Risk Agencies, Bond Ratings and Income Smoothing in Public Bond Offering in Brazil

Antonio Lopo Martinez

FUCAPE Business School

Miguel Angel Rivera Castro

Federal University of Bahia

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Abstract

Income smoothing has been the subject of extensive accounting and financial research over the past three decades. In this article we use the variables proposed by Eckel (1981) and Leuz, Nanda and Wysocki (2003) as proxies to measure income smoothing and find that Brazilian companies that engage in this behavior receive better ratings from the risk agencies in their public bond issues. The importance of bonds rating has led to extensive research on the determination of ratings. Among economic determinants, the reporting accounting numbers are probably the most important. Few papers have examined the effects of smoothing on the bond market. This paper aims to contribute to the literature by focusing on the role of accounting accruals, and especially the income-smoothing role of accruals, in bond ratings.

We focus on managing earnings smoothness as a means to manage credit ratings not only because earnings smoothness is believed to be an important input into the rating methodology, but also because income smoothing can be viewed as a useful device for signaling firms´ superior performance. Using data obtained from the National Bond Registration System and the Economatica database, we evaluated public bond offerings by listed Brazilian corporations in the period from 2005 to 2007. The results of univariate and multivariate analyses and robustness tests show the significance of the income smoothing factor, regardless of the rating agency (Fitch, Moody's or S&P). The results support the notion that income smoothing in Brazil is an information-signaling mechanism and has an impact on the respective bond ratings. These findings from the bond market complement an extensive literature on the equity market indicating that income smoothing has a positive effect on stock prices. Among the main implications of this study, the most important is the evidence that this type of earnings management can have positive effects (beneficial smoothing), by reducing the cost of debt capital because of better ratings. A word of caution is in order, since less volatile reported earnings affect the ratings given by risk agencies, the practice of pernicious income smoothing can arise, where in a market with asymmetric information, a pooling equilibrium (in the sense of game theory signaling) can occur. This means that firms can practice pernicious smoothing, trying to mimic other firms with genuinely smooth earnings. In this scenario, we believe that it is important to have regulatory instruments to monitor and prevent this type of manipulation from abusively altering the risk perception of the agencies and consequently of bond investors. In the final analysis, the conclusions of this paper are important to shed light on the factors that explain the cost of debt capital and the ratings received by firms in their public bond offerings.

Keywords: Income Smoothing, Ratings, Risk Agencies, Bonds.

1. INTRODUCTION

Income smoothing is one of the facets of earnings management that has attracted the most attention from the financial and accounting literature. Indeed, it is a longstanding practice that seeks to diminish fluctuations in earnings over time. The majority of published works on the theme have focused on analyzing the factors that lead to smoothing or have contrasted the relative presence of this phenomenon in different sectors. In the international literature, among the works that have studied the relation between stock returns and the degree of income smoothing are those of Michelson, Jordan-Wagner , & Wooton (1995, 1999), Booth, Kallunki, & Martikainen (1996), Bin, Wan, & Kamil (2000), Iñiguez & Poveda (2004), Bão (2004), Tan & Jamal (2006), Tucker & Zarowin (2006) and Grant, Markarian, & Parbonetti (2009), analyzing the American, Finnish, Malayan and Spanish markets. Among these works, those of Michelson, Jordan-Wagner, & Wooton (1995, 1999) and Iñiguez & Poveda (2004) contain long-term analyses and reach different conclusions by applying distinct methods.

Here we analyze the effect of income smoothing on the ratings of public bond issues in Brazil, by correlating them with empirical proxies of smoothing. The importance of bonds rating has led to extensive research on the determination of bond ratings. Among economic determinants, the reporting accounting numbers are probably the most important. This paper aims to contribute to the literature by focusing on the role of accounting accruals, and especially the income-smoothing role of accruals, in bond ratings.

There are several debt contractual terms that firms may accept. It is possible to distinguish between public debt and private debt. Firms incur public debt by issuing bonds. These obligations tend to be long term, with relatively loose covenants. Private loans are obtained mostly in banks. They tend to be short term. This paper will examine the role of accounting accruals and earnings in the agencies assessment of the ratings for public debt.

On the surface, it is not immediately apparent why bond rating agencies would be concerned with accrual and earnings. As Standard & Poor´s states in the guide to the methodology used to rate bonds, "Interest or principal payments cannot be serviced out of earnings, which is just an accounting concept; payment has to be made with cash" (Standard & Poor´s, 2001, p.26). Nevertheless, the key question is, which current performance measure(s) is most informative about future cash flow? If reported accounting earnings provide information about future cash flow, we expect bond rating agencies to utilize this information rather than rely on current cash flow alone.

The article is organized into five sections including this introduction. The second section presents the theoretical framework on risk rating agencies and describes income smoothing and the metrics used to detect it. The third section describes the research design, database and method of analysis. The results are presented and discussed in the fourth section, and the fifth section summarizes the main findings and implications.

