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DISCRETIONARY ACCRUALS: THE MEASUREMENT ERROR INDUCED BY CONSERVATISM

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Abstract

This paper discusses the sign of the expected measurement error in discretionary accruals (*DAC*) estimates when accrual models do not control for the asymmetric treatment of gains and losses underlying conservatism. I show that *DAC* in firms with "bad news" are expected to be understated (positive measurement error), while those in "good news" firms will be overstated (negative measurement error). Based on this original result, and using graphical analysis, I discuss an empirical illustration, which corroborates the expectations.

Keywords: accruals; accrual models; earnings management.
Data availability: data are available from the sources mentioned in the study.
JEL: M41, C2.

"ACCRUALS" DISCRICIONÁRIOS: O ERRO DE ESTIMAÇÃO INDUZIDO PELO CONSERVANTISMO

Resumo

Este estudo discute o sinal do erro de estimação contido nas estimativas dos "accruals" discricionários (*DAC*) quando os modelos de "accruals" não controlam o efeito assimétrico relativo ao tratamento dos ganhos e perdas e inerente ao princípio do conservantismo. Mostro que será de esperar que os *DAC* das empresas com "más notícias" estão subestimados (erro de estimação positivo), e que os das empresas com "boas notícias" estão sobrestimados (erro de estimação negativo). Baseado neste resultado original e usando análise gráfica discuto uma ilustração empírica que corrobora aquelas expectativas.

Palavras – chave: "acruals"; modelos de"accruals" manipulação dos resultados.
Disponibilidade dos dados: Os dado gestão disponíveis nas fontes indicados no estudo.
Classificação do JEL: M41, C2.

1. INTRODUCTION

Earnings management actions tend to leave a trail in firms' accounting.[1] The studies that look for signs of such management - either specific studies on manipulation (e.g. Jones, 1991) or studies on earnings quality (e.g. Burgstahler et al., 2006) - do so through an accruals' analysis.[2] To achieve this, researchers split total accruals (*ACC*) into two components: a non-discretionary one (*NDAC*), assumed to be the level of accruals the firm would report if there were no manipulation; a discretionary part (*DAC*), obtained by deducting *NDAC* from *ACC*, which is taken as a signal of manipulation.

Accrual models are the technology used to make such a split, and because of that, they have always played a paramount role in empirical Accounting research. However, it is widely accepted in the literature that such models do not work well in identifying earnings management practices. They are not well-specified (Dechow et al., 1995); are not precise in estimating *DAC* (Guay et al., 1996) because they do not control for factors like growth, level of cash flows, financial gearing and income smoothing (Young, 1999); and have a low forecasting power (Thomas and Zhang, 2000).

These limitations are a strong motivation for undertaking research directed at the improvement of such models and at a more accurate perception of the quality of their estimates. In this study, I follow such a motivation, and discuss a limitation that until recently has been "forgotten" although Healy (1996) mentioned it "en passant": the inability of (traditional) accrual models to control for the asymmetric impact of conservatism on accruals (and earnings). The current study thus analyses the quality of *DAC* under conservative accounting. My intuition is that *DAC* estimates contain a measurement error, and that this is different for firms with expected gains in the period ("good news", *GN*) and expected losses ("bad news", *BN*).

The study is structured as follows. In section 2, I discuss the impact of conservatism on *ACC* and in section 3 the nature and sign of the error in *DAC* estimates. In section 4, I present an empirical illustration. Section 5 contains a short conclusion.

2. THE IMPACT OF CONSERVATISM ON ACCRUALS

The conservatism principle refers to the prudence that managers must use in recognising expected gains and losses, adopting an asymmetric treatment of these

[1] According to Schipper (1989) and Healy and Wahlen (1999), earnings management is the result of managers' accounting choices intended to influence financial reporting and, through it, obtain a benefit for themselves or their firms.

[2] The English term "accruals" (*ACC*) corresponds in Portuguese to the "*variação do fundo de maneio*" and relates to operating income (*OI*) in the following way: *OI* = *CFO* + *ACC*, where *CFO* is operating cash flow.

earnings components that is more stringent for the latter than for the former. Losses ("bad news", *BN*) must be recognised as soon as they become expected, while expected gains ("good news", *GN*) need only be recognised when they become realisable/ realised. Let us suppose the expectation of a bad debt. Accounting has to recognise a provision to cover the underlying potential cost immediately. However, if there is an expectation that a debt previously deemed as bad is now receivable, accounting only recognises such a gain when the bad debt is effectively received. Thus, the asymmetric treatment of expected losses and gains implies that the former are more timely recorded than the latter, and the overall impact on accruals (earnings) is negative.[3]

Empirical studies on earnings management usually split accruals (*ACC*) into two components as follows: a discretionary component (*DAC*), related to managers' interventions towards earnings management; and a non-discretionary component (*NDAC*), related to firms' normal business activity. For a given period, it can then be written:

$$ACC = NDAC + DAC.^4 \quad (1)$$

Because of its nature, *NDAC* can be written as a function *f* that relates this non-discretionary component positively to the earnings drivers of normal accruals and negatively to the (conditional) conservatism embodied in the general accepted accounting principles (GAAP).[5] This is,

$$NDAC = f(\textit{accrual drivers; GAAP conservatism}). \quad (2)$$

The impact of conservatism on accruals is asymmetric, and depends on the type of news affecting the firm. As mentioned above, *BN* affect accruals negatively; *GN* tend not to have an impact on them. Conversely, conservatism does not have an impact on the accruals drivers. If one thinks about sales, for example, the existence of *BN* or *GN* does not affect them.[6] This is the source of the problem (or of the solution).

