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Reflections Of Law 11.638/07 In The Accounting Indicators Of Textile Companies Listed On BM&FBovespa

Abstract

In December 2007, Law 11.638 (2007) was enacted in Brazil, which altered the Corporate Law. This law imposed significant changes, including the adoption of the Brazilian accounting standards in accordance with international standards, which implies different changes in the financial statements. According to this perception of changes in the financial statements, changes can also take place in the accounting indicators used for the purpose of financial statement analysis. In that context, in this paper, the aim is to verify whether Law 11.638 (2007) entailed statistically significant reflections in the accounting indicators. A descriptive study was undertaken with a quantitative approach. Data were collected from the Standardized Financial Statements (SFSs) for the period from 2000 till 2008, available on the website of the Brazilian Securities Commission (CVM). The convenience sample consisted of 16 companies listed on BM&FBovespa, classified in the cyclical consumption sector, in the subsector tissue, clothing and footwear, under the ply and tissue segment, with all SFSs in the period under study. Statistical linear regression techniques were applied based on the Koyck Model and the canonical correlation model. The results showed that a statistically significant canonical correlation exists between the accounting indicators in force before Law 11.638 (2007) and the accounting indicators after the same law came into force. In general, according to the companies analyzed, it is concluded that the accounting indicators underwent no statistically significant alterations as a result of the elaboration of the financial statements in compliance with the premises of Law 11.638 (2007).

Key words: Accounting indicators, Law 11.638 (2007); Canonical correlation; Koyck Model.

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1. Introduction

In December 2007, Law 11.638 (2007) was enacted in Brazil, which changed corporate law. The law imposed significant changes, including the adoption of the Brazilian accounting standards in compliance with the International Financial Reporting Standards (IFRS).

This new law creates conditions for Brazilian accounting standards and practices, applicable to the individual financial statements of joint-stock companies, to converge with international accounting practices (PriceWaterhouseCoopers [PWC], (2008). Law 11.638 (2007) contains several points of convergence with the IFRS, even if they mean neither their immediate adoption, nor complete convergence between Brazilian and international practices, but represent an important step towards the alignment of accounting practices.

In Brazil, with a view to the successful adoption of the IFRS as from 2010, some efforts and measures were taken and are ongoing. In 2005, through CFC Resolution 1.055 (2005), the Federal Accounting Council created the Accounting Pronouncements Committee (CPC). The mission of the CPC is to study, prepare and issue technical pronouncements about accounting issues in the intent to establish Brazilian accounting criteria that converge with international standards. In that sense, different pronouncements have been issued, as highlighted in Figure 1.

CPC	Description	CVM Deliberation	IFRS standard
01	Impairment of assets	611/09	IAS 36
02	The effects of changes in foreign exchange rates and the conversion of financial statements	534/08 and 624/10	IAS 21
03	Statement of cash flows	547/08 and 624/10	IAS 7
04	Intangible assets	553/08	IAS 38
05	Related party disclosures	560/08	IAS 24
06	Leases	554/08	IAS 17
07	Accounting for government grants and disclosure of government assistance	555/08	IAS 20
08	Transaction cost and premiums on the issuing of bonds and securities	556/08	Part 39
09	Statement of value added	557/08	No correspondence
10	Share-based payment	562/08	IFRS 2
11	Insurance contracts	563/08	IFRS 4
12	Adjustment at present value	564/08	Various
13	Initial adoption of law 11.638/07 and Provisional Measure 449/08	565/08	No correspondence
14	Financial instruments: recognition, measurement and disclosure	566/09	Revoked. Corresponds to OCPC 03
15	Business combinations	580/09 and 665/11	IFRS 3
16	Inventories	575/09 and 624/10	IAS 2
17	Construction contracts	576/09	IAS 11
18	Investments in associates	605/09	IAS 28
19	Investment in joint ventures	606/09 and 666/11	IAS 31
20	Borrowing costs	577/09 and 672/11	IAS 23
21	Interim financial reporting	581/09 and 673/11	IAS 34
22	Operating segments	582/09	IFRS 8
23	Accounting policies, changes in accounting estimates and errors	592/09	IAS 8
24	Events after the reporting period	593/09	IAS 10

CPC	Description	CVM Deliberation	IFRS standard
25	Provisions, contingent liabilities and contingent assets	594/09	IAS 37
26	Presentation of financial statements	595/09, 624/10 and 676/11	IAS 1
27	Property, plant and equipment	583/09	IAS 16
28	Investment property	584/09	IAS 40
29	Agriculture	596/09	IAS 41
30	Revenue	597/09	IAS 18
31	Non-current assets held for sale and discontinued operations	598/09	IFRS 5
32	Income taxes	599/09	IAS 12
33	Employee benefits	600/09	IAS 19
35	Separated financial statements	607/09 and 667/11	IAS 27
36	Consolidated financial statements	608/09, 624/10 and 668/11	IAS 27
37	Initial adoption of international accounting standards	609/09	IFRS 1
38	Financial instruments: recognition and measurement	604/09	IAS 39
39	Financial instruments: presentation	604/09	IAS 32
40	Financial instruments: disclosure	604/09	IFRS 7
41	Earnings per share	636/10	IAS 33
43	First-time adoption of CPC technical pronouncements 15 till 40	610/09	IFRS 1
	CPC PME – Accounting for small and medium-sized companies	No correspondence	No correspondence

Figure 1. CPC Pronouncements

Source: Accounting Pronouncements Committee (2010).

The pronouncements and other technical orientations by the CPC can be used either fully or partially, as described in Law 11.638 (2007), by the Brazilian Securities Commission (CVM), the Brazilian Central Bank (Bacen) and other regulatory entities and agencies. In view of previously sanctioned pronouncements towards the convergence with international standards, the financial statements will clearly undergo changes, due to new ways of recognizing, measuring and disclosing assets and liabilities.