2. THEORETICAL FRAMEWORK

2.1 The income smoothing hypothesis

As far back in the mid-1960s, Gordon (1964) observed that corporate managers may be motivated to smooth income, with the assumption that stable income and growth rate will be preferred over higher average income streams with greater variability. More specifically, Gordon theorized income smoothing as follows:

> Proposition 1: The criterion managers use in selecting among accounting principles is maximization of utility or welfare.
>
> Proposition 2: The utility of managers increases with (1) their job security, (2) the level and growth rate of their income, and (3) the level and growth rate of corporate size.

Proposition 3: The achievement of the management goals stated in Preposition 2 is dependent in part on stockholders' satisfaction with the corporation's performance; that is, other things being equal, the happier the stockholders are, the greater the job security, income, etc., of managers.

Proposition 4: Stockholders' satisfaction with a corporation increases with the average rate of growth in its income (or the average rate of return on capital) and the stability of its income. This preposition is a readily verified as Preposition 2.

Theorem: Given that the above four proposition are accepted or found to be true, it follows that managers would, within the limits of their power, that is, the latitude allowed by accounting rules, (1) smooth reported income, and (2) smooth the rate of growth of income. "Smoothing the rate of growth in income" means if the rate of growth is high, accounting practices that reduce it should be adopted, and vice versa.

The empirical tests of the income smoothing hypothesis are typically tests of a joint hypothesis, that in the absence of manipulation by management, accounting earnings follow a particular process and managers adopt or change accounting procedures to reduce the variance of that process.

In theory, it can be assumed that earnings before manipulation are generated by the following process:

$$\tilde{A}_t = \Psi + \delta t + \tilde{\omega}_t , \qquad (1)$$

where $\tilde{A}_t$ is the earnings of period t, Ψ and δ are parameters, $\tilde{\omega}_t$ is a random disturbance term, $E(\tilde{\omega}_t) = 0$ and σ_w^2 is constant for all t, and managers are assumed to select an accounting procedure to reduce σ_w^2.

The assumptions of the income smoothing literature have implications for the time series of reported earnings. For example, in the previous case, if "true" earnings follow the

process described by equation (1) and managers smooth by reducing the variance of earnings around the line $\Psi + \delta t$, the reported earnings ($\bar{A}_t$) will also follow a linear process. In fact, the process will be:

$$\bar{A}_t = \Psi + \delta t + \breve{\upsilon}_t \,, \qquad (2)$$

where $\breve{\upsilon}_t$ is a disturbance term. If managers smooth successfully, $\sigma_v^2 < \sigma_w^2$. Hence, the joint hypothesis (smoothing and equation (1)) can be tested by observing whether the time series of reported earnings do, in fact, follow a process such as equation (2).

2.2 Literature review: income smoothing, capital markets and ratings

The role of income smoothing in the bond market has received little attention in the literature. Most of studies are related to stock market. Collins & Kothari (1998), Easton & Zmijewski (1989) and Barth, Landsman, & Wahlen (1995) all demonstrated that share prices reflect a premium for low earnings variability and that managers can reduce their firms' cost of capital by using their discretionary power in estimating certain components of income to reduce its variability. The literature calls this income smoothing, and it can be employed in the following situations: i) to reduce a particularly profitable result ascertained in the management accounts so as to disclose lower earnings; and ii) to do the opposite, to boost an unimpressive result or one below market expectations or the firm's own projections.

Investors and creditors perceive high variance in the accounting results as a measure of risk. Therefore, firms with less variation in their earnings tend to attract more investors and can obtain loans at lower costs. This market perception can prompt managers to take positive efforts to make the results less volatile, by dampening them from one reporting period to the next. This type of earnings management is called income smoothing.

According to Stolowy & Breton (2004), the objective of income smoothing is to produce stable growth of income flows. For this to happen, companies must have sufficient

earnings to create provisions to regulate the flow when necessary, such as by the timing of recognizing revenues.

In an early study of the theme, Copeland (1968) established that income smoothing implies a repetitive selection of an accounting measure or a rule on specific disclosure with the effect of disclosing earnings flows with lower variations than would otherwise be the case.

Other authors have defined this type of earnings management, among them Beidleman (1973), who defined income smoothing as intentional leveling out of earnings fluctuations to meet expectations of what is generally considered normal for the firm. The definition of Barnea, Ronen, & Sadan (1976) is similar, except they omitted the term "intentional", which in their opinion would mean knowing the aims of management, something that cannot be tested with empirical data that are not behavioral in nature.

Imhoff (1981) defined income smoothing as a special case of inadequate information disclosure, with the intention of artificially reducing the variation of income flows. For Beattie et al. (1994), in turn, smoothing can be viewed as an effort to reduce the variation of results in determined periods, or within a period, to meet market expectations.

According to Beidleman (1973) there are two types of intentional smoothing: real and artificial. Real smoothing involves making decisions on production and investment to reduce the variability of income streams. Artificial smoothing, in contrast, is achieved by accounting choices that affect the timing of income streams. It should be mentioned that smooth earnings can also occur naturally, without any opportunistic decision, because of the low variability of earnings in some sectors.

Irrespective of the nature of smoothing, the academic literature has always indicated that reduced income fluctuation is generally beneficial for firms because it reduces the cost of debt capital (Trueman & Tilman, 1988). In the same sense, Albrecht & Richardson (1990)

argued that small earnings variability reduces the systematic risk of a particular stock, in face of the fall in the covariance between the firm's return and that of the overall market.

