Earnings manipulations by real activities management and investors’ perceptions

César Medeiros Cupertino\textsuperscript{a}, Antonio Lopo Martinez\textsuperscript{b}, Newton C. A. da Costa Jr.\textsuperscript{c,*}

\textsuperscript{a} SENAC-SC, Florianópolis, SC 88020-200, Brazil
\textsuperscript{b} Fucape Business School, Vitória, ES 29075-505, Brazil
\textsuperscript{c} Federal University of Santa Catarina, Florianópolis, SC 88040-900, Brazil

\textbf{A R T I C L E   I N F O}

\textit{Article history:}
Received 11 November 2014
Accepted 2 February 2015
Available online 12 February 2015

\textit{Keywords:}
Earnings management
Real activities management
Investors’ perceptions

\textbf{A B S T R A C T}

The focus of this paper is to identify the practice and the investor’s perception regarding real activities management in Brazil. The study explores hypotheses related to (i) identification of different types of real activities management, and (ii) investors’ perceptions of the effects of this manipulation. Data were acquired from Economatica\textsuperscript{®} covering the period from 1989 to 2012 inclusive. Panel data regressions were conducted to test information efficiency (using the Mishkin test). The results provide evidence of the occurrence of earnings manipulation by real activities management and indicate that the market fails to evaluate the effect of earnings management through certain types of manipulation of real activities.

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1. Introduction

The term “earnings management” is used to describe the decision that some managers take to employ accounting methods or to direct operational activities in such a way as to affect earnings with the intention of meeting specific objectives in terms of the results reported in financial statements.
In turn, the earnings management methods employed for such ends can be classified in terms of whether they affect the process of accruals-based accounting or impact on normal operational activities (Enomoto et al., 2013). The first approach is known as “accrual-based management” (ABM) and the second as “real activities management” (RAM).

Earnings management is a relevant subject in the academic literature (Kothari, 2001). One reason for this interest is the fact that the earnings is used for a variety of purposes, such as in contractual obligations (e.g. debt covenants), asset valuation and for executive remuneration and bonus plans (e.g. executive equity compensation). Therefore, accounting data provide relevant informational content and are employed by a wide range of stakeholders. For example, creditors use the numbers reported to assess aspects related to firms’ financial health, credibility and viability (Ge, 2010). In turn, shareholders use earnings, among other indicators, to monitor operational performance. However, their conclusions on a given entity’s performance may be erroneous if they are unable to identify and adjust for the effects of earnings management that is embedded in the financial statements. This distortion will become clear in future results, when the entity’s performance does not match their estimates.

In general, earnings management affects the quality of earnings, masking the underlying economic transactions. When control mechanisms such as auditors, regulatory authorities and others are ineffective, opportunities arise for management to manipulate earnings with the objective of hitting certain targets related to reported results (Healy and Wahlen, 1999), such as meeting analysts’ expectations, avoiding losses, maintaining a growth trend or “smoothing out” the levels of reported earnings (Xu, Taylor and Dugan, 2007).

There is already evidence that managers practice discretionary earnings management through manipulation of accruals, generally with no impact on company cash flow (Sajadi et al., 2011). However, it is a recent finding that earnings manipulation is also accomplished through real activities, i.e. by taking actions that deviate from normal operational practices. In Brazil, the subject has received almost no attention, with research limited to a very small number of studies, such as one by Martinez and Cardoso (2009). In effect, almost all of the studies conducted into earnings management in Brazil have concentrated on manipulation through accruals.

This study is a first step toward filling this gap by dealing with identification of results manipulation through decisions affecting real operational activities and stakeholders’ perceptions of this method of earnings management. The next section describes the scope of the study and its contributions to current research. It is understood that manipulation of results can create information asymmetries between stakeholders and company managers and that the two strategies for earnings management – accruals-based and real activities management – can possibly be used in combination to manipulate the accounting numbers reported.

In this context, the objective of this study is to identify whether earnings management by real activities related to manipulation of sales, discretionary expenses and production costs has an impact on the results disclosed in financial statements. This general objective can be subdivided into the following specific objectives: (i) to determine whether manipulation through real activities takes place in companies on the Brazilian capital market; (ii) to determine whether investors are able to identify the practice of real activities earnings management. The study will focus on aspects related to (1) manipulation of results through real activities; (2) investors’ perceptions with relation to the occurrence of the practice of real activities management.

2. Literature review

2.1. Earnings management through decisions affecting real activities

Earnings management is one of the most debated subjects in finance and accounting. Interest in this research avenue is growing and goes back to seminal work such as Schipper (1989) and Healy and Wahlen (1999). Schipper (1989, p. 92) considered that earnings management consisted of “a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain”.
On the basis of definitions found in Schipper (1989) and Healy and Wahlen (1999), Martinez and Cardoso (2009, p. 2) classified earnings management as: [...] accounting practices chosen and real activities taken with the purpose of preparing reports and disclosing accounting numbers that are different from those that would have been prepared and disclosed without the adoption of such practices and/or the taking of such decisions. Intervention in the accounting numbers that are disclosed is a critical procedure given that the financial statements summarize relevant information on an entity’s performance. In this context, reported earnings are of central importance (FASB, 1978), since they are employed for a variety of ends. Xu (2008) considers that this importance creates incentives for earnings management and this opinion is also shared by Dye (1988).

The discretion that is delegated to management to choose the accounting methods applied to operations that will be reported in the financial statements is a key point in understanding earnings management. Managers have the discretion to choose between alternative and equally valid methods of recording certain financial transactions. For example, the choice of depreciation method – accelerated, straight line etc. – and inventory valuation method – first in, first out; last in, first out, moving average – have different impacts on earnings for the period.

Earnings management techniques can be divided into two categories: accrual-based management and real activities management (Gunny, 2010). These two categories have certain fundamental differences, including their impact on operational cash flows. Given that earnings can be broken down into two elements – cash flow and accruals – managers have both routes to management at their disposal (Joosten, 2012). Operational decisions impact on an organization’s cash flow, whereas accruals do not necessarily have this relationship. Another difference between these types of earnings management is the point at which they are utilized. Operational decisions are taken throughout the period, depending on managers’ perceptions of the way in which the entity’s business-related activities will pan out over the course of the operational cycle. In turn, accruals-based manipulation is primarily conducted in the interval between the end of a financial year and publication of the financial statements. According to Chen (2009), management assesses the operational results achieved over the period and determines the sums that will be allocated to accruals-based management. Therefore, while real activities are an ex ante form of earnings management, accruals are considered an ex post manipulation method.