One aspect inherent in the financial statements is the premise of comparability. Lage and Weffort (2009, p. 5) highlight that "users should be able to compare an entity's financial statements over time, with a view to identifying trends in its financial position and performance". Lage and Weffort (2009, p. 5) add that "as the users want to compare the financial position, performance and changes in financial position over time, it is important for the financial statements to include corresponding information from earlier periods".

In the same sense of changes in the financial statements, changes can also occur in the accounting indicators used in balance sheet analysis. The aim of balance sheet analysis is to establish an idea about the company's performance over a certain period and to extract information that helps to make projections about an entity's future, in addition to others (Martins, 2005).

For the purpose of balance sheet analysis, different indicators can be used, such as liquidity, indebtedness, profitability and activity (Matarazzo, 1998; Assaf Neto 2002; Gitman, 2005; Iudícibus, 2009; Marion, 2012). Different accounting indicators exist that permit the analysis of balance sheets. Lyra (2008) undertook a study to develop and analysis an instrument for the valuation and comparison of companies' economic-financial performance, based on the association between accounting indicators and analysts' expertise.

To reach the proposed objective, the author elaborated a list of the indicators scored in the yearbook *Melhores e Maiores*, in addition to the indicators resulting from the application of the statistical technique factor analysis and other indicators mentioned in the research bibliography, as important to assess corporate performance. Lyra (2008) selected indicators based on experts' replies through the application of three Delphi rounds, with a view to the establishment of a hierarchical structure among these indica-

tors. The result was the selection and ranking of seven indicators, with an acceptable degree of consensus among the experts' responses, which were: 1) Return on equity; 2) Return on assets; 3) Sales growth; 4) Current liquidity; 5) Indebtedness composition; 6) Net margin and 7) Asset turnover. For the sake of this research, the accounting indicators highlighted in Lyra's research will be used (2008).

In view of the changes in the financial statements as a result of Brazil's convergence with the international accounting standards and the fact that these changes can affect the accounting indicators and, consequently, the balance sheet analysis, the following problem is raised: *Did Law 11.638 (2007) entail statistically significant reflections in the accounting indicators?* Thus, the general objective is to verify whether Law 11.638 (2007) caused statistically significant influences in the accounting indicators.

The paper is structured in five topics, starting with this introduction. Next, a theoretical incursion is made, addressing the aims of financial statement analysis, followed by the explanation of the analysis through indicators and research on the theme. Then, the research method and procedures are described, followed by the description and analysis of the data. Finally, the conclusions of this research are presented.

2. Financial statement analysis

A literature overview reveals that several authors observe the importance of financial statement analysis, also called balance sheet analysis or financial analysis. Matarazzo (1998, p. 17) mentions that "the analysis of balance sheets is aimed at extracting information from the financial statements for the purpose of decision making".

By using the expression "balance sheet analysis", the author is referring to the analysis of the financial statements themselves, including the balance sheet, income statement, cash flow statement etc. The same author highlights that the aim of balance sheet analysis is to produce information. To give an example, the financial statements can disclose that a certain company has R$ Y thousand in debts. The financial analysis shows whether this debt is excessive or normal when compared to the sector, and also informs whether the company can pay it or not (Matarazzo, 1998).

Silva (2005) comments that, with a view to the financial analysis of a company, the information taken from its financial statements is used, as well as any available knowledge on the organization and the segment it is active in, so as to understand and assess aspects related to the company's payment capacity through its cash generation; ability to remunerate investors; making profit at levels that are compatible with their expectations; indebtedness level, reason and quality of indebtedness; operational policies and their impacts on the company's need for working capital and the impact of strategic decisions related to investments and funding.

The financial statement analysis technique is one way to assess the economic-financial performance, aiming to present the company managers with information that is of help in the decision-making process (Bortoluzzi, Lyrio & Ensslin, 2008).

Therefore, as observed, through financial statement analysis, information can be extracted that is relevant for organizational decision making, as it permits inferences about the companies' economic, financial and equity situation.

Martins (2005) provides invaluable instructions on what is necessary to develop a good analysis of the financial statements. First, one needs to know much more about accounting than one can image. Martins (2005) comments that "the number of mistaken conclusions due to lack of knowledge about the accounting foundations used in certain cases is truly noticeable".

Martins (2005) gives a step-by-step description of the procedures needed for an analysis. The first step is the analysis of the audit opinion, in view of the risk of reaching certain conclusions to discover, when reading the opinion at the end, the amount of nonsense concluded and the time lost.

The second step Martins (2005, p. 6) proposes is to "get to know the company's business and the accounting foundations it uses". The author highlights that, if one does not know how the business works

in a company and/or what accounting rules are applicable to this organization, one should not analyze its statements. Before analyzing a given company's statements, it is fundamental to know the business and the accounting criteria it uses.

The third step is that any analysis boils down to two main objectives: to know companies' liquidity and profitability. The aim of liquidity is to verify the company's ability to honor its financial commitments to all of its creditors. Liquidity can be analyzed in the short, medium, long term etc. Profitability analysis, on the other hand, is aimed at verifying whether the company effectively remunerates the capital it uses, mainly its own capital (Martins, 2005b).

Martins (2005b) alerts to the fact that both the inability to remunerate the company's own capital and to settle its obligations can put an end to an organization. The author highlights that other indicators are considered in the financial analysis, but that these are all secondary instruments that help to check liquidity and profitability. The fourth step proposed in financial analysis is to take special care with problems concerning the relations among magnitudes and certain "embellishing" operations".

To assess different company aspects, some forms of analysis instruments exist, including: horizontal analysis, vertical analysis, indicator-based analysis, dynamic analysis of working capital, bankruptcy forecasting models, among others. The literature review reveals authors who adopt the terminology balance-sheet or financial indices (Matarazzo, 1998; Gitman, 2005; Silva, 2007; Souza, 2007; Guth, Pinto, Fernandes & Rocha, 2008; Marion 2012), quotients (Souza, 2007; Iudícibus, 2009); Marion, 2012); economic-financial indicators (Assaf Neto, 2002) and accounting indicators (Lyra, 2008) when mentioning indicator-based balance sheet analysis.