In this context, the rating agencies play a fundamental role in the capital market. They are responsible for assessing the probability of default of companies making public bond offerings. In the majority of cases investors (especially institutional ones subject to risk exposure regulations, such as insurance companies and pension funds) base their decisions on these ratings and also price their debt holdings based on them. Therefore, a firm's ratings are closely linked to its cost of debt capital and significantly affect its financing decisions (Standard & Poor's, 2001).

The importance of ratings has stimulated extensive research on the factors determining these evaluations. Among the economic determinants examined in the literature, accounting numbers are probably the most important. According to Gu and Zhao (2005), the use of accounting information to determine bond ratings has always been the primary application of financial statement analysis.

Jorion, Shi, & Zhang (2009) argued that earnings management by abnormal accruals leads to lower ratings. In turn, Gu & Zhao(2005) examined the role of accruals on ratings and found that accruals not only affect the level of earnings, but also their volatility. Accruals thus have an important role in establishing bond ratings, because they serve as income smoothing mechanisms.

Few authors have examined the effects of smoothing on the bond market. We focus on managing earnings smoothness as a means to manage credit ratings not only because earnings smoothness is believed to be an important input into the rating methodology, but also because income smoothing can be viewed as a useful device for signaling firms´superior performance.

Graham, Harvey, & Rajgopal. (2005) find that managers‟ preference for a smooth earnings path is very strong. For example, managers claim that they prefer smoother earnings

even if it means sacrificing long-term firm value, since a more volatile earnings path can result in an increase in the cost of debt and equity (Graham et al. 2005).

There is no consensus as to whether earnings smoothing reduces the cost of equity. On one hand, smoother earnings enhance earnings predictability to outsiders and reduce information risk (or estimation risk), resulting in lower cost of equity (Francis et al. 2005). On the other hand, earnings smoothing can increase cost of equity by reducing the quality of earnings because earnings smoothing is considered as a device for opportunistic earnings management (Bhattacharya, Daouk, &Welker. 2003; Leuz, Nanda, & Wysocki 2003; Myers & Skinner, 2007). McInnis (2010) documents no effect of earnings smoothing on cost of equity by relying on standard asset pricing tests, suggesting that managers‟ preference on smooth earnings paths is not driven by equity market.

Focusing on the Brazilian market, the study by Martinez (2001) shows that for non-financial companies traded on the domestic stock market the most common manipulation of accounting information aims to avoid lowering net profit and to reduce its volatility (also referred to as income smoothing). Also, Fuji (2004) showed that in a sample of the 50 largest Brazilian banks, promotes income smoothing especially using the provision account to allow for bad debts. It aims at reducing the political cost related to regulation by the Brazilian Central Bank. There are several other examples along the same line. In Debt Market, Castro and Martinez (2009) find that companies that promote income smoothing are likely to have a lower cost of capital and capital structure with greater percentage of long term debt.

3 METHODOLOGY

3.1 Empirical Proxies of Income Smoothing

There are many ways to estimate the Earnings Management (Jones, 1991; Kang & Sivaramakrishnan, 1995; Paulo, 2007), but they are not proper to detect income smoothing. In

that sense,we use the smoothing metrics from Eckel (1981) and Leuz, Nanda and Wysocki (2003).

3.1.1 The Smoothing Metrics of Eckel (1981)

The methodology generally employed in works on income smoothing is based on the model of coefficients of variation proposed by Eckel (1981) and by the models of Leuz, Nanda and Wysocki (2003), used subsequently by Booth, Kallunki & Martikainen (1996), Michelson, Jordan-Wagner & Wooton (1995; 1999), Bin, Wan & Kamil (2000), Leuz, Nanda and Wysocki (2003) and Bao (2004).

These works have shown that if (i) profits are a linear function of net sales revenue, (ii) the variable unit cost remains constant over time, (iii) fixed costs do not diminish and (iv) gross sales revenue cannot be artificially smoothed, then the coefficient of variation (CV) measuring the fluctuation of sales is less than that of income. If this does not hold, that is, if income oscillates less than sales, then Eckel (1981) demonstrated that the firm is artificially smoothing its income. In mathematical terms,

$$VC\Delta\%net\_income \leq VC\Delta\%sales \rightarrow \text{smoothing},$$

where:

$\Delta\%net\_income$ = annual fluctuation in income;

$\Delta\%sales$ = annual fluctuation in sales;

$VC(x) = \sigma(x) / \mu(x)$

where

CV(x) = Coefficient of variation of a random variable

μ (x) = The mean of a random variable

σ (x) = The standard deviation of a random variables

Based on this reasoning, important works on smoothing have been published in recent years, such as those of Albrecht & Richardson (1990), Ashari et al. (1994), Booth, Kallunki & Martikainen (1996), Michelson, Jordan-Wagner & Wooton (1995; 1999), Bin, Wan & Kamil (2000) and Bao (2004). All these authors have employed a smoothing measure in the form of a non-dimensional index, obtained by the quotient of the coefficients of variation, that is:

$$IS_1 = \frac{VC\Delta\%net\_income}{VC\%sales}$$

Based on this measure, these authors have assumed that an index with absolute value less than one indicates the presence of smoothing, since the coefficient of variation of income is less than that of sales, and Eckel (1981) demonstrated this situation is caused by smoothing at the behest of managers. Nevertheless, in this paper we have modified this model, excluding firms with a smoothing index (SI) between 0.90 and 1.10 in absolute value. This procedure is necessary to reduce classification errors, in line with the methodology of Chalayer (1994).

