to non-compliance with non-contractual terms, there was an increase in current assets, which also influences the NWC and CB indicators negatively. There is still the issue of debentures, which causes a reduction in liabilities positively affecting the NWC and CB indicators. Finally, the debenture premiums cause an increase in current liabilities, negatively influencing the NWC and CB.

Picture 3 shows the changes brought about by the convergence process with international standards in terms of valuation criteria. It can be noticed that significant changes occurred in the evaluation of some accounts, both under assets and liabilities, which, in turn, can affect the working capital indicators and company valuation itself.

Changes	Account	Up to 2007	After adoption of CPCs	NWC	WCR	CB
Evaluation criteria	Accounts receivable	1) Net realizable value.	Valued at net realizable value, but adjusted at present value.	–	–	n/a
		2) Provision for doubtful receivables.	Estimated losses in doubtful receivables.	+	+	n/a
	Financial instruments	3) Valued at purchasing cost or market value, the lowest of both.	Valued at fair value.	+/–	n/a	+/–
	Suppliers, tax obligations and other liabilities	4) Accounts valued at cost.	The balance should be adjusted to present value.	+	+	n/a
	Loans and Funding, Debentures and Other Debt Securities	5) Liabilities registered at value updated to balance sheet date.	Besides the registration at the updated value, the company should adjust the account balance at present value.	+	n/a	+

Legend: "+" positive impact; "-" negative impact; "n/a" does not affect the indicator; "+ /-" impact can be positive or negative.

Source: adapted from Silva (2014).

Picture 3. Changes in valuation criteria and possible impacts in working capital management indicators

The valuation changes resulted in the compulsory use of adjustment to present value, which affects accounting. In the group "accounts receivable", it is necessary to debit the account adjustment to present value, reducing the assets and crediting a financial income account (Iudícibus, Martins, Gelbcke & Santos, 2013). Therefore, this change may adversely affect the CCL and WCR indicators, as there will be a reduction of the asset.

Also in the "Accounts Receivable", in item 2, the international standards show that the account "provision" should no longer be used, adopting the account "estimated loss on doubtful receivables". As stated by Silva (2014), this change means that there is an increase in the account balance, positively affecting the NWC and WCR indicators.

Other changes resulting from the use of adjustments to present value occurred in the accounts "Suppliers, Tax Obligations and Other Liabilities" and "Loans and Funding, Debentures and Other Debt Securities", resulting in a reduction in liability accounts. Thus, in both cases, changes to the NWC, as well as the WCR group "Suppliers" and the CB of the group "Loans".

Also regarding valuation changes, there is the requirement to use fair value, which occurs in the account "Financial Instruments", which can change the NWC and CB both positively and negatively. Thus, as shown in Pictures 2 and 3, there were changes in the classification and valuation of accounts that can affect working capital indicators. It is emphasized that, according to Smith (2014), there were no changes in the (de)recognition of accounts.

According to Gilio (2011), convergence to the accounting standards in Brazil, through the IFRS, caused significant changes in financial accounting, as it presented a conceptual framework that raises the question of the essence over form for the recognition, measuring and disclosure of accounting. It is understood, therefore, that these changes may contribute to the approximation between financial and management accounting.

From the interpretation of Pictures 2 and 3, it is clear that the changes resulting from the adoption of international standards can affect the financial indicators of a company. It is clear, too, that most of the changes show an increase in asset accounts and a reduction in liability accounts, which leads to the inference that, in this aspect, the standards caused a reduction with regard to conservatism in accounting (Silva, 2014).

As shown in the literature, international standards have resulted in significant changes in financial accounting. Therefore, it is understood that these changes will also influence management accounting. The analysis of the financial statements, essential to understand the financial position of an entity, should recognize the consequences of these changes.

3. Methodological Aspects

As to the objectives, the research is classified as descriptive, since sectorial information of Brazilian companies is raised for analysis. The approach is classified as quantitative, which is defined by the use of statistical tools in the process of collecting and analyzing data (Gil, 2006).