In this study, the terminology accounting indicators is used. When citing different authors, however, the terminologies mentioned above can be used to maintain the original citation.

2.1 Analysis based on accounting indicators

The analysis based on accounting indicators includes the calculation of proportions that relate various amounts expressed in the financial statements. According to Silva (2005), the analysis based on indices is the best known, and is even mixed up with balance sheet analysis. That author states that indicators are relations between accounts or account groups in the financial statements, which are aimed at providing information that is not easy to observe directly in the statements.

Matarazzo (1998) mentions that the indices are the most used analysis technique in which, often, in practice or even in some books, balance sheet analysis is mixed up with the extraction of indices. The essential characteristic of indices is to provide a comprehensive view of the company's economic or financial situation.

According to Souza (2007, p. 56), "indices or quotients facilitate the analyst's work, making it easier and more relevant to value certain relations or percentages than amounts only".

Lyra (2008, p.34) mentions that "the aim of accounting indicators is to measure, compare and project economic, financial or equity performances. The indicators selected need to characterize the corporate situations under analysis though".

The basic aspects the indicators should contain are: objectivity, measurability, understandability and comparability. Objectivity permits their assessment. The measurability aspect means that the indicators need to be quantifiable on a certain scale. Concerning the understandability criterion, the indicators need to have an understandable meaning. In addition, comparisons should be possible over time as well as among companies (Lyra, 2008).

There is no exact or ideal quantity of indices to use in financial statement analysis. According to Matarazzo (1998) "what is important is not to calculate a large number of indices, but a set of indices that permits knowing the company's situation according to the desired level of depth in the analysis". The author also highlights that "the analysis of indices belongs to the kind that starts very will and gradually runs out of steam as new indices are added, that is, its output decreases".

Iudícibus (1998) agrees with Matarazzo, informing that it is much more useful to consistently calculate a certain quantity of indicators, from period to period, and to compare them with pre-established standards, and then verify what problems deserve further investigation, than to calculate tens and tens of indicators, without any mutual correlation, without comparisons, and to intend to attribute an absolute focus and meaning to those indicators.

Therefore, the adoption of different indicators does not mean a more sophisticated or better analysis. On the opposite, it can even be harmful. How many indices to use essentially depends on the information the analyst wants to obtain from the company.

As regards the group of financial indices, Guth, Pinto, Fernandes and Rocha (2008) undertook a literature review and found that, although the different authors share some points, it was verified that some differences exist in their groupings, as illustrated in Figure 2:

Groups of Financial Indicatores	Assaf Neto	Brigham e Houston	Gitman	Iudícibus	Marion	Matarazzo
Activity	X	X	X	X	X	X
Stock analysis	X		X			
Indebtedness/Capital structure	X	X	X	X	X	X
Liquidity	X	X	X	X	X	X
Profitability	X	X	X	X	X	X
Market value		X	X			

Figure 2. Group of financial indicators

Source: Guth, Pinto, Fernandes and Rocha (2008).

The liquidity indicators reveal the organization's degree of solvency as a result of the existence or not of financial solidity to guarantee the payment of the commitments assumed with third parties in the long, short or immediate term (Souza, 2007). Silva (2005) mentions that liquidity indices are aimed at strengthening the company's ability to pay its debts, based on the comparison between rights and liabilities. The following liquidity indicators are known in the literature: general liquidity, current liquidity, quick ratio and immediate liquidity. The main criticism against these indices is that they give a static picture of the company's situation, without any details on the settlement dates for receivables and payables. According to Assaf Neto (2002), the aim of the liquidity indicators is to get to know the organization's ability to comply with its liabilities on time. As the main constraint, however, the author highlights the fact that the organization is presented in a static position, which does not reflect the magnitude of the different currents inflows and outflows.

Concerning the indebtedness rates or capital structure, the proportion of own or third-party resources the organization maintains can be detected. Guth, Pinto, Fernandes and Rocha (2008) mention "it is through these indicators that the company's level of indebtedness is valued, that is, these indicators inform whether the company makes more use of resources from third parties or the owners. The indicators that belong to this group are: general indebtedness, interest of capital from third parties, indebtedness composition, index of immobilized equity, immobilized fixed assets, immobilized non-current resources and interest coverage index (Lyra, 2008).

The profitability indices serve to measure the company's economic capacity, that is, they disclose the degree of economic success the capital invested in the company obtains. They are calculated based on values taken from the income statement and balance sheet (Souza, 2007). These indices show the return on the capital invested. The main indicators used to verify company profitability are: return on equity, return on assets, gross margin, net margin and asset turnover.

The activity indices measure how efficiently the organization uses its assets, as they are directly related to the operating cycle by calculating the stock turnover and the trade notes receivable and payable (Sato, 2007).

It is highlighted that, in this research, the authors do not intend to detail each index, as they have already been explained more than appropriately in the literature. The authors emphasize, however, that they are studied in plenty of academic research, mainly using statistical tools or relating them with a new theme. In this study, statistically significant reflections were found in the accounting indicators after the enactment of Law 11.638 (2007).

2.2 Impact of the international accounting standards on the accounting indicators

On December 28th 2007, Law 11.638 was enacted, which altered, revoked and introduced new determinations into Corporate Law, mainly in chapter XV, about accounting matters, which came into force as from 01/01/2008. The main aim of this Law was to update Brazilian financial legislation to permit the convergence process of the accounting standards adopted in Brazil with the International Financial Reporting Standards (IFRS); and to allow the Brazilian Securities Commission (CVM0 to issue new accounting standards and procedures in accordance with the international accounting standards (Iudícibus, Martins & Gelbcke, 2008).