$$0.9 \leq \left| \frac{VC\Delta\%net\_income}{VC\Delta\%sales} \right| \leq 1.1$$

Smoothing $\leq$ |Gray area| $\leq$ No smoothing

We assume there is a strict distinction between smoothers and non-smoothers indicated by the smoothing index (SI), according to whether it is above or below one, and identify robust empirical support for the hypothesis that managers are motivated to reduce the variability of earnings and cash flows in an attempt to reduce the perceived risk of their firms.

The choice of this procedure for grouping firms based on a smoothing index is motivated basically by the following reasons:

a) In the first place, for Bao (2004) this index takes into consideration the aggregate effects of all the accounting variables involved in income smoothing, describing the overall behavior of a firm with respect to smoothing. Companies do not choose accounting procedures independently. Instead, they consider the joint effect of these procedures on the result they communicate to the market. For this reason, the choice of a single variable as a smoothing indicator can lead to mistaken conclusions, since its effect can be mitigated by the aggregate effect of other variables.

b) In the second place, as pointed out by Albrecht & Richardson (1990), another advantage of this methodology is that it provides a non-dimensional measure of the variability of the sample and permits comparing the variabilities between different groups. Besides this, they stressed its utility when comparing data that have a different mean and standard deviation. These qualities make the smoothing index a useful instrument to formulate groups as a function of the degree of smoothing. Nevertheless, according to Eckel (1981), the main drawback of the methodology is that it does not recognized as smoothers firms that have reduced the variability of their earnings but not to the point where they are less variable than sales.

The coefficient of variation methodology relates the standard deviation with the mean of a series of numbers represented by the published earnings results. The nearer this index is to zero, the more the series has been smoothed. Generally the coefficient of variation is calculated from the variations of earnings, based on the assumption that firms try to show smoothly rising profits (Eckel, 1981). Nevertheless, despite the considerable number of instruments available that permit managers to publish a series of smoothed income results, these instruments are insufficient to assure perfect smoothing. Consequently, the coefficient of variation calculated in this manner is never zero, making it necessary to determine at what point income smoothing is occurring. Definition of this cutoff point is necessarily arbitrary.

Following Eckel (1981), one can introduce a reference to the firm's sector: if the firm's coefficient of variation is less than the average for its sector, it is classified in the group of firms that are intentionally smoothing their earnings. But this sector-specific threshold is still arbitrary.

In sum, IS_1 is essentially scaled percentage change in income relative to scale percentage in sales. It is conceptually not the best measure of income smoothing, but it has been used here to as proxy of the real income smoothing, given the fact that IS_1 largely captures leverage (operating and financial).

3.1.2 The smoothing metrics of Leuz, Nanda and Wysocki (2003)

The metrics used to measure smoothing correspond to the empirical analysis undertaken by Leuz, Nanda and Wysocki (2003), Francis et al. (2004) and Lopes & Tukamoto (2007). Executives can reduce the changes in the economic performance of their firms by making decisions that affect operations and accounting choices on how to disclose financial information (Leuz, Nanda and Wysocki, 2003). Focused on accounting choices, the aim of the second metric is to capture the degree to which executives practice smoothing, that is, how they reduce the variability of profits by altering the accounting components of profits, by adjustments in accruals. The metric is computed by the standard deviation of operating income divided by the standard deviation of operating cash flow. Because this variable is scaled by operating cash flow, it generally controls for the differences of variability in economic performance. Small values of this metric indicate that, *ceteris paribus*, executives are exercising discretionary power in smoothing the income reported in the financial statements.

Operating cash flow is calculated indirectly by the reduction of accruals to net income. We calculated this measure for each firm in our sample with a time-series estimation, that is:

$CFO = net\_income - accruals$,

where:

$$Accruals = \{[(CA_t - CB_t) - (CL_t - STD_t)] - [(CA_{t-1} - CB_{t-1}) - (CA_{t-1} - STD_{t-1})] - Deprec\ \&\ Amort_t\}$$

CA_t= current assets in year *t*

CB_t= cash and banks in year *t*

CL_t= current liabilities in year *t*

STD_t= short-term debt in year *t*

CA_{t-1}= current assets in year *t-1*

CB_{t-1}= cash and banks in year *t-1*

PC_{t-1}=current liabilities in year *t-1*

STD_{t-1}= short term debts in year *t-1*

$Deprec\&Amort_t$ = depreciation and amortization in year *t*

Hence, the second yardstick to measure the degree of income smoothing of listed Brazilian companies is:

$$IS_2 = \frac{\sigma(operating\_income_{it})}{\sigma(operating\_cash\_flow_{it})} \quad (2)$$

The metric IS_2 is responsible to capture the effects of accrual based income smoothing. On average, accruals lead to earnings that are smoother than cash flow. Such income smoothing appears to be widespread practice by managers and has long intrigued academics and practitioners. Some see this kind of income smoothing negatively as a form of opportunistic earnings management.