The majority of academic research is still focused on manipulation by accruals, and research into the use of real activities as a means of earnings management is incipient (Ge, 2010). The phenomenon of employing real activities management (RAM) as a tool for manipulation was only recently understood. A study published by Roychowdhury (2006) was a milestone in research into RAM, since it documented evidence of manipulation of operational activities through sales, discretionary expenses and production costs in North-American capital markets.

Graham et al. (2005) have recommended that research into manipulation of results should be extended to investigate decisions on the real business activities of organizations, since the practice enjoys popularity among managers. They also point out that RAM has the potential to have negative consequences for organizations’ profitability. The following sections present a detailed discussion of accruals-based management and real activities management.

### 2.2. Investors’ perceptions

If share pricing is rational, investors incorporate disclosed information into the market prices of assets. However, this is not always the case and the situation becomes more and more critical the weaker the efficiency of the market. From this perspective, efficiency is related to the market’s reaction to information about assets.

If the market identifies and corrects expectations about an entity’s future cash flows after a certain delay, then the share price becomes decoupled, if only temporarily, from the underlying financial and economic reality of the asset. Investors’ failure to understand the persistence of earnings components has been discussed in a number of foreign publications (Bergstresser and Philippon, 2006; Bhojraj et al., 2009; Sloan, 1996; Xie, 2001).

Gunny (2005) found that investors are not able to recognize real activities management in financial statements since they do not incorporate the consequences of that manipulation into the share price.
In Brazil, Cupertino (2010) found that there are distortions in the market’s subjective predictions with relation to the persistence of earnings components – accruals and cash flow – when compared with estimates based on rational expectations. In general, this inefficiency in identifying and incorporating information that is disclosed generates potentially adverse effects, including an incentive to practice earnings management and the existence of financial anomalies/opportunities for abnormal gains.

2.3. Formulation of the research hypotheses

The academic literature contains a robust body of evidence relating to companies that manipulate their earnings in order to hit results targets (Xu, 2008). The majority of findings relate earnings management to discretionary accruals (Ge, 2010), ignoring other forms of manipulation.

When manipulation through accruals involves a high level of risk (detection by control and auditing procedures, for example), companies resort to other means of achieving the desired level of earnings. According to Gunny (2005), these alternative methods fall into one of two types: fraudulent accounting and manipulation through real activities. The focus of this paper is on the second of these categories and its existence is founded on the assumption that companies are disposed to sacrifice future performance to obtain short-term benefits. Martinez and Cardoso (2009) found evidence that this practice takes place in Brazil in a sample of data from 315 non-financial companies for the period 1998 to 2004. It is expected that this finding will be confirmed over an extended interval of time (1989–2012), which is the study’s first research hypothesis:

H1. Companies on the Brazilian capital market employ real activities management as a strategy for manipulation of their year-end results.

With the intention of keeping the study centralized and allowing for comparability with previous research, the analyses investigate three methods of manipulation through real activities that are often cited in the academic literature, as follows: (1) accelerating sales by increasing discounts or by offering more flexible credit terms; (2) increasing production in order to reduce the fixed cost of products; and (3) cutting discretionary expenses.

Healy and Wahlen (1999) claim that investors have mechanisms for identifying the practice of results manipulation and are not “myopic” in their predictions of entities’ future performance. This premise assumes that the practice of earnings management is detected by the market which then incorporates the effects of manipulation into its expectations. However, there is a body of evidence that demonstrates that the market is not capable of recognizing the behavior of the components of earnings when forming its expectations about the future performance of entities (Sloan, 1996; Xie, 2001; Bhojraj et al., 2009).

The failure to identify earnings management and, consequently, to recognize its effect on the value of an asset means that investors react to manipulation in a relatively uniform manner (Li, 2010). These investors may then be taken by surprise when, in subsequent financial periods, an entity’s performance proves to be different from their predictions (Xu, 2008; Ge, 2010; Li, 2010). In the case of RAM, this likelihood is increased by the fact that manipulation is conducted by taking decisions that have an effect on the results for the current financial period, in detriment to future cash flows.

Information efficiency also has an influence on the process of formation of expectations. If there is a delay or distortion to interpretation of disclosed information, then there is space for abnormal gains. In contrast, if there is information efficiency, the practice of real activities management will be incorporated into share prices and the market will be in equilibrium (Gunny, 2005), and there will be no incentive for management to manipulate earnings using this strategy.

There is a body of evidence indicating that earnings management does take place in Brazil (Almeida, 2006), which suggests that the Brazilian market is not efficient in detecting manipulation of results and adjusting its expectations. This leads to the following hypothesis:

H2. The market fails to incorporate the practice of real activities management into expectations about the future performance of entities.
3. Methodology

This section describes the procedures employed to accomplish the research objectives. Initially, aspects related to sample selection are discussed. The remainder of the section presents the tests employed to test the hypotheses empirically.

3.1. Data and sample selection

The sample comprised all companies listed on the São Paulo Stock Exchange (BOVESPA), for which financial and accounting data were available via the Economática service. Securities related to financial companies (insurance firms, banks and investment funds) and companies in the energy or telecommunication sectors were excluded, as is common in studies of this type (Gunny, 2010; Badertscher, 2011). One of the reasons for excluding these shares is the fact that these are heavily regulated sectors that have their own legislation and these specific standards have an idiosyncratic effect on accounting (Gunny, 2005). Companies classified under the “Other” industries umbrella were also excluded, since they comprise assets that are not relevant.

Observations were collected on an annual basis for the period from 1989 to 2012 inclusive. Although the Economática service has data going back to 1986, the small number of companies tracked between 1986 and 1988 means that excluding these 3 years’ data does not lead to any relevant loss of information. Furthermore, this procedure considerably reduced the number of extreme observations (outliers). In view of this, 1989 was chosen as the first year of analysis. In turn, 2012 was the last year of analysis because it was the last year for which data were available via the Economática service when the research was conducted.

The sample sizes for identification of RAM and ABM refer to the number of observations in the data used for the regressions to estimate expected level of accruals and real activities (and, as a result, for the residuals, which represent the magnitude of earnings management).

3.2. Models adopted to test the hypotheses

The empirical tests related to the hypotheses defined above are described below. Real activities management is analyzed in relation to: models of identification (H1); and to investors’ perception (H2).

Where applicable, analyses were restricted to firms suspected of manipulation of results. This procedure is intended to increase test power and is justified in earlier work, in particular in work by Roychowdhury (2006) and Zang (2012). For the purposes of analysis, suspected firms are those that meet or exceed certain benchmarks. Three criteria were used for this study: zero earnings, earnings for the preceding financial period and variation of earnings for the preceding financial period. These benchmarks identify situations in which it is more likely that earnings management will take place and are founded on the results of studies that have documented a discontinuity around zero earnings and earnings for the preceding financial period.