Law 11.638 (2007) entailed important changes in the accounting standards, including modifications in the following aspects: in the compulsory financial statements, in bookkeeping, in the equity account group and its valuation criteria, in the structure of the Income Statement (DRE), in the replacement of the Statement of Changes in Financial Position (DOAR) by the Cash-Flow Statement (DFC), in the inclusion of the Statement of Value Added (DVA), in the constitution and treatment of reserves, in transformations, incorporations, mergers and split-ups and their accounting registers, in the valuation of investments in associated and controlled companies and their accounting treatment (Sothe & Cunha, 2008).

In this study, a statistically significant impact is verified in a group of accounting indicators for 2008 (start of the alterations) when compared to the same group of indicators between 2000 and 2007. In Figure 3, the main legal changes introduced in 2008 are summarized, which can influence the accounting indicators:

Changed Accounting Practices		Effects In Consolidated Financial Statements	
		Balance Sheet	Income Statement
Adjustment at present value (CPC 12)	Relevant current and long-term assets are registered at their present value on the transaction date, using the contracted or implicit rate.	↓ Relevant current assets Relevant current liabilities Long-term assets Long-term liabilities	↑ Financial revenues Financial expenses ↓ Gross revenue Operational costs and expenses
Leases (CPC 06)	In the lessee, the leased good needs to be classified as a Fixed Asset at the present value of the minimum installments of the financial leasing, adjusted by the accumulated depreciation, and the obligation of its payment needs to be registered under liabilities at the present value of outstanding installments.	↑ Fixed assets Financial debt (Liability)	↑ Depreciation costs and expenses ↓ Rent costs and expenses
	In the lessor, the Fixed Asset cost of the leased good and the respective accumulated depreciation need to be written off and the right to receive needs to be registered as a Long-term Asset (Accounts receivable) at the present value of outstanding installments. The revenue has to be recognized on the transaction date and registered at its present value, while the interests need to be recognized during the contract term.	↑ Accounts receivable ↓ Fixed assets	↑ Gross revenue ↓ Depreciation costs and expenses
Transaction cost and premiums on the issuing of bonds and securities (CPC 08)	Transaction costs became registered in an account that reduces the account where the funding was registered (Liabilities or Equity) and the debt securities are accounted for at the net value of the transaction. The transaction costs, premiums and others start to be disclosed on an accrual basis.	↓ Financial debt (Liability) Equity	↓ Financial expenses
Accounting for government grants and disclosure of government assistance (CPC 07)	Government grants and assistance started to be disclosed directly in the income on an accrual basis, which used to be registered as a Capital Reserve. They can be excluded from the calculation base of compulsory dividends and destined to the Profit Reserves, in the Fiscal Incentive Reserve.	↑ Fiscal incentive reserves (Profit reserves) ↓ Capital reserves	↓ Deductions from gross revenue Cost of products or goods sold Income tax and social contribution
Asset revaluation	Law 11.638/07 prohibited the spontaneous revaluation of assets.	↓ Fixed assets Revaluation reserves	↓ Depreciation costs and expenses
Deferred Assets	Law 11.941/09 (MP 449/08) extinguished the Deferred Assets account.	↓ Deferred assets Accumulated profit	↓ Amortization expenses ↑ Operational costs and expenses
Intangible Assets (CPC 04)	Intangible Assets were created to classify identifiable non-monetary assets without physical substance, such as brands and patents, software, copyrights, internally created goodwill and goodwill paid upon expected future profitability.	↑ Intangible assets	↑ Amortization expenses

Legenda: ↑ Represents an increase in the respective account ↓ Represents a reduction in the respective account.

Figure 3. Summary of effects on the financial statements resulting from specific changes in Brazilian accounting practices

Source: Adapted from Carvalho (2010).

Figure 3 demonstrates how the new accounting practices adopted can affect accounting, in groups like assets, liabilities, revenues and expenses. For some changes, however, it cannot be determined whether their adoption will result in an increase or decrease, as this depends on the scenario the company is inserted in, as observed in Figure 4.

Changed Accounting Practices		Effects In Consolidated Financial Statements	
		Balance Sheet	Income Statement
Equity Accounting	Financial investments are valued based on equity accounting when the management of the controlling stockholder exerts significant influence in the investee's decisions, even without controlling it, or when it holds an interest of 20% or more in the voting capital of its associated or controlled companies or which are part of a same group or under common control.	△ Assets △ Liabilities △ Net equity	△ Net income
Effects of changes in foreign exchange rates and conversion of financial statements (CPC 02)	The functional currency of foreign subsidiaries of Brazilian companies is the Real, except when these subsidiaries essentially represent autonomous units. The balances of monetary equity accounts are still converted at the final rate of the period, while the balances of non-monetary equity accounts and transactions that affect the income are converted at the exchange rate on the transaction date.	△ Assets △ Liabilities △ Adjustments to equity valuation	△ Financial income △ Net income
Financial instruments (CPC 14)	New criteria were established for the valuation of financial statements, which are now classified under short and long-term assets and liabilities and distributed in three categories:: (i) held for trade, which should be valued at their fair value and registered in the income; (ii) held until maturity, which should be registered at their purchase cost or emission value plus yield adjusted at their probable realization value, plus effective interest rates; and (iii) available for sale, which should be valued at fair value, but the difference between the fair value and book value has to be registered in the adjustments to equity valuation account.	△ Assets △ Liabilities △ Adjustments to equity valuation	△ Financial income
Share-based payment (CPC 10)	Stock-based remuneration is recognized as an expense or interest when settled with equity instruments (e.g. stock or stock options) or in cash, measured at fair value, at the moment it is granted, against the Equity account Stock or Options Granted.	△ Stock or options granted (Capital reserve)	△ Other operational revenues and expenses

Legend: △ Represents an undefined variation in the respective account, which can be an increase or a reduction, depending on the context the company is inserted in.

Figure 4. Summary of probable effects in financial statements deriving from specific changes in Brazilian accounting practices

Source: Adapted from Carvalho (2010).