3.2 Data

We obtained our data from the records in the National Bond Registration System (*Sistema Nacional de Debêntures* - SND) on public bond offerings by listed Brazilian corporations in the period from 2005 to 2007. The sample size was limited by the absence of ratings data for some firms, and particularly by the extent of data available to estimate the metrics of Eckel (1981) and Leuz, Nanda and Wysocki (2003). The accounting data to ascertain the empirical proxies of smoothing (IS1 and IS2) were obtained from the Economática database.

To permit quantifying the ratings on a discrete and comparable scale among the rating agencies, we decided to keep in our database only the ratings published by Moody's, Standard & Poor's and Fitch. As a result of these necessary exclusions, the sample is composed of 114 public bond offerings, which we use for all the analyses in this paper.

Table 1 below presents the distribution of the public bond offerings in our sample according to the ratings, broken down by which agency published each evaluation.

Table 1
Bond Ratings for Public Offerings by Risk Agencies

	Risk Agencies			
RATINGS	**FITCH RATINGS**	**MOODY'S**	**STANDARD & POOR'S**	**Total**
AAA	2	13		15
AA +	4	1	14	19
AA	7	1	6	14
AA-	5			5
A+	8		16	24
A	12		10	22
A-	2	1	9	12
BBB+	1			1
BBB		1	1	2
Total	41	17	56	114

Note that all the above ratings are investment grade. The sample did not include any offering of a speculative nature, that is, with a rating of BB+ or lower. This exclusion was not

intentional, but it did provide an opportunity for analysis within a universe of offerings with good ratings, allowing a more refined assessment of the effect of smoothing.

To quantify the ratings, we created a discrete numerical variable, defined from the rating given by the agency in each public offering. The values attributed go from 1 to 21 points, with 1 indicating default and 21 indicating the maximum rating (Aaa from Moody's and AAA from S&P and Fitch). We control for the fact if one concrete firm would have made more than one bond offering in the sampling period, and there is no firm with different ratings. Also the observations are not repeated, as it would be possible that the bond offering have been rated by several risk agencies.

As control variables, we used some identified in the literature as important for the definition of ratings, such as LEV (leverage, or long-term liabilities divided by total assets), beta (calculated based on the monthly return over 60 months) and M/B (market to book, the ratio between the market value and accounting value of equity) (Gu & Zhao, 2005).

To analyze the relation of the rating with the income smoothing metrics, we used univariate analysis, segregating for various groups, and multivariate analysis encompassing regressions and parametric and nonparametric tests to assure robustness of the results identified.

4. RESULTS

4.1 Univariate Analysis

In this section we present and discuss the results of the statistical procedures performed to identify the role the smoothing factor plays in the ratings defined by the risk agencies.

Table 2 presents some descriptive statistics on the profile of the 114 public bond offerings in the sample, particularly the ratings and smoothing metrics. For purposes of

analysis we classified the ratings as Lower Medium Grade, Upper Medium Grade, High Grade and Maximum. The last of these contains the bond issues that received the highest possible rating, AAA, which according to our criteria here means a maximum score of 21 points.

Table 2
Descriptive Statistics

Rating Classes	N	Mean Rating	Mean IS1	Mean IS2	Mean LEV	Mean Beta	Mean M/B
Maximum	15	21.00	0.65	0.26	0.28	0.83	1.06
High Grade	38	19.37	1.06	1.10	0.43	0.83	0.75
Upper Medium Grade	58	16.21	1.08	1.54	0.37	0.92	0.83
Lower Medium Grade	3	13.33	1.53	1.93	0.30	0.70	0.89
All	114	17.82	1.03	1.24	0.38	0.87	0.83

As can be seen, all the offerings received investment grade ratings, with the average score being 17.82 on the scale of 1 to 21 points. This means that on average all the offerings received good evaluations by the rating agencies.

Analysis of the data stratified by rating class shows that the highest ratings and/or classes were also those with the lowest smoothing indicators, meaning more income smoothing. Although simplistic, this result already indicates that on average, smoothing tends to boost firms' ratings. This evidence is confirmed both by the indicator of Eckel (1981) and by that based on Leuz, Nanda and Wysocki (2003), IS1 and IS2, respectively.

We should add that no pattern was evident for the control variables – leverage (LEV), beta (β) and market to book value (M/B) – among the rating classes. Thus, for exploratory purposes, we segregated the sample by economic sectors to verify whether there is some pattern in the behavior regarding rating and smoothing. The results of this sectorial analysis are shown in Table 3, organized in decreasing order of the average sector ratings.

Note that the sector with the highest average rating is finance and insurance, with very small values of the empirical proxies IS1 and IS2, indicating the practice of income smoothing. On the other hand, sectors like construction, pulp and paper and retailing have higher indicators, implying less income smoothing in average terms.

No clear pattern emerges for the control variables (LEV, β and M/B) among these sectors, reflecting characteristics correlated with the rating.