The first of these – zero earnings – is defined as reported earnings before interest and taxes (EBIT), divided by total assets for the previous year, between 0 and 0.01. The sample analyzed contained 132 firm-year observations that met this standard. The earnings for the preceding financial period variable corresponds to the first difference in earnings per share that falls between R$0.00 and R$0.10. A total of 101 firm-year observations that corresponded to this parameter were identified. The last criterion was a variation in earnings before interest and taxes, after deflation by the total assets at t − 1, that falls between 0 and 10%. A total of 232 firm-year observations met this standard.

3.2.1. Manipulation through real activities

Identification of manipulation through real activities requires empirical application of models. These models estimate the “normal” level of operational activities and, as a consequence, their regression residuals represent the “abnormal” level, i.e. they are proxies for management variables. In other words, the abnormal component of real activities is the difference between the true observed value and the estimate obtained by applying the models (Gunny, 2005; Roychowdhury, 2006).
The abnormal level of discretionary expenses was estimated using a model derived from seminal work by Dechow et al. (1998) and Roychowdhury (2006), formulated as follows:

\[
\frac{DISEXP_t}{A_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \beta_2 \left( \frac{S_{t-1}}{A_{t-1}} \right) + \varepsilon_t
\]

(1)

where \(DISEXP\) represents discretionary expenses, \(A\) is total assets, and \(S\) is sales revenues.

Eq. (1) adopts the specification with panel data, considering all shares and the entire sample period. Additionally, the Hausman test was employed to detect correlated random effects. The model basically defines discretionary expenses for the current period as a function of the current level of sales, so that the regression residual \(\varepsilon_t\) is related to the magnitude of manipulation by cutting discretionary expenses (\(RAM_{DE}\)).

The second proxy utilized to capture manipulation through real activities is abnormal levels of production (\(RAM_{PROD}\)), presented by Dechow et al. (1998) and applied by Roychowdhury (2006):

\[
\frac{PROD_t}{A_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \beta_1 \left( \frac{S_t}{A_{t-1}} \right) + \beta_2 \left( \frac{\Delta S_{t-1}}{A_{t-1}} \right) + \varepsilon_t
\]

(2)

where \(PROD\) is the cost of production and \(\Delta\) is the first difference operator.

Martinez and Cardoso (2009) stress that the functionality of this formulation allows it to be applied to any type of industry, whether manufacturing or otherwise. In turn, Roychowdhury (2006) explains that inclusion of the intercept standardized by total assets allows the independent variable to be different from zero even when there are no sales for the period \(t\) or \(t-1\). Gunny (2010) explains that analysis according to production costs – rather than by cost of goods sold (COGS) or changes in inventory – is an important consideration to avoid the confounding influence of accruals-based management. For example, a manager’s decision to delay writing off a stock of obsolete products in order to reduce the cost of products sold could manifest as an abnormally low COGS. As a result, if COGS were used as the variable of analysis, the effects of ABM could be erroneously classified as the effects of RAM. In contrast, by using production costs – i.e. COGS and difference in inventory – the effect of accruals would not be confused with that of real activities because the reduction in COGS would be compensated by an increase in difference in inventory.

Abnormal cash flow levels were used to detect manipulation of sales, specified as presented in studies such as Ge (2010):

\[
\frac{CFO_t}{A_{t-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{A_{t-1}} \right) + \beta_1 \left( \frac{S_t}{A_{t-1}} \right) + \beta_2 \left( \frac{\Delta S_t}{A_{t-1}} \right) + \varepsilon_t
\]

(3)

where \(CFO\) is cash flow from operations.

As was the case with formulae (1) and (2), regressions were conducted in a panel data specification, using the Hausman test to detect correlated random effects. The equation specified in (3) defines expected operational cash flow as a linear function of sales revenues and of the change in sales revenues.

Manipulation of real activities in order to increase earnings can potentially cause one of, or a combination of, the following effects (Cohen et al., 2008): abnormally low operational cash flow; abnormally low discretionary expenses; or abnormally high production costs. For the purposes of illustration, variables representing abnormal operational cash flow and abnormal discretionary expenses were multiplied by \(-1\). As a result, high values for the proxies for abnormal cash flow (\(RAM_{CFO}\)) and abnormal discretionary expenses (\(RAM_{DE}\)) indicate greater degrees of real activities management (Roychowdhury, 2006; Cohen et al., 2008; Cohen and Zarowin, 2010; Zang, 2012). Abnormal production costs were not multiplied by \(-1\) because high values of \(RAM_{PROD}\) already indicated high degrees of manipulation by RAM.

Measures of earnings measurement were combined into other metrics in order to identify the effect of manipulation. The first of these metrics is the variable \(RAM\), which captures the total impact of manipulation through real activities. It comprises the sum of abnormal cash flow (\(RAM_{CFO}\)), abnormal discretionary expenses (\(RAM_{DE}\)) and abnormal production costs (\(RAM_{PROD}\)). Since all of these measures are standardized by total assets for the preceding financial period, they can be summed and the result
compared across companies of different sizes. Thus, high values for the RAM variable suggest intense utilization of real activities to manipulate the results for the current financial period.

The second metric is total earnings management (TOTM), which was created to synthesize the effect of earnings management using both manipulation strategies. As defined, the variable comprises manipulation by accruals-based management (ABM) and by real activities management (RAM). As Cohen et al. (2008), different measures of manipulation have distinct impacts on the results reported and so concentration into a single metric could dilute and mask individual effects. Therefore, where applicable, the results of the tests conducted will be presented with the variables that capture the individual effects of manipulation through real activities (RAMCFO, RAMDE and RAMPROD) also with the combined metrics (RAM and TOTM).

3.2.2. Investors’ perceptions of RAM

In a scenario in which earnings are made on the basis of rational expectations, investors analyze their investment decisions on the basis of the information available on variables that affect the return on assets. In such situation, this information will be incorporated into share prices, implying an efficient market. In contrast, in a scenario in which investors’ perceptions of the value of assets is out of line with the rational pricing, their expectations will be frustrated when the future profitability of those shares is different from what was expected.

The Mishkin test was used to test the hypothesis that the second scenario exists, i.e. the supposition that investors fail to incorporate the practice of earnings management through real activities into their expectations for the future performance of organizations. Mishkin (1983) proposed a test of market rationality and efficiency that consists of a nonlinear maximum likelihood estimation procedure. The test was initially designed to test the hypothesis of rational expectations in Macroeconomics, providing a statistical comparison between a measure of pricing by the market (the coefficient of evaluation) and a measure of rational expectations (the coefficient of prediction), given by a relevant variable.