Figure 4 presents the Brazilian accounting practices that were altered, although their recognition and measurement influences in the balance sheet and income statement cannot be determined.

The changes in Brazilian accounting practices derive from the convergence process with international accounting standards, aiming to eliminate the divergences that cause a lack of comparability between the financial statements. In this search for convergence, existing differences in accounting practices can result in changes in accounting indicator values, as a result of changes in the recognition or valuation of assets, liabilities and income.

2.3 Earlier studies

Figure 5 displays studies about the impact of the adoption of international accounting standards on accounting indicators.

Authors	Theme addressed and results
Miranda (2008)	Identified possible impacts of the adoption of the IFRS (International Financial Reporting Standards) on the economic-financial indicators of banks in some countries in the European Union. The results showed that the IFRS affected half of the indicators tested for banks in the United Kingdom and Spain, and only one indicator calculated for banks in France. The main international standards that affected the indicators tested in the research were: IAS 27, IAS 32, IAS 39 and IFRS 4. The author concluded that the adoption of the IFRS was capable of provoking significant changes in the economic-financial indicators of banks in some countries in the European Union.
Beuren, Hein & Klann (2008)	Analyzed the impact of the differences between IFRS and the Generally Accepted Accounting Principles in the United States (US GAAP) on the economic-financial indicators of British companies. The study involved 37 British companies whose American Depositary Receipts (ADRs) are traded on the New York Stock Exchange (NYSE). The financial statements for 2005 were used which were sent to the London Stock Exchange and the NYSE. The research results identified percentage differences in the British companies' indicators, calculated based on the financial statements sent to LSE and NYSE. The regression and correlational analysis, however, indicated a significant correlation between these indicators' differences. Thus, it was concluded that the indicators are not significantly affected by the differences in accounting standards (IFRS and US GAAP).
Barbosa Neto, Dias & Pinheiro (2009)	Analyzed the impact of the presentation of financial statement according to the IFRS on the economic-financial indicators of Brazilian publicly traded companies. Through a descriptive research with a quantitative approach, the authors checked whether a correlation exists between the indicators calculated based on the financial statements elaborated according to the Brazilian standards and the IFRS. The results showed differences between the indicators calculated based on the financial statements elaborated according to each accounting standard. It was observed, however, that the influence of existing differences between the Brazilian and international standards on the economic-financial indicators is not statistically significant.
Carvalho; Ponte; Coelho & Luca, (2011)	Investigated whether the adopted of the accounting practices altered by the enactment of Law 11.638/2007 affected Brazilian companies' economic-financial indicators. Indicators were investigated related to the capital structure, working capital management, liquidity, profitability and market value. The results showed statistically significant changes in the interest of third parties in companies' capital, index of immobilized liquid assets and quick ratio. In a sectorial analysis, the authors observed changes in the behavior of indicators from companies in the construction and engineering, iron and steel, textile, electric and other sectors. They also found that no statistically significant alterations were observed in the indicators management of working capital, profitability and market value.
Braga; Araujo; Macedo & Corrar (2011)	Compared economic-financial indicators of Brazilian publicly-traded companies listed on Bovespa, considering statements for 2007 elaborated based on the "former" and "new" accounting practices adopted in Brazil. Thus, they verified whether statistically significant differences exist in the economic-financial indicators when the convergence with international standards was implemented. The study results showed significant changes (increases) in the indebtedness ratio only when the financial statements for 2007 were represented according to the new accounting practices adopted in Brazil.
Ribeiro (2011)	Investigated companies' adoption of the IFRS (International Financial Reporting Standards) and its possible impacts on the organizational and accounting context. This result was evidenced through the academic and professional perspective of faculty members at FAP and UFPI in Parnaíba/PI, using the BSC (financial and non-financial indicators) as a support and analysis model for the research. The study results showed that, according to the participants' perspective, the companies' (joint-stock companies) adoption of the IFRS strongly affects the corporate/accounting context and all financial and non-financial indicators addressed in the research.

Figure 5. Earlier studies on the impact of the adoption of the international accounting standards on accounting indicators

Source: elaborated by the authors.

As observed, these studies about the impact of the adoption of international accounting standards on the accounting indicators display conflicting results. While some showed statistically significant modifications, others did not. Therefore, the researchers hope this study will contribute to a better understanding about the theme.

3. Research method and techniques

A descriptive research with a quantitative approach was undertaken. Descriptive studies observe, register, analyze and correlate facts or phenomena (variables) without manipulating them. The intent is to discover, as precisely as possible, how frequently the phenomenon occurs, as well as its relation and connection with others and its nature and characteristics (Cervo & Bervian, 2003). In that sense, this research attempts to describe whether a statistically significant impact exists in a group of accounting indicators for 2008 when compared to the some group of indicators between 2000 and 2007.

The approach of the problem was quantitative, characterized by the use of quantification in information collection and treatment through statistical techniques, ranging from the most simple, such as percentages, means and standard deviations, to the most complex, such as correlation coefficients, regression analysis etc. (Richardson, 1989).

Concerning the data collection procedures used, a documentary research was chosen, based on the financial statements for the period from 2000 to 2008, available on the CVM website. Gil (2002) highlights that a documentary research is based on materials that were not subject to any previous analytic treatment or that can be re-elaborated in function of the research objectives.

The research population consists of the 20 companies listed on BM&FBovespa, classified in the cyclical consumption sector, in the subsector tissue, clothing and footwear, under the ply and tissue segment, consulted on May 20th 2009. A convenience sample was obtained, considering those companies whose Standardized Financial Statements (SFSs) for the period from 2000 to 2008 were available on the CVM website. Hence, the financial sample included 16 companies, described in Figure 6.