Table 3

Ratings by Economic Sectors

Economic Sectors	N	Mean Rating	Mean IS1	Mean IS2	Mean LEV	Mean M/B	Mean BETA
Finance and Insurance	15	20.2	0.59	0.68	0.26	1.37	0.95
Mining	2	20.0	1.30	1.22	0.50	0.74	1.00
Telecommunications	7	19.9	1.19	0.40	0.31	0.64	1.19
Food and Beverage	3	19.0	0.80	1.01	0.28	0.88	0.60
Transportation	8	18.0	0.99	0.50	0.44	0.89	0.63
Electric Power	34	17.5	0.91	1.12	0.41	0.76	0.74
Chemicals	8	17.1	1.13	1.59	0.30	0.74	0.68
Other Services	11	17.1	0.96	1.15	0.64	0.50	0.92
Vehicles and Parts	1	17.0	0.40	0.23	0.69	0.24	0.30
Construction	9	16.8	1.54	3.95	0.28	0.97	1.50
Pulp and Paper	4	16.5	1.65	0.50	0.42	0.72	0.75
Retail	7	16.1	1.16	0.67	0.25	0.84	0.67
Iron & Steel	3	16.0	1.33	2.35	0.40	0.73	1.90
Textile	2	16.0	1.70	2.85	0.36	0.81	0.70

Table 4 shows the correlations between the rating and smoothing metrics. It can be immediately seen that the rating has a negative correlation with the indicators IS1 and IS2.This correlation confirms the hypothesis that firms' ratings increase as they smooth their earnings more. It can also be seen that the strongest correlation is with indicator IS1 (Eckel, 1981). The correlation with indicator IS2 (Leuz, Nanda and Wysocki , 2003) is also negative, but with a relatively high p-value of 0.079. Additionally, there is a negative correlation between the rating and beta, indicating the higher beta is, the lower the rating tends to be. This is compatible with the financial theory.

Income smoothing measures IS_1 and IS_2 that are meant to capture the same concept, even though they are correlated, 0,287. It is not so high, probably because as predicted they capture, somewhat, two different types of income smoothing. IS_1 represents mainly the real income smoothing, and IS_2, the accrual based income smoothing.

Table 4

Pearson Correlation Matrix

		Rating	IS 1	IS 2	LEV	BETA	M/B
Rating		1	-,495**	-.165	.066	-,261**	-.044
	p-value		.000	.079	.484	.005	.639
	N	114	114	114	114	113	114
IS 1		-,495**	1	,287**	.027	,314**	-.072
	p-value	.000		.002	.776	.001	.449
	N	114	114	114	114	113	114
IS 2		-.165	,287**	1	.095	,186*	.051
	p-value	.079	.002		.314	.049	.593
	N	114	114	114	114	113	114
LEV		.066	.027	.095	1	-.015	-,229*
	p-value	.484	.776	.314		.877	.014
	N	114	114	114	114	113	114
BETA		-,261**	,314**	,186*	-.015	1	.032
	p-value	.005	.001	.049	.877		.733
	N	113	113	113	113	113	113
M/B		-.044	-.072	.051	-,229*	.032	1
	p-value	.639	.449	.593	.014	.733	
	N	114	114	114	114	113	114

Even though, not reported in the Table, in additional analysis, we control the correlation of Ratings with size and ROA (return on assets). Given the fact that the correlations were not significant with any variable, the results were not disclosed.

Still working with univariate analysis, to assure the robustness of the results we performed parametric and nonparametric tests of the differences of means, to find out whether there are significant differences between the smoothing factor within the rating classes. To conduct this analysis, we segregated the observations between High Grade (H) and Medium Grade (M). In the first category we included the Maximum and High Quality ratings and in the second the Upper Medium Grade and Lower Medium Grade ratings.

The results are shown in Table 5. Panel (a) documents the statistics of the means for the High Grade and Medium Grade for the smoothing and control variables. Panel (b) shows the results of the parametric tests, which confirm with acceptable significance the expected hypothesis that the means of the smoothing proxies (IS1 and IS2) between the rating classes

are different. Finally, panel (c) shows the results of the nonparametric tests, which confirm the same results, providing further support for the conclusions already observed.

Table 5

Mean Difference Test for High Grade (H) and Mediun Grade (M) Classes

Panel a) Statistics High Grade (H) and Mediun Grade (M) Classes

	Classes	N	Mean	Stand. Dev.	Mean Error
IS1	H	53	0.945	0.502	0.069
	M	61	1.100	0.442	0.057
IS2	H	53	0.866	1.163	0.160
	M	61	1.559	2.251	0.288
LEV	H	53	0.392	0.387	0.053
	M	61	0.369	0.129	0.017
MB	H	53	0.840	0.248	0.034
	M	61	0.829	0.581	0.074
BETA	H	52	0.829	0.562	0.078
	M	61	0.907	0.773	0.099

Panel b) Mean Differences Parametric Test

		t-test of equality of the means			
		t	**Sig. (2-tailed)**	**Mean Diff.**	**S.D. Diff**
IS1	σ^2 is equal	-1.749	0.083	- 0.155	0.088
	σ^2 is not equal	-1.734	0.086	- 0.155	0.089
IS2	σ^2 is equal	-2.021	0.046	- 0.694	0.343
	σ2 is not equal	-2.105	0.038	- 0.694	0.329
LEV	σ^2 is igual	.446	0.657	0.023	0.053
	σ^2 is not equal	.421	0.675	0.023	0.056
MB	σ^2 is equal	.123	0.903	0.011	0.086
	σ^2 is not equal	.129	0.898	0.011	0.082
BETA	σ^2 is equal	-.602	0.548	- 0.078	0.129
	σ^2 is not equal	-.617	0.539	- 0.078	0.126