The version of the Mishkin test employed in this paper is an adaptation presented by Gunny (2005) based on work by Sloan (1996). In order to explain the mechanics of the procedure, it is necessary first to discuss the application of the Mishkin test as used by Sloan (1996) in order to then present the adaptation made by Gunny (2005). In Sloan (1996), the hypothesis to be tested is that the effect of the subjective expectation of the market with respect to earnings on share prices is identical to the effect of the objective prediction on the basis of earnings, conditional on past information. Assuming that the model of expected shareholder returns is correctly specified, i.e. that the equation for equilibrium pricing is correct, the parameter estimated by the model is compared with the coefficient given by regression of earnings by lagged variables. If the two equations return different estimated parameters, the conclusion is that the market is not making rational use of historical information, in other words, the market is inefficient. For example, if the coefficient of evaluation is significantly higher than the coefficient of prediction, the Mishkin test will indicate that the market overestimates the relevant variable, in this case, earnings. The interpretation is the same, although with the opposite effect, if the coefficient of evaluation is significantly less than the coefficient of prediction, in which case the market is underestimating the relevant variable.

The hypothesis of rational expectations of future earnings states that the market’s subjective evaluation is equal to the objective evaluation, conditional on available information:

\[ E_m(Earnings_{t+1} | \phi_t) = E_t(Earnings_{t+1} | \phi_t) \]  \hspace{1cm} (4)

where \( \phi_t \) all available information for period \( t \); \( Earnings \), operating profit (EBIT); \( E_m(Earnings_{t+1} | \phi_t) \), market’s subjective expectation, conditional on \( \phi_t \); \( E_t(Earnings_{t+1} | \phi_t) \), objective expectation, conditional on \( \phi_t \).

The specification shown in (4) implies that the market’s subjective expectation of earnings is equal to the true expectation of earnings, conditional on past information. Assuming efficient markets:

\[ E_t(Y_{t+1}) = R_{t+1} - E_{m_t}(R_{t+1} | \phi_t) = 0 \]  \hspace{1cm} (5)

where \( Y_{t+1} \), is abnormal shareholder return for period \( t + 1 \); \( R_{t+1} \), is shareholder return for period \( t + 1 \); \( E_{m_t}(R_{t+1} | \phi_t) \), market’s subjective expectation of \( R_{t+1} \), conditional on \( \phi_t \).
Eq. (5) determines that $Y_{t+1}$ should not be correlated with past information. The empirical content of Eq. (5) must be provided by a model of market equilibrium, which will determine $E_m(\overline{R}_{t+1}|\varphi_t)$. Abel and Mishkin (1983) offer an in-depth discussion of several models of market equilibrium that can be used for this purpose. In common with previous investigations (Sloan, 1996), for the purposes of this study, the abnormal return adjusted by firm size will be used as a proxy for $Y_{t+1}$. The abnormal return adjusted by size represents the difference in gross shareholder return between investing in the asset in question in a buy-and-hold strategy and investing in a theoretical portfolio comprising assets that are in the same quintile for firm size, where size is defined as the entity's market capitalization at the start of the period. The gross return is calculated for the 12-month period starting from the 5th month after the end of the financial period.

From Eqs. (4) and (5), the condition of market efficiency is:

$$Y_{t+1} = \beta(Earnings_{t+1} - E_t(Earnings_{t+1}|\varphi_t)) + \varepsilon_{t+1}$$  \hspace{1cm} (6)

where $\varepsilon_{t+1}$ is the error term, $\beta$ is the response coefficient for earnings and $E_t(\varepsilon_{t+1}|\varphi_t) = 0$. Based on the model for prediction of earnings used by Sloan (1996), the test of market rationality is based on the following equations for pricing and prediction of the system:

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \nu_{t+1}$$ \hspace{1cm} (7a)

$$Y_{t+1} = \beta(Earnings_{t+1} - \alpha_0 - \alpha_1 Earnings_t) + \varepsilon_{t+1}$$ \hspace{1cm} (7b)

The prediction Eq. (7a) uses past information to predict future earnings. The weighting placed on past information, $\alpha_1$, is an objective measure of how $Earnings_t$ is related to future earnings. By linear estimation of (7a) and (7b) equation system, information on returns can be used to infer how the market uses information on $Earnings_t$ to predict $Earnings_{t+1}$. Eq. (4) implies that the market’s subjective expectation, which is conditional on past information and is given by Eq. (7a), should be equal to the objective expectation of earnings estimated by Eq. (7b). As a result, the test of rationality is $\alpha_1 = \alpha_1^*$. Equality of coefficients is tested by non-linear least squares estimation. In order to obtain estimations for both $\beta$ and for $\alpha_1$, it is necessary to assume that $\alpha_0$ in the prediction Eq. (7a) is equal to $\alpha_0$ in the shareholder returns Eq. (7b). In turn, if $\alpha_1 = \alpha_1^*$, then the residual sum of squares by estimation under restriction ($SQR^r$), in which $\alpha_1 = \alpha_1^*$, should be equal to the residual sum of squares by unrestricted estimation ($SQR^u$), with $\alpha_1 \neq \alpha_1^*$. Mishkin (1983) shows that this restriction can be tested using the likelihood ratio test, asymptotically distributed as $\chi^2(q)$ on the null hypothesis:

$$2n \times \ln \left( \frac{SQR^u}{SQR^r} \right)$$ \hspace{1cm} (8)

where $q$ is the number of restrictions imposed in a rational pricing scenario, $n$ is the number of observations in each equation (2n is the number of observations in the pooled regression), $SQR^r$ is the residual sum of squares of the restricted system and $SQR^u$ is the residual sum of squares of the unrestricted system.

Sloan (1996) further divides earnings into their components of accruals and cash flow for the Mishkin test and the coefficients are interpreted in the identical manner to the explanation above. Working from this breakdown, Gunny (2005) adapted the test to include the effects of real activities management, with the following specification:

$$Earnings_{t+1} = \gamma_0 + \gamma_{1a} CFO_t + \gamma_{1b} ACC_t + \gamma_2 I_{RAMt} + \gamma_2 CFO_t \times I_{RAMt} + \gamma_{2b} ACC_t + I_{RAMt} + \nu_{t+1}$$ \hspace{1cm} (9a)

$$Y_{t+1} = \beta(Earnings_{t+1} - \gamma_0 - \gamma_{1a} CFO_t - \gamma_{1b} ACC_t - \gamma_2 I_{RAMt} - \gamma_2 CFO_t \times I_{RAMt} + \gamma_{2b} ACC_t + I_{RAMt}) + \varepsilon_{t+1}$$ \hspace{1cm} (9b)

where $CFO$ is cash flow from operations, $ACC$ is accruals, $n$ corresponds to one of the three methods of manipulation through real activities ($RAM_{DE}$, $RAM_{PROD}$, or $RAM_{CFO}$), and $I_{RAMt}$ takes the value 1 if the firm manipulated its results through real activities.
This specification allows the subset of companies that did manage earnings through RAM to be compared with the group of companies that did not. Gunny (2005) explains that for a company to be defined as having managed earnings via RAM, it must be in the lowest quintile for RAMn and, concurrently, in the lowest quintile for Net Operating Assets (NOA). This criterion was also adopted for the present study.