	Selected Companies
1	Buettner S.A. Ind. e Comércio
2	Cia. Ind. Schlosser S.A.
3	Dohler S.A.
4	Fábrica de Tecidos Carlos Renaux S.A.
5	Karsten S.A.
6	Teka Tecelagem Kuehnrich S.A.
7	Têxtil Renauxview S.A.
8	Cia. Fiação Tecidos Cedro Cachoeira
9	Cia. Tecidos Norte de Minas Coteminas
10	Empresa Nacional com Redito Participações S.A. Encorpar
11	Fiação Tec. São José S.A.
12	Cia. Industrial Cataguases
13	Cia. Tecidos Santanense
14	Tecblu Tecelagem Blumenau S.A.
15	Vicunha Têxtil S.A.
16	Wembley Sociedade Anônima

Figure 6. Selected Companies

Source: website BM&FBovespa (2009).

After establishing the sample, the companies' financial statements were downloaded in an Excel worksheet to calculate the accounting indicators defined by Lyra (2008), as demonstrated in Figure 7.

Indicator	Definition
Return on equity (ROE)	Result of dividing net profit by net equity.
Return on Assets (ROA)	Result of dividing operational profit before financial expenses by operational assets.
Sales growth (SG)	Evolution in gross revenues from sales.
Current liquidity (CL)	Current assets divided by current liabilities.
Indebtedness composition (IC)	Division of current liabilities by sum of current liabilities and long-term liabilities.
Net margin (NM)	Net profit divided by gross revenues from sales.
Asset turnover (AT)	Gross revenues from sales divided by total assets.

Figure 7. Definition of accounting indicators

Source: adapted from Lyra (2008).

Next, the seven indicators were calculated for the 16 sample companies, according to definitions displayed in Figure 7. After the calculations, it was verified whether any company possessed a negative equity. In these cases, to calculate the return on equity, total equity was replaced by the total subscribed capital stock.

After calculating the indicators, the bivariate linear equation from the Koyck model was applied to forecast the indicators, as described by Franses (2004), using the following equation (1).

$$\hat{Y}(t) = aX_{(t)} + b\Delta Y_{(t)} + c \quad (1)$$

In Koyck's model, the response of the dependent variable ($\hat{Y}$), which is the estimated accounting indicator for period t, occurs in function of the independent variables (X_t), i.e. the year and $\Delta Y_{(t)}$, which corresponds to the variation in the accounting indicator between period t and t-1. Through the Koyck model, the effect of these variables is distributed across different periods, considered the differentiation over time. Pineda (1999) describes the Koyck model as a bivariate linear regression that permits estimating economic results in a period based on the results reached in earlier periods and also considers the time period covered in the forecast. Thus, for each indicator described in Figure 7, equation 1 was calculated.

After calculating and processing the real indicators (obtained from the amounts taken from the financial statements) and those based on the Koyck model (through the application of equation 1), the null hypothesis (H_0) and an alternative (H_1) were established, tested through statistical analyses, as follows:

H_0: No statistically significant canonical correlation exists between the accounting indicators calculated before Law 11.638 (2007) and the accounting indicators calculated after Law 11.638 (2007) was enacted.

H_1: A statistically significant canonical correlation exists between the accounting indicators calculated before Law 11.638 (2007) and the accounting indicators calculated after Law 11.638 (2007) was enacted.

In case of evidence to accept H_0 (or lack of statistical evidence to reject H_0), it will be concluded that the accounting indicators underwent changes as a result of Law 11.638 (2007). If H_0 is rejected, one can infer that the accounting indicators did not change as a result of the elaboration of the financial statements in compliance with the premises of Law 11.638 (2007).

The analysis of canonical correlations was proposed by Hotelling (Mingoti, 2005) and its main aim is to "study existing linear relations between two sets of variables" (Mingoti, 2005, p. 143). The technique basically summarizes the information from each set of response variables in linear combinations. The choice of the coefficients in these combinations is based on the criterion of maximizing the correlation between the sets of response variables. These linear combinations built are called canonical variables, while the correlation between them is called canonical correlation. This correlation measures the degree of association that exists between two sets of variables, in this case the indicators mentioned for the textile companies. In mathematical terms, one might say that the regression is a generalization of the multiple linear regression, or a particular case of the first (Mingoti, 2005).

The two sets of variables are the seven real accounting indicators of the 16 companies for 2008 and the seven accounting indicators of the 16 companies for 2008 found through Koyck's model, both shown in Tables 2 and 3 in the data analysis topic.

Matrices $X_{16\times7}$ and $Y_{16\times7}$ illustrate the table of the 16 companies and their seven respective accounting indicators. The intent is to establish the relation:

$$a_1x_1 + a_2x_2 + a_3x_3 \ldots + a_7x_7 = b_1y_1 + b_2y_2 + b_3y_3 + \ldots + b_7y_7$$

Formally, the first pair of canonical variables is defined as the pair $U_1 = a_1x_1 + a_2x_2 + \ldots a_mx_m$ and $V_1 = b_1y_1 + b_2y_2 + \ldots + b_ny_n$ (in this case m = n = 7), in which a = [a_1, a_2, ..., a_m] and b = [b_1, b_2, ..., b_n] are vectors of constants, respectively chosen for a maximum correlation between variables U_1 and V_1 and a variance for these two variables equal to 1, that is: var(U_1) = Var(V_1) = 1. The same is true for U_2 and V_2, U_3 e V_3, ...V_k and U_k, k = 1,2,..., min(m,n).

To obtain vectors a_k and b_k, according to the literature (Seber, 1984), the following linear system should be solved:

$$\begin{cases} \left(\Sigma_{XY}\Sigma_{YY}^{-1}\Sigma_{YX} - \lambda_k\Sigma_{XX}\right)a_k = 0 \\ \left(\Sigma_{YX}\Sigma_{xx}^{-1}\Sigma_{xy} - \lambda_k\Sigma_{YY}\right)b_k = 0 \end{cases}$$

where Σ_{XX} is the variance matrix of X, Σ_{YY} the variance matrix of Y, Σ_{XY} and Σ_{YX} the covariance matrices and λ_k the k-eth highest eigenvalue of the matrix $\Sigma_{XX}^{-1}\Sigma_{XY}\Sigma_{YY}^{-1}\Sigma_{YX}$.