Panel c) Mean Differences Non- Parametrics Test

	IS1	IS2	LEV	MB	BETA
Mann-Whitney U	1326.500	1177.500	1368.000	1345.000	1422.500
Wilcoxon W	2757.500	2608.500	2799.000	3236.000	2800.500
Z	-1.655	-2.496	-1.412	-1.543	-.944
Asymp. Sig. (2-tailed)	.098	.013	.158	.123	.345

4.2 Multivariate Analysis

To complement the univariate analysis, we developed a linear regression model, expressed in the following form:

$$Rating_t = \beta_0 + \beta_1 IS1_{t-1} + \beta_2 IS2_{t-1} + \beta_3 LEV_{t-1} + \beta_4 BETA_{t-1} + \beta_5 M/B_{t-1} + \varepsilon_t \quad (3)$$

RATING $_t$= ratings in year *t*

IS1 $_{t-1}$= first income smoothing index – Eckel (1981) in year *t-1*

IS2 $_{t-1}$= second income smoothing index – Leuz, Nanda and Wysocki (2003) in year *t-1*

LEV $_{t-1}$= financial leverage in year *t-1*

BETA $_{t-1}$ = beta in year *t-1*

M/B $_{t-1}$= market book value in year *t-1*

Since the aim of the proposed model is to explain the rating from the two smoothing metrics, we also included the control variables. We include both income smoothing metrics, in order to control for different types of income smoothing. It was applied Variance inflation factor (VIF) testes, which ruled out the presence of multicollinearity, that would biased the results.

The result of this regression and its main statistics are shown in Table 6. It can be seen that the IS_1 metric, or indicator of Eckel (1981), is highly significant in explaining the rating. The negative sign indicates that as IS_1 increases (meaning the firm engages in less income smoothing), the rating falls. The model's statistics are satisfactory and provide further backing for the conclusions reached from the univariate analysis.

Table 6

Ratings Econometric Model

Risk Rating Agencies

Model	Rating	Coefficients		Stand. Coeff.	t	Sig.
		B	Std. Error	Beta		
	(Constant)	10.504	0.524		20.062	.000
	IS 1	-1.682	0.330	-.461	-5.102	.000
	IS 2	-.008	0.083	-.008	-.092	.926
	LEV	.400	0.532	.065	.753	.453
	BETA	-.285	0.224	-.112	-1.269	.207
	MB	-.214	0.326	-.056	-.656	.514
	R	R^2	Adjusted R^2	Std. Error Forecast	F	Sig.
Statistics	.514	.264	.230	1.525	7.692	,000

We run regressions including size and return on asset as control variables, but the results did not improve, so the results are no reported in tables. However, one doubt remains: Do the rating agencies give equal importance to the smoothing factor? To answer this intriguing question, we performed regressions stratified by agency: Moody's, Standard & Poor's and Fitch.

The results displayed in Table 7 confirm that for the three rating agencies considered, firms that smooth more generally obtain higher ratings. However, some specificities of the agencies emerged from the model.

For Fitch e S&P, the IS_1 metric was the only variable significantly explaining the rating. The control variables were not significant in the sense predicted and the IS_2 metric did not have explanatory power in the way expected. For S&P, the proposed model was minimally satisfactory, in view of the low value of F and adjusted R^2. The model's modest predictive capacity based on the smoothing proxies and control variables for Fitch, and especially for S&P, allows presuming that other factors affect their rating decisions, ones not captured by the variables in the regression described here.

Table 7

Ratings Econometric Models for each Risk Agency

Panel a) FITCH

Model		Coefficients		Stand. Coeff.	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.101	1.057		11.451	.000
	IS 1	-2.240	.481	-.668	-4.653	.000
	IS 2	-.097	.312	-.051	-.313	.756
	LEV	-1.410	2.104	-.094	-.670	.507
	BETA	.231	.346	.088	.667	.510
	MB	-.032	.347	-.014	-.094	.926
	R	R^2	Std. Error	Std. Error Forecast	F	Sig.
Statistics	,680	.462	.383	1.307	5.846	,001

Panel b) MOODY'S

Model	Rating	Coefficients		Stand. Coeff.	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	18.103	2.582		7.012	.000
	IS 1	2.464	1.066	.845	2.312	.041
	IS 2	-3.309	1.173	-1.329	-2.821	.017
	LEV	-16.013	6.518	-.924	-2.457	.032
	BETA	-2.596	.801	-.848	-3.241	.008
	MB	-4.382	1.200	-.677	-3.651	.004
	R	R^2	Adjusted R^2	Std. Error Forecast	F	Sig.
Statistics	,879	.772	.668	.738	7.447	,003