Eq. (9a) is the prediction equation, in which coefficients $\gamma_{1a}$ and $\gamma_{1b}$ represent persistence of cash flow and accruals respectively. In turn, the coefficients $\gamma_{2a}$ and $\gamma_{2b}$ capture the cash flow and accruals persistence differentials for companies that did manipulate via RAM in relation to the rest of the sample. Gunny (2005) explains that Eq. (9b) assumes that the market reacts to unexpected profits, in addition to estimating the weighting that the market puts on the components cash flow and accruals when predicting future profits. The comparison of the coefficients in (9a) and (9b) is intended to indicate whether the market efficiently prices the components of earnings by comparing companies that engage in RAM with companies that do not.

4. Analysis of results

4.1. Manipulation through real activities

Table 1 shows estimates, descriptive statistics and correlations between the normal and abnormal levels of real activities and accruals. Panel A lists the results for Eqs. (2)–(4). The coefficients all have the expected signs and, with the exception of variable $\Delta S_l/A_{l-1}$ used in Eq. (3), all are significant to 5% or better. These findings are in conformity with studies undertaken previously with data from the North-American market (Roychowdhury, 2006; Zang, 2012).

Panel B in Table 3 shows descriptive statistics for the metrics for earnings management via ABM and RAM strategies, the second of which is made up of manipulation via discretionary expenses ($RAM_{DE}$), production costs ($RAM_{PROD}$) and sales ($RAM_{CFO}$). Additionally, consolidated measure of real activities management ($RAM$) and total earnings management ($TOTM$) are shown, plus the absolute values of ABM and RAM, represented by the variables $RAM_{ABS}$ and $RAM_{ABS}$, respectively. The resulting values contrast with figures published by Martinez and Cardoso (2009) who also studied the Brazilian market. Possible explanations include differences related to the following factors: time period, models employed, and treatment of outliers.

It is worth pointing out that metrics for earnings manipulation were “Winsorized” to 1.5% at the top and tail of the distribution in order to eliminate outliers. As a result, not all of the mean values for the proxies are equal to zero. Since the results are standardized against total assets for the previous financial period, it can be stated that companies used accrual-based methods to manage ($ABM_{ABS}$), on median, an equivalent of 4% of total assets at $t - 1$. In absolute terms, the quantity manipulated using RAM methods ($RAM_{ABS}$) is greater, equating to approximately 8% of total assets for the preceding financial period.

Panel C of Table 1 lists the Pearson and Spearman correlations between proxies of manipulation. All coefficients were statistically significant to 1%. There was a positive correlation between $RAM_{DE}$ and $RAM_{PROD}$, possibly because management cut a proportion of discretionary costs whilst also increasing production. In contrast, the linear association between $RAM_{DE}$ and $RAM_{CFO}$ is negative, possibly because these forms of manipulation have adverse effects on cash flow. The positive and significant correlation between $RAM$ and $ABM$ suggests that companies employ both management strategies to manipulate the results reported for the period.

Manipulation through real activities generates one of, or a combination of, the following effects: abnormally low operational cash flow; abnormally low discretionary costs; or abnormally high production costs (Cohen et al., 2008). These conditions can be tested using the specification proposed by Roychowdhury (2006), which allows comparison of companies suspected of earnings management with the remainder of the sample:

$$y_{RAM_{DE}}$$ (10)
Table 1
Measurement of RAM and ABM.

Panel A – estimates of expected levels of accruals and real activities

<table>
<thead>
<tr>
<th>Variable</th>
<th>DISEXP₁/₆ₐ₋₁</th>
<th>PROD₁/₆ₐ₋₁</th>
<th>CFO₁/₆ₐ₋₁</th>
<th>ACC₁/₆ₐ₋₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.0234***</td>
<td>-0.0435**</td>
<td>0.0366***</td>
<td>-0.0216***</td>
</tr>
<tr>
<td>1/₆ₐ₋₁</td>
<td>0.4832***</td>
<td>-1.2142**</td>
<td>0.09256**</td>
<td>0.0313***</td>
</tr>
<tr>
<td>Ș₋₁/₆ₐ₋₁</td>
<td>0.1210***</td>
<td>0.8054***</td>
<td>0.0648**</td>
<td>0.0006</td>
</tr>
<tr>
<td>ΔȘ₋₁/₆ₐ₋₁</td>
<td>-0.0071**</td>
<td>1.0234***</td>
<td>0.0082</td>
<td></td>
</tr>
</tbody>
</table>

Adjusted R² 0.8292

Panel B – descriptive statistics for accrual-based management and real activities

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>25th percentile</th>
<th>Median</th>
<th>75th percentile</th>
<th>Obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABMₜ</td>
<td>-0.0001</td>
<td>0.0760</td>
<td>-0.0425</td>
<td>-0.003</td>
<td>0.0413</td>
<td>3214</td>
</tr>
<tr>
<td>ABMₐₑᵦ</td>
<td>0.0570</td>
<td>0.0503</td>
<td>0.0179</td>
<td>0.0420</td>
<td>0.0831</td>
<td>3214</td>
</tr>
<tr>
<td>RAMₜ</td>
<td>0.0111</td>
<td>0.1442</td>
<td>-0.0810</td>
<td>0.0027</td>
<td>0.0866</td>
<td>2902</td>
</tr>
<tr>
<td>RAMₐₑᵦ</td>
<td>0.1098</td>
<td>0.0934</td>
<td>0.0393</td>
<td>0.0836</td>
<td>0.1533</td>
<td>2902</td>
</tr>
<tr>
<td>RAM₆ₑᵦ</td>
<td>0.0001</td>
<td>0.0453</td>
<td>-0.0200</td>
<td>0.0026</td>
<td>0.0237</td>
<td>4058</td>
</tr>
<tr>
<td>RAMₗₑᵦ</td>
<td>0.0006</td>
<td>0.0724</td>
<td>-0.0392</td>
<td>0.0004</td>
<td>0.0375</td>
<td>3339</td>
</tr>
<tr>
<td>RAM₇ₑᵦ</td>
<td>-0.0001</td>
<td>0.0941</td>
<td>-0.0550</td>
<td>-0.0010</td>
<td>0.0528</td>
<td>3225</td>
</tr>
<tr>
<td>TOT₉ₑᵦ</td>
<td>0.0013</td>
<td>0.1866</td>
<td>-0.1076</td>
<td>0.0006</td>
<td>0.1113</td>
<td>2823</td>
</tr>
</tbody>
</table>