In this study, only U_1 and V_1 will be analyzed for each case, as these can also be interpreted as global performance indices. The other latencies will also be discussed.

The, the canonical correlations between the two sets were calculated, using Statgraphics software.

4. Description and data analysis

Initially, in Table 1, the calculation for the return on equity (ROE) indicator is demonstrated in the company Buettner. For the other indicators in the other companies, the same steps are followed. The first step was to calculate the indicator in view of a one-year time difference.

Table 1

Calculation of Buettner's ROE with one-year time difference

Ano	ROE	$\Delta ROE = ROE_t - ROE_{t-1}$
2000	0.06	–
2001	0.30	0.24
2002	(0.25)	(0.55)
2003	(2.91)	(2.66)
2004	(0.25)	2.66
2005	(1.09)	(0.84)
2006	(0.66)	0.43
2007	(0.45)	0.21
2008	(0.39)	0.06

Source: Research data.

The ROEp for the company Buettner in 2001 was calculated by discounting the ROE for 2000 (0.06) from the ROE for 2001 (0.30), resulting in an index of 0.24, and repeating the same step for the other years. After calculating this time difference, the year 2000 was removed from the database for the subsequent calculations.

After calculating the ΔROE in view of a one-year time difference, as proposed in equation 1, the regression was calculated using SPSS version 11.5. This resulted in the estimated indicator for 2008, in comparison with the real indicator that was calculated based on the SFSs, as demonstrated in Tables 2 and 3.

Table 2

Accounting indicators (ROE, ROA, SG and CL): real x expected according to Koyck's model

	ROE		ROA		SG		CL	
	Real	Koyck	Real	Koyck	Real	Koyck	Real	Koyck
Buettner	(0.39)	(0.82)	0.00	0.01	0.08	(0.01)	0.22	0.31
Dohler	0.03	0.01	–	(0.03)	0.06	0.00	5.11	5.01
Karsten	(0.85)	(0.79)	0.08	0.03	0.20	0.14	(1.53)	1.36
Renaux	(13.23)	(13.45)	(0.05)	(0.08)	0.23	0.12	0.29	0.32
Renauxview	(57.53)	(71.79)	–	(0.10)	0.15	(0.01)	0.22	0.13
Schlosser	(0.96)	(0.33)	(0.06)	(0.09)	0.45	0.37	0.13	0.12
Teka	(12.59)	(25.56)	(0.04)	(0.09)	0.03	(0.12)	0.11	(0.00)
Cedro	0.09	0.13	0.09	0.13	0.04	0.03	1.51	0.44
Coteminas	0.04	0.01	0.02	0.02	0.25	(0.21)	2.19	2.09
Encorpar	0.08	0.09	0.03	–	0.29	0.39	0.26	2.54
Fiação São José	(0.56)	(0.53)	(0.18)	(0.23)	0.32	(0.46)	0.17	0.16
Santanense	0.19	0.19	0.17	0.15	0.13	0.13	2.97	2.47
Tec. Blumenau	(1.21)	(0.61)	0.43	(0.44)	(0.57)	(0.84)	0.16	0.21
Vicunha	(0.59)	(0.53)	(0.01)	0.01	(0.08)	(0.07)	1.79	1.45
Wembley	0.06	0.06	0.02	0.02	0.24	(0.21)	2.12	2.08
Cataguases	0.1183	0.09	0.06	0.06	0.06	0.09	1.84	2.50

Source: Research data.

Table 3
Accounting indicators (IC, NM and AT): real x expected according to Koyck's model

	IC		NM		AT	
	Real	Koyck	Real	Koyck	Real	Koyck
Buettner	0.64	0.65	(0.07)	(0.08)	1.00	1.07
Dohler	0.62	0.68	0.03	0.01	0.77	0.82
Karsten	0.72	0.66	(0.11)	(0.10)	1.23	1.31
Renaux	0.45	0.34	(0.31)	(0.35)	0.79	0.55
Renauxview	0.66	0.54	(0.38)	(0.53)	1.20	1.22
Schlosser	0.56	0.58	(0.34)	(0.38)	2.66	2.64
Teka	0.63	0.62	0.47	0.31	0.86	0.65
Cedro	0.54	0.57	0.03	0.05	1.31	1.35
Coteminas	0.60	0.59	–	–	1.50	1.01
Encorpar	0.85	0.83	1.52	1.95	0.04	0.04
Fiação São José	0.98	0.98	(0.52)	(0.65)	0.43	0.52
Santanense	0.52	0.69	0.10	0.10	1.42	1.40
Tec. Blumenau	0.01	0.01	(229.79)	(229.98)	0.01	0.01
Vicunha	0.32	0.38	(0.17)	(0.14)	0.93	0.92
Wembley	0.27	0.26	0.00	0.01	0.90	0.96
Cataguases	0.56	0.45	0.07	0.05	0.89	0.84

Source: Research data.

By applying the statistical software Statgraphics for the two groups of variables used, seven linear combinations were found, as displayed in Table 4.

Table 4
Canonical correlation result

Number	Eigenvalue	Canonical Correlation	Wilks Lambda	Chi-Squared	D.F.	P-Value
1	1.0	1.0	1.15578E-14			
2	0.990107	0.995041	1.84845E-7	116.278	36	0.0000
3	0.987701	0.993831	0.0000186844	81.6587	25	0.0000
4	0.955005	0.977243	0.00151917	48.6719	16	0.0000
5	0.88463	0.940548	0.0337629	25.4129	9	0.0025
6	0.660035	0.812426	0.29265	9.21583	4	0.0559
7	0.139175	0.373061	0.860825	1.12398	1	0.2891

Source: Research data.