Regarding data collection, the financial statements of companies were consulted, classified by sectors available on the website of the Instituto Assaf. The Institute's database consists of Brazilian publicly traded companies whose financial statements are published by the Brazilian Securities Commission (CVM). Document analysis was used for the collection and organization of data. Thus, the research sample was composed of the 35 economic sectors available on the website of the Instituto Assaf, totaling more than 500 companies, covering the period 2004-2013, as described in Picture 4.

Steel	Leisure, Culture and Entertainment
Water and Sewage	Machinery
Food and Beverages	Metals
Car parts	Mining
Shoes	Paper and Pulp
Cement and Aggregates	Perfumery and Cosmetics
General Trade	Basic Chemistry
Transportation Operators	Diversified Chemistry
Civil Construction	Health Services
Natural Crops	Transportation Services
Natural Gas Distributors	Diverse Services
Appliances	Educational Services
Electronics	Telecommunication Services
Electric Energy	Software e-commerce
Oil Extraction	Special Retailing
Railways	Road and Airway Vehicles
Hotel Business	Clothing
Diverse Material Industry	

Source: elaborated by the authors.

Picture 4. Investigated sectors

For the sake of analysis, the sample was divided in two parts: the first refers to a four-year period before the adoption of the international standards, from 2004 till 2007; and the second to four years after the adoption from 2010 till 2013. As observed, the years 2008 and 2009 were not investigated, as that was the transition period, when the international standards were partially adopted.

After collecting the material, the indicators NWC, WCR, CB and LR_{WCR} were calculated, based on the formulae demonstrated in Picture 1 and converted into billing days. Next, these indicators were analyzed, comparing both periods to check for significant differences of means.

Therefore, the *Kolmogorov-Smirnov* test was used to identify the data distribution. The test results demonstrated that the distribution is not normal. Thus, next, Mann-Whitney's non-parametric test was used.

The Mann-Whitney test is a non-parametric test to identify if two independent samples present equal means at a certain level of significance. Thus, posts are attributed to the observations as if they were part of a single sample (Chan, Silva & Martins, 2007). The results are presented in the next topic.

4. Analysis of Results

The study sample consists of 35 economic sectors, as indicated earlier. The indicators NWC, WCR, CB and LR_{WCR} were calculated separately for each sector and each year of study, and their values were displayed in days. To apply the Mann-Whitney test, however, the sample was separated per period, analyzing all sectors as the whole, in the period before and after the adoption of the international standards.

Table 1 displays the means and sum of the indicators in both periods analyzed, according to the Mann-Whitney test, to show some changes.

Table 1

Comparison of means and sum of both periods

Indicators	Period	Mean	Sum
NWC_{days}	before after	125.82 151.90	17237.00 21266.00
WCR_{days}	before after	146.65 131.51	20091.50 18411.50
CB_{days}	before after	113.91 163.55	15606.00 22897.00
$LR_{WCR\ days}$	before after	118.04 159.51	16172.00 22331.00

Source: research data.

The analysis of Table 1 reveals that the indicators NWC, CB and LR_{WCR} showed higher means and sum of posts when comparing the period before and after the adoption of the standards. It is highlighted that the WCR was the only indicator that dropped between the periods.

In Table 2, the differences of means are demonstrated according to the Mann-Whitney test, comparing the periods before and after the adoption of Law 11.638/07, based on a significance level of 0.05. This shows a significant variation in three out of four indicators.

Table 2

Difference of indicators before and after the adoption of the Law

Items	NWC_{days}	WCR_{days}	CB_{days}	$LR_{WCR\ days}$
Mann-Whitney U	7784.000	8541.500	6153.000	6719.000
Wilcoxon W	17237.000	18411.500	15606.000	16172.000
Z	-2.709	-1.573	-5.156	-4.307
Sig. (p-value)	.007	.116	.000	.000

Source: research data.