Panel C – Pearson’s (upper triangle) and Spearman’s (lower triangle) correlation coefficients

<table>
<thead>
<tr>
<th>ABMₜ</th>
<th>RAMₜ</th>
<th>RAM₆ₑᵦ</th>
<th>RAMₗₑᵦ</th>
<th>RAMₗₑᵦ</th>
<th>RAM₇ₑᵦ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4618</td>
<td>0.4543</td>
<td>0.3378</td>
<td>0.8135</td>
<td>0.8000</td>
<td>0.6201</td>
</tr>
<tr>
<td>0.0743</td>
<td>0.2539</td>
<td>0.2552</td>
<td>-0.1189</td>
<td>0.4066</td>
<td></td>
</tr>
<tr>
<td>0.0905</td>
<td>0.1846</td>
<td>0.4245</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

where Yₜ refers to one of the forms of manipulation through real activities (RAM₆ₑᵦ, RAMₗₑᵦ, and RAM₇ₑᵦ), MtB refers to the market-to-book ratio, and MVₜ is the natural logarithm of the company’s market value.

Eq. (10) is run in a panel data model and correlated random effects are identified by the Hausman test. The Suspectₜ coefficient will be positive if the companies under suspicion recorded higher abnormal levels of operational activities than the remainder of the sample. In order to control for systematic variation in the metrics of manipulation through real activities, related to firm size and growth opportunities respectively, the variables MV and market-to-book ratio (MtB) were included in the regressions. Additionally, the control variable Return on Assets (ROA) is included to reduce possible bias introduced by correlations between performance and abnormal values.
Table 2
Suspected companies that meet or exceed benchmarks.

<table>
<thead>
<tr>
<th></th>
<th>$RAM_t$</th>
<th>$RAM_{DE}$</th>
<th>$RAM_{PROD}$</th>
<th>$RAM_{CFO}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A – suspects are companies that meet or barely exceed zero earnings (n = 132)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>−0.0011</td>
<td>−0.0005</td>
<td>−0.0012</td>
<td>−0.0024</td>
</tr>
<tr>
<td>$MV_{t-1}$</td>
<td>0.0033**</td>
<td>0.0094**</td>
<td>0.0004</td>
<td>−0.0007</td>
</tr>
<tr>
<td>$MtB_{t-1}$</td>
<td>0.0002</td>
<td>−0.0002</td>
<td>−0.0002</td>
<td>−0.0003</td>
</tr>
<tr>
<td>$ROA_t$</td>
<td>−0.0512***</td>
<td>0.0033**</td>
<td>−0.0027***</td>
<td>−0.0534***</td>
</tr>
<tr>
<td>$Suspect_t$</td>
<td>0.0585***</td>
<td>0.0053</td>
<td>0.0344***</td>
<td>0.0262</td>
</tr>
<tr>
<td>Panel B – suspects are companies that meet or exceed earnings for the preceding financial period (n = 101)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0009</td>
<td>−0.0009</td>
<td>−0.0003</td>
<td>−0.0013</td>
</tr>
<tr>
<td>$MV_{t-1}$</td>
<td>0.0030*</td>
<td>0.0096**</td>
<td>0.0004</td>
<td>−0.0009</td>
</tr>
<tr>
<td>$MtB_{t-1}$</td>
<td>0.0002</td>
<td>−0.0002</td>
<td>−0.0002</td>
<td>−0.0003</td>
</tr>
<tr>
<td>$ROA_t$</td>
<td>−0.0510***</td>
<td>0.0033**</td>
<td>−0.0026**</td>
<td>−0.0532***</td>
</tr>
<tr>
<td>$Suspect_t$</td>
<td>0.0068</td>
<td>0.0205**</td>
<td>0.0095</td>
<td>−0.0029</td>
</tr>
<tr>
<td>Panel C – suspects are companies with 0–10% variation on EBIT for t − 1 (n = 232)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0027</td>
<td>−0.0007</td>
<td>0.0006</td>
<td>−0.0001</td>
</tr>
<tr>
<td>$MV_{t-1}$</td>
<td>0.0032*</td>
<td>0.0093**</td>
<td>0.0004</td>
<td>−0.0006</td>
</tr>
<tr>
<td>$MtB_{t-1}$</td>
<td>0.0003</td>
<td>−0.0002</td>
<td>−0.0001</td>
<td>−0.0003</td>
</tr>
<tr>
<td>$ROA_t$</td>
<td>−0.0506***</td>
<td>0.0034**</td>
<td>−0.0029**</td>
<td>−0.0531***</td>
</tr>
<tr>
<td>$Suspect_t$</td>
<td>−0.0289***</td>
<td>0.0059*</td>
<td>−0.0098**</td>
<td>−0.0245***</td>
</tr>
</tbody>
</table>

* Statistically significant to 10%, respectively.
** Statistically significant to 5%, respectively.
*** Statistically significant to 1%, respectively.

Coefficients were estimated for observations that comprised the sample from 1989 to 2012, using the following regression.

$$Y_t = \alpha_0 + \beta_1MV_{t-1} + \beta_2MtB_{t-1} + \beta_3ROA_t + \beta_4Suspect_t + \epsilon_t$$ (10)

where the dependent variable $Y_t$ corresponds to one of the measures of earnings management ($RAM_t$, $RAM_{DE}$, $RAM_{PROD}$, or $RAM_{CFO}$), according to the models described in Section 3.2.1. $Suspect$ is a binary variable that takes the value of 1 when the firm-year observation meets one of the benchmarks indicated in panels A, B or C.

Panel A shows coefficients for suspected companies that hit the benchmark zero earnings, which corresponds to firm-year observations for which earnings per share (EBIT) – standardized by total assets for the preceding financial period – is in the range from 0 to 0.01.

Panel B shows the coefficients for those suspected companies that hit the benchmark earnings for the preceding financial period, defined as firm-year observations for which the difference in earnings per share in relation to the immediately preceding period falls in the range from R50.00 to R50.10.

Panel C shows the coefficients for suspected companies that hit the benchmark variation in EBIT, which corresponds to firm-year observations for which change in EBIT between $t − 1$ and $t$ is in the range from 0 to 1%.

These results are shown in Table 2. Coefficients for suspected companies that meet or barely exceed the zero earnings threshold (Panel A) were positive and significant for all types of $RAM$, with the exception of $RAM_{DE}$. The combined metric for overall manipulation by real activities – $RAM_t$ – had a coefficient of 0.0585, which was significant to 1%. Therefore, the companies suspected of managing earnings to achieve zero earnings exhibited a level of real activities that was greater, on average, by an equivalent of 5.85% of their total assets, when compared to the other companies that make up their respective market segments. For example, companies suspected of managing results to meet or exceed earnings for the preceding financial period (Panel B) exhibited a level of abnormal reduction of discretionary costs that was equivalent to 2.05% of total assets. This finding constitutes evidence to support accepting hypothesis $H1$.