As verified in Table 4, the two sets of variables used resulted in seven linear combinations, the first six of which showed high mutual correlations. Until the fifth combination, the degrees of correlation exceeded 94%, with the first combination showing 100% of correlation, and the second and third 99% of correlation. In combination 6, the correlation dropped to 81%, although this is still considered high. Combination 7 showed a low correlation, corresponding to 37%.

Table 5 presents the canonical correlation equations for the seven combinations found.

Table 5
Canonical correlation equations

Number	Equations	Canonical Correlation
1	**Real** = 0.000534536*ROE - 0.0134607*ROA + 0.00263673*CV - 0.00285912*LC - 0.00434953*CE + 0.990478*ML - 0.000508811*GA **Expected** = 0.00316623*ROEp - 0.0138509*ROAp - 0.00158045*CVp - 0.00322264*LCp - 0.00463157*CEp + 1.01508*MLp + 0.00100769*GAp	100.0%
2	**Real** = 0.876291*ROE – 0.705932*ROA + 0.194671*CV – 0.0206343*LC + 0.105737*CE - 0.633973*ML – 0.226424*GA **Expected** = 1.02054*ROEp – 0.740113*ROAp - 0.0159493*CVp - 0.0939046*LCp + 0.0921921*CEp + 0.716697*MLp – 0.226222*GAp	99.5%
3	**Real** = 0.275715*ROE + 1.40486*ROA -0.07169*CV + 0.324349*LC + 0.38908*CE - 0.983306*ML – 0.153947*GA **Expected** = -0.0365652*ROEp + 1.311106*ROAp - 0.0311832*CVp + 0.354098*LCp + 0.437661*CEp -1.26999*MLp – 0.118435*GAp	99.3%
4	**Real** = 0.39444*ROE - 0.0273634*ROA + 0.0280766*CV – 0.252504*LC – 0.808002*CE + 0.282416*ML + 0.628568*GA **Expected** = 0.494305*ROEp + 0.0776642*ROAp + 0.00266285*CVp – 0.195509*LCp – 0.701772*CEp + 0.204449*MLp + 0.649727*GAp	97.7%
5	**Real** = -0.0330649*ROE – 0.121089*ROA + 0.131269*CV – 0.202248*LC – 1.28723*CE + 1.06514*ML – 0.968699*GA **Expected** = 0.131253*ROEp + 0.0169383*ROAp -0.0157069*CVp – 0.0931283*LCp – 1.05364*CEp + 1.03279*MLp – 0.824392*GAp	94.0%
6	**Real** = -0.250934*ROE – 0.72374*ROA + 0.368217*CV + 1.08224*LC – 0.059177*CE – 1.0982*ML + 0.144382*GA **Expected** = -0.165919*ROEp – 0.855319*ROAp – 0.64835*CVp + 1.10423*LCp – 0.32753*CEp + 0.821595*MLp + 0.588453*GAp	81.2%
7	**Real** = -0.233753*ROE + 0.873877*ROA + 2.1623*CV + 0.0654132*LC – 0.476342*CE – 0.52188*ML – 0.581134*GA **Expected** = 0.0645212*ROEp – 0.94969*ROAp + 1.45794*CVp + 0.36869*LCp – 0.29261*CEp – 0.147669*MLp – 0.153494*GAp	37.3%

Source: Research data.

The analysis of Tables 4 and 5 reveals that a statistically significant canonical correlation exists between the accounting indicators calculated before and after the enactment of law 11.638/07. Thus, the null hypothesis is rejected and it is inferred that hypothesis H_1 is accepted, which indicates that the accounting indicators were not altered by the fact that the financial statements were elaborated in compliance with the premises of law 11.638/07.

5. Conclusion

This paper was aimed at verifying whether Law 11.638 (2007) entailed statistically significant influences for accounting indicators. The 20 Brazilian companies were selected that are listed on BM&F-Bovespa and classified in the cyclical consumption sector, in the subsector tissue, clothing and footwear, under the ply and tissue segment, consulted on May 20th 2009. Sixteen of these companies presented the financial statements needed for this study. The data were collected from the balance sheet and the income statement the companies forwarded to CVM, for the period from 2000 to 2008.

The accounting indicators used for the study were those considered by Lyra (2008), resulting from a research that involved Brazilian and international specialists: 1) Return on Equity; 2) Return on Assets; 3) Sales Growth; 4) Current Liquidity; 5) Indebtedness Composition; 6) Net Margin and 7) Asset Turnover.

After defining the indicators, they were calculated for the 16 companies, considering the period from 2001 till 2008. Then, the linear regression of Koyck's model was applied to find the indicators forecasted for 2008, in view of a one-year time difference. This resulted in two sets of variables to apply the canonical correction: the seven accounting indicators of the 16 companies for 2008 were calculated based on the financial statements published, and the same seven accounting indicators found through the application of the linear equation in Koyck's model.

Finally, the canonical correlations between the two sets of variables were analysis. The research results showed that the sets of variables found seven linear combinations, the first six of which showed high mutual correlations, corresponding to 100.0%; 99.3%; 97.7%, 94.0% and 81.2%, respectively.

Therefore, in view of the research hypothesis, based on the statistical analysis, the null hypothesis (H_0) is rejected and the alternative hypothesis is accepted (H_1). The alternative hypothesis H_1 presupposed that a statistically significant canonical correlation exists between the accounting indicators before and after the enactment of law 11.638 (2007).

In general, it is concluded that, in the companies under analysis, the enactment of law 11.638 (2007) entailed no statistically significant influence on the accounting indicators. The results are in line with the findings by Beuren, Hein & Klann (2008); Barbosa Neto, Dias & Pinheiro (2009) and Carvalho *et al.* (2011), revealing no statistically significant alterations in economic-financial indicators as a result of the adoption of international accounting standards.

Further research is recommended to verify the same aspects in other economic segments, including the possible use of other statistical tools to support or refute the present study.

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