Panel c) STANDARD & POOR'S

Model	Rating	Coefficients		Stand. Coeff.	t	Sig.
		B	Std. Error	Beta		
	(Constant)	9.937	.955		10.409	.000
	IS 1	-1.193	.512	-.318	-2.332	.024
	IS 2	-.030	.075	-.052	-.401	.690
	LEV	.262	.496	.071	.529	.599
	BETA	-.359	.249	-.197	-1.442	.156
	MB	-.331	.828	-.054	-.400	.691
	R	R^2	Adjusted R^2	Std. Error Forecast	F	Sig.
Statistics	,458	.210	.131	1.305	2.658	,033

Although not shown in the tables, to further check the robustness of the statistics of the models estimated (besides adjusted R^2), we performed the following additional statistical tests: i. Jarque-Bera (JB) normality test, which indicated that the residuals are normally distributed; ii. Breusch-Godfrey (BG) test, which showed no autocorrelation of the residuals.

In sum, the statistical procedures carried out provide robust evidence that the smoothing factor is relevant to obtain a better rating on public bond offerings in Brazil.

5. CONCLUSIONS

This paper focused on the relationship between the rating given by risk agencies and the practice of income smoothing. The results of the statistical procedures applied indicate that the smoothing factor is a determinant of the rating of public bond issues in Brazil, irrespective of the agency (Fitch, Moody's or S&P). More specifically the results show that firms that smooth more aggressively increase their chances of receiving better ratings. Those that received the maximum ratings among the firms studied were those that had more pronounced smoothing indicators.

Based on the analysis of a sample of firms over the period, this paper presents empirical evidence that Brazilian companies that engage in smoothing on average stand apart from those that do not with respect to bonds ratings. The results can be summarized by the hypotheses investigated, as follows:

Ratings and Smoothing	The analyses show that firms classified as smoothers have a significantly better ratings than non-smoothers. The results sustain for two empirical proxiesof income smoothing, Eckel(1981) and Leuz et al (2003). The results sustain for all risk agencies (Fitch, Moody´s and S&P). These results were supported both by univariate and multivariate analyses.

Chart 1: Results of the study

Among the main characteristics of this study, we highlight our use of a regression model that permitted controlling the structural heterogeneity of the firms over the years studied, as well as the application of various tests to establish the robustness of the results. This study is also innovative in demonstrating the relevant role that accounting practices,

particularly income smoothing, have on the risk agencies' assignment of ratings to public bond offerings. We empirically document that rather than being ubiquitous, earnings smoothing activities vary significantly with these incentives. Our results also suggest that not only do managers smooth earnings to influence credit ratings, but also that credit rating agencies may do not fully compensate for such smoothing in their credit rating decisions. In sum, it appears that earnings smoothing activity can be used as a tool to manage credit ratings.

The results presented here for the bond market complement an extensive literature on the effect of income smoothing on stock values, which already have indicated that investors favor smoothers. Among the main implications of this study is the fact that financial managers can find scientific evidence here justifying efforts to smooth earnings, because of the positive effects of this behavior (beneficial smoothing). Because of the higher ratings attained, this behavior to reduce the variability of earnings can reduce firms' cost of capital.

The study's acknowledged limitations involve the statistical methods used, as well as the empirical proxies used for income smoothing. The study is also limited to the period analyzed, which included the years 2005 to 2007. Finally, its scope went only as far as the firm reported to the National Bond Registration System (Sistema Nacional de Debêntures - SND).

A word of caution is in order. Since less volatile reported earnings affect the ratings given by risk agencies, the practice of pernicious income smoothing can arise, where in a market with asymmetric information, a pooling equilibrium (in the sense of game theory signaling) can occur. This means that firms can practice pernicious smoothing, trying to mimic other firms with genuinely smooth earnings. In this scenario, we believe that it is important to have regulatory instruments to monitor and prevent this type of manipulation from abusively altering the risk perception of the agencies and consequently of bond

investors. Future research might try to investigate the long term effects of pernicious and beneficial smoothing.

In the final analysis, the conclusions of this paper are important to shed light on the factors that explain the cost of debt capital and the ratings received by firms in their public bond offerings.

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Appendix

Ratings according to the main risk agencies

Moody's	Standard & Poor's	Fitch	Duff & Phelps Credit Rating	Definitions
Aaa	AAA	AAA	AAA	**Maximum**
Aa1	AA+	AA+	AA+	**High Grade. High Quality**
Aa2	AA	AA	AA	
Aa3	AA-	AA-	AA-	
A1	A+	A+	A+	**Upper Medium Grade**
A2	A	A	A	
A3	A-	A-	A-	
Baa1	BBB+	BBB+	BBB+	**Lower Medium Grade**
Baa2	BBB	BBB	BBB	
Baa3	BBB-	BBB-	BBB-	
Ba1	BB+	BB+	BB+	**Grade**
Ba2	BB	BB	BB	**Speculative**
Ba3	BB-	BB-	BB-	
B1	B+	B+	B+	**Highly Speculative**
B2	B	B	B	
B3	B-	B-	B-	
Caa	CCC+	CCC	CCC	**Substantial Risk**
	CCC			**In Poor Standing**
	CCC-			
Ca				**Speculative**
C				**Default**
		DDD		**Default**
		DD	DD	
	D	D		
			DP	