4.2. Investors’ perceptions of $RAM$

The Mishkin test was applied as part of the procedures conducted to test hypothesis $H2$. Gunny (2005) claims that this test methodology, based on comparison of historic weightings against weightings inferred by the market, makes it possible to determine whether investors perceive $RAM$ when it occurs and take account of its implications for future earnings. Table 3 lists the results of the Mishkin test, broken down by each type of manipulation through real activities: $RAM_{DE}$ (Panel A), $RAM_{PROD}$
Table 3
Mishkin test.

<table>
<thead>
<tr>
<th></th>
<th>Prediction</th>
<th>Evaluation</th>
<th>Likelihood ratio</th>
<th>Marginal signif.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>t-stat</td>
<td>Estimate</td>
<td>t-stat</td>
</tr>
<tr>
<td>Panel A – RAM_{DE}</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0213</td>
<td>9.7346</td>
<td>0.0357</td>
<td>4.0358</td>
</tr>
<tr>
<td>CFO_t</td>
<td>0.6144</td>
<td>36.5346</td>
<td>0.4817</td>
<td>7.1000</td>
</tr>
<tr>
<td>ACC_t</td>
<td>0.5419</td>
<td>23.7504</td>
<td>0.5400</td>
<td>5.9067</td>
</tr>
<tr>
<td>γ_3IRAM_{M0t}</td>
<td>−0.0231</td>
<td>−1.4054</td>
<td>−0.0158</td>
<td>−0.2555</td>
</tr>
<tr>
<td>γ_4CFO_t + IRAM_{M4t}</td>
<td>0.1964</td>
<td>1.8363</td>
<td>0.2550</td>
<td>0.6283</td>
</tr>
<tr>
<td>γ_5ACC_t + IRAM_{M5t}</td>
<td>0.1165</td>
<td>0.9139</td>
<td>0.2437</td>
<td>0.4985</td>
</tr>
<tr>
<td>Panel B – RAM_{PROD}</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0211</td>
<td>9.5465</td>
<td>0.0342</td>
<td>13.9811</td>
</tr>
<tr>
<td>CFO_t</td>
<td>0.6159</td>
<td>36.8623</td>
<td>0.5018</td>
<td>3.8214</td>
</tr>
<tr>
<td>ACC_t</td>
<td>0.5402</td>
<td>23.6778</td>
<td>0.5542</td>
<td>7.4409</td>
</tr>
<tr>
<td>γ_3IRAM_{PROD}</td>
<td>−0.0116</td>
<td>−0.9232</td>
<td>0.0660</td>
<td>6.0269</td>
</tr>
<tr>
<td>γ_4CFO_t + IRAM_{PROD}</td>
<td>0.2095</td>
<td>1.6736</td>
<td>−0.7023</td>
<td>1.2197</td>
</tr>
<tr>
<td>γ_5ACC_t + IRAM_{PROD}</td>
<td>0.2163</td>
<td>1.5540</td>
<td>−0.5265</td>
<td>−1.3514</td>
</tr>
<tr>
<td>Panel C – RAM_{CFO}</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0203</td>
<td>9.0887</td>
<td>0.0335</td>
<td>14.0652</td>
</tr>
<tr>
<td>CFO_t</td>
<td>0.6177</td>
<td>36.7824</td>
<td>0.5004</td>
<td>3.7015</td>
</tr>
<tr>
<td>ACC_t</td>
<td>0.5372</td>
<td>23.3479</td>
<td>0.5410</td>
<td>7.4286</td>
</tr>
<tr>
<td>γ_3IRAM_{CFO}</td>
<td>0.0109</td>
<td>1.0339</td>
<td>0.0328</td>
<td>5.8675</td>
</tr>
<tr>
<td>γ_4CFO_t + IRAM_{CFO}</td>
<td>0.1549</td>
<td>1.4167</td>
<td>−0.3330</td>
<td>0.7487</td>
</tr>
<tr>
<td>γ_5ACC_t + IRAM_{CFO}</td>
<td>0.1040</td>
<td>0.9142</td>
<td>−0.1124</td>
<td>−0.7188</td>
</tr>
</tbody>
</table>

Coefficients were estimated using the following regression, covering the period from 1989 to 2012.

Forecasting equation,

\[
Earnings_{t+1} = \gamma_0 + \gamma_1CFO_t + \gamma_2ACC_t + \gamma_3IRAM_{M0t} + \gamma_4CFO_t * IRAM_{M4t} + \gamma_5ACC_t * IRAM_{M5t} + \epsilon_{t+1}
\] (9a)

Pricing equation,

\[
SAR_{t+1} = \alpha_0 + \beta (Earnings_{t+1} - \gamma_0 - \gamma_1CFO_t - \gamma_2ACC_t - \gamma_3IRAM_{M0t} - \gamma_4CFO_t * IRAM_{M4t} - \gamma_5ACC_t * IRAM_{M5t}) + \epsilon_{t+1}
\] (9b)

where the dependent variable in the forecasting equation – \(Earnings_{t+1}\) – refers to the EBIT for the following period; the variable \(IRAM_{M0t}\), is a binary variable that takes the value 1 if the firm is in the lowest quintile for \(RAM_{M}\), and in the lowest quintile for \(NOA_{t-1}\). In turn, \(RAM_{M}\) can take one of the 3 measures of earnings management by real activities: \(RAM_{DE}\), \(RAM_{PROD}\), or \(RAM_{CFO}\).

The dependent variable in the pricing equation – \(SAR_{t+1}\) – corresponds to the size adjusted abnormal return, i.e. the gross return from a buy-and-hold strategy less the buy-and-hold return for the corresponding quantile according to the size variable. The period of accumulation for calculation of abnormal returns is a 12-month interval starting the 5th month after the end of the financial period.

(Panel B) and \(RAM_{CFO}\) (Panel C). In all cases the investors appear to underestimate the persistence of the cash flow component of earnings and overestimate the persistence of the accruals component of earnings. For example, in Panel A the coefficient of prediction, a proxy for rational estimates, for persistence of the cash flow (accruals) component of earnings is 0.6144 (0.5417), whereas the coefficient of evaluation – a proxy for the market’s estimates – is 0.4817 (0.5400). Both coefficients are significant, with \(t\) statistics of 36.5346 (23.7504) for the coefficient of prediction and 7.1000 (5.9067) for the coefficient of evaluation of the cash flow (accruals) component of earnings.