As can be seen in Table 2, the results of the non-parametric test indicate that the indicators NWC, CB and LR_{WCR} presented significant differences between the period before and after the enactment of Law 11.638 / 2007; while the WCR presented no statistically significant difference. These results are similar to Silva (2014), who investigated the same sectors, finding significant differences in current liquidity indicators and dry liquidity. It is inferred that the changes perceived in these indicators may derive from the same factors that caused the changes in working capital indicators, as both indicators use elements of current assets and liabilities.

When analyzing the differences in the indicators, it appears that the changes in the NWC and CB indicators may be due to changes introduced by Law 11638 / 2007, as presented in the theoretical framework in Pictures 2 and 3, as these could cause an increase or decrease of assets and liabilities and consequently alter those indicators. The existence of positive or negative change in financial indicators was also perceived by Barbosa et al. (2009), in a study of some publicly traded companies.

The WCR indicator, however, showed different behavior. The analysis of Table 1 shows a negative variation in this indicator, but this variation was not significant in statistical terms. This suggests that Law 11.638 / 07 affected the financial assets and liabilities more strongly than the operating assets and liabilities, confirming the data presented in Figures 2 and 3.

The LR_{WCR} is an indicator that can be used to complement the analysis of the company's financial situation. Calculated based on the CB and WCR, the indicator changes significantly, accompanying the behavior of the balance in treasury and corroborating the findings of Silva (2014) with regard to liquidity.

In summary, the results indicate that the economic and financial indicators, in this case working capital indicators, have undergone significant changes after the adoption of Law 11638 / 2007. Similar studies with other indicators also found differences, such as Miranda (2008), Ribeiro et al. (2013) and Silva (2014). However, when adopting the Fleuriet model, this study shows that the detailed analysis of current asset and liability elements can generate more accurate information, since it not only confirms significant changes in terms of business liquidity, but also shows that the change mainly occurred in the financial elements.

5. Final considerations

The analysis process of financial statements is an important activity that supports decision making by users, notably creditors and investors. Thus, changes in accounting procedures deserve attention because they can affect the indices used in the decisions of internal and external users to the company. The adoption of international standards was undoubtedly one of the biggest changes in Brazilian accounting since the enactment of Law 6404 in 1976.

In this context, the objective of this study was to determine whether, after the adoption of international standards, significant changes occurred in working capital indicators, known as the Fleuriet model, i.e. NWC, WCR, LR_{WCR} and CB. Therefore, initially, the main changes introduced by Law 11638 / 2007 were presented that could impact these indicators, followed by an analysis in 35 economic sectors, during the four years before and four years after the changes. It is noteworthy that the study period covers the years 2004-2013, but the years of 2008 and 2009 were not considered as they were considered a transition period.

Consistent with the changes in the accounts that make up the current assets and liabilities, the study results indicate that the indicators NWC, CB and LR_{WCR} showed significant variation between the periods analyzed, being higher after the adoption of the international standards. The WCR indicator did not change significantly. In other words, the detailed analysis of asset elements and liabilities confirms the significant changes in terms of liquidity and also shows that the change occurred mainly in the financial elements.

These findings attest the relevance of detailed analysis of working capital in operational and financial data to show that the changes brought about by the adoption of international accounting standards most strongly influenced the financial items. Thus, by using the statements for decision making, external users should be aware of the changes that have affected the financial elements of current, since such fluctuations can change the indicators, thus affecting the decision-making process.

In general, it appears that the changes resulting from the adoption of international standards may have contributed to the occurrence of these variations. It should be noted, however, that there are also other factors that can contribute to these changes, such as aspects related to the economy or to internal factors of companies.

Thus, this study intended to promote reflection on the impacts of Law 11.638 / 2007 in the management of working capital, given its importance in the analysis of the financial situation of companies. Also noteworthy are the limitations of the study, since the analysis was carried out in the sectors as a whole. Thus, for future studies, the analysis could show differences in each sector separately, since the activities of each company or segment can influence the results of the indicators.

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