In order to determine whether the market efficiently recognizes the differential in persistence of the cash flow and accruals components of earnings between companies suspected of managing by real activities and those that do not manage earnings, the conditions \(\gamma_3 = \gamma_4^*\), \(\gamma_4 = \gamma_4^*\) and \(\gamma_5 = \gamma_5^*\) are tested for the coefficients of Eqs. (9a) and (9b). Since the aim is to test the differential in persistence between the two groups, the statistics likelihood ratio and marginal significance level are only shown for the coefficients tested. Specifically, Table 3 shows the likelihood ratio and marginal significance for the mean effect of each type of manipulation through real activities and for the differentials of the factors of persistence of the cash flow and accruals components.
Panel A of Table 3 lists the results of the Mishkin test, with the sample split by reduction in discretionary costs. The coefficient of the variable that indicates this type of manipulation in the forecasting equation is $-0.0231$, whereas the market perception of manipulation is $-0.0158$. The equations were estimated once more, this time imposing the restriction that the coefficients must be equal. The likelihood ratio (0.0371) indicates that the differential in persistence between the forecasting equation and the pricing equation is not significantly different (marginal significance of 2.0339). The differentials in persistence factors for cash flow and for accruals were also not significant. These findings appear to indicate that the market assesses the impact on future earnings of manipulation by reduction of discretionary costs in an efficient manner.

Panel B lists the results of the Mishkin test, split by manipulation of production costs. The coefficient $\gamma_3$ of the variable that indicates this type of manipulation is $-0.0116$ (non-significant), whereas the market estimates it at 0.0660. The likelihood ratio of 5.5864 indicates that the differential of persistence between the forecasting equation and the pricing equation is significant (marginal significance of 0.0103), showing that the market overestimates the contribution of $RAM_{PROD}$ to future earnings. In turn, the differential in persistence factors for the cash flow earnings component is 0.2095, whereas the market predicts $-0.7023$ (non-significant). The likelihood ratio (5.5864) shows that the differential in persistence between the forecasting equation and the pricing equation is significantly different (marginal significance of 0.0022). For the persistence of the accruals component of earnings, the estimate according to the forecasting equation is 0.2163 (non-significant) and according to the pricing equation it is $-0.5265$ (non-significant). Once more, the likelihood ratio (4.9498) rules out equality of the coefficients (marginal significance of 0.0151). Taken together, these findings appear to indicate that the market overestimates the contribution of $RAM_{PROD}$ to future earnings.

Panel C of Table 3 shows the results of the analysis of the differentials in persistence identified by the Mishkin test for the sample broken down by manipulation of sales revenues. The coefficient $\gamma_3$, which represents the mean effect, is equal in the forecasting equation and in the pricing equation (likelihood ratio of 0.6647, marginal significance of 0.3509). The variable indicative of the factor of persistence for cash flow has coefficient $\gamma_4$ of 0.1549 (non-significant), while the market estimation coefficient is $-0.3330$ (non-significant) and the likelihood ratio (2.9678) rules out equality of the coefficients. In turn, there is no difference in the persistence factor between cash flows and the accruals components of earnings according to the forecasting and pricing equations (likelihood ratio of 0.5477).

This evidence partially supports hypothesis H2, particularly with relation to manipulation by increasing production. In contrast, the market does appear to evaluate manipulation by reduction of discretionary costs in an efficient manner. However, with relation to manipulation of sales revenues, the market fails to incorporate the effects of the persistence factor of the cash flow component of earnings into its expectations of future earnings.

5. Conclusions

The first study hypothesis (H1) stated that companies on the Brazilian capital market employ real activities as a strategy for manipulation of the results reported at the end of the financial year. Models created specifically for studies of this type were employed to test this hypothesis, in particular specifications presented in work by Roychowdhury (2006). Estimates of abnormal levels of real activities were obtained by panel data regressions covering the entire sample. The results observed support acceptance of hypothesis H1. Specifically, after controlling for the effects of firm size, growth opportunities and profitability, metrics of manipulation through real activities exhibited positive, linear and significant associations with scenarios in which the occurrence of earnings management is predicted (zero earnings, earnings for the preceding financial period, variation in earnings). These conclusions on use of real activities to manipulate results agree with the findings of previous studies conducted in the North American market and the Brazilian market.

The second hypothesis (H2) stated that the market fails to price the practice of real activities earnings management into its expectations of the future performance of entities. This analysis employed an adaptation of the Mishkin test proposed by Gunny (2005). The adaptation determines whether the market incorporates the impact of manipulation through real activities into its expectations of future performance, as reflected by share prices. The results of this test provided evidence that the market
does understand the consequences of manipulation by reducing discretionary costs, but fails to evaluate the effects of earnings management through altering production costs and cash flow attributed to manipulation through sales revenues. These findings therefore partially support hypothesis H2.

This study contributes to the literature on earnings management in Brazil and is the first research to document several aspects related to manipulation through real activities, including an analysis of the market’s ability to perceive the implications for future earnings of real activities management and duly adjust its expectations of the predicted return from shares. The findings of this analysis can be used to determine whether there is information asymmetry resulting from the investors’ failure to perceive that RAM is taking place, which is potentially harmful to the company.

The results of this research are of use to stakeholders for at least three reasons. Firstly, these findings confirm the occurrence of manipulation through real activities in the Brazilian capital market, indicating that earnings management in Brazil goes beyond the use of accounting decisions. Therefore, the users of financial statements should take into account not only the effects of discretionary accruals, but also the effects of those operational practices that impact on the results reported at the end of the financial year. This insight is important, because adjustments intended to discount the effect of manipulation tend to be more efficient when there is greater understanding of the management techniques applied to the data disclosed.

Secondly, this study has made advances in identification of the information asymmetry created by real activities management in Brazil. If investors are unaware of the implications of manipulation, they will not be able to make the necessary adjustments when forming their expectations of the future performance of an entity. There is evidence of information asymmetry caused by some forms of manipulation through real activities. Among other consequences, if investors allocate resources to assets for which the results have been manipulated, they will be frustrated when the future performance is different from their expectations.

The field of research into subjects related to real activities management is vast. The investigation described in this paper did not pursue an exhaustive list of potential RAM techniques, such as delaying or canceling new investment projects and hedging in derivatives. Additionally, factors such as institutional differences, the legal system in force (code law/common law), corporate governance, the role of auditing, the influence of sophisticated investors and the relevance of accounting information were not considered in this study, even though some are costs that determine manipulation strategies. An extended analysis, considering other forms of manipulation through real activities and additional determinant costs, should further increase understanding of the effects of this earnings management strategy in companies on the Brazilian capital market.

References