The structure of a Jones-type accrual model is based on a single linear equation that takes the form

$$ACC_{it} = \alpha_0 + \alpha_1 Y_{it} + \varepsilon_{it}, \quad (3)$$

[3] The impact of conservatism flows to earnings through accruals (*ACC*) because cash flow recognition is made on a realisation basis. Thus conservatism does not contemporaneously affect cash flows (e.g. Moreira, 2002; Ball and Shivakumar, 2006).

[4] For the sake of simplicity and because there is no loss of precision, I do not include the subscripts for time and firm.

[5] E.g. Jones (1991); Basu (1997); Peasnell et al. (2000).

[6] Moreira (2002) shows evidence supportive of the absence of conservatism impact on the determinants of accruals.

where ACC is an aggregate measure of accruals, Y is a vector with one or more earnings components ("accrual drivers", such as revenue or cash flow) designed to explain the dependent variable, ε is the residual of the regression, α_0 and α_1 are parameters, and t designates the specific time period.

I re-write this expression to reflect in it the information in equations (1) and (2). My purpose is to allow a better perception of the impact of conservatism on accrual models and, most especially, on their estimates. Expression (3) becomes:

$$NDAC\ [f\ (accrual\ drivers;\ conservatism)]+DAC = \\ = \alpha_0 + \alpha_1 Y\left[accrual\ drivers\right] + \varepsilon\ . \qquad (3')$$

This expression highlights some important aspects for a correct understanding of the impact of conditional conservatism on accrual models and their estimates. The left hand side (ACC) is negatively affected by conservatism, as previously mentioned. Conversely, on the right hand side of this expression, the accrual drivers are unaffected by conservatism, and the independent term (α_0) and the error term (ε) tend to absorb the underlying impact.[7]

The consequence is easy to predict, the (normal) part of the ACC explained by the model is:

$$\hat{A}CC_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 Y_{it}\ ; \qquad (4)$$

the estimates of DAC (the abnormal part) are given by ($\hat{\varepsilon}$):

$$ACC_{it} - \hat{A}CC_{it} = \hat{\varepsilon}_{it} = DAC_{it}\ ;^{8} \qquad (5)$$

and thus DAC contain a measurement error, that is different by type of news (GN, BN).

The following section discusses in detail the nature of such an error.

3. THE NATURE OF DISCRETIONARY ACCRUALS' MEASUREMENT ERROR

Let us return to equation (3):

$$ACC_{it} = \alpha_0 + \alpha_1 Y_{it} + \varepsilon_{it}\ .$$

[7] In econometric terms, if there are uncorrelated omitted variables, then the coefficients of the explanatory variables will be unbiased, but the intercept will pick up the mean effect of those omitted variables and the error term will pick up the remaining effect.

[8] If the model is estimated in time-series, *DAC* is the residual of the regression. Otherwise, when estimated cross-sectionally by industry, *DAC* can be understood as a forecast error. In any case, the lack of a variable controlling for the impact of conservatism provokes a measurement error in *DAC*.

Because the intercept absorbs the average effect of the uncorrelated omitted variables - in this particular case the variable that should control for the impact of conservatism on ACC - I expect that term to be higher for firms with GN (their ACC are not affected) than for firms with BN (their ACC are negatively affected), i.e. $\alpha_{0GN} > \alpha_{0BN}$.

When firms have both types of news over time (potentially the most frequent case), or when the model is estimated cross-sectionally by industry, one may expect that, with no control for conservatism, the size of the intercept will lie somewhere between the extreme cases characterised by having only one type of news. Let us call this the "average intercept" (α_{0m}). Given the asymmetric impact of conservatism on ACC, I expect this intercept is understated for GN firms and overstated for BN firms, i.e. $\alpha_{0BN} > \alpha_{0m} > \alpha_{0MN}$.

The consequences of this situation for the estimation of DAC are as follows: for GN firms, estimated normal ACC will tend to be smaller than they should be (Equation 4) and DAC will be overstated (Equation 5); for BN firms the opposite occurs, and DAC are understated. Thus, there is a measurement error, as I have already mentioned in the previous section.

Let us consider the measurement error (ERR) as the difference between the true estimates of DAC (DAC_C)[9] and the estimates obtained with a model that does not control for the impact f conservatism (DAC_{NC}), i.e. $ERR = DAC_C - DAC_{NC}$. Given the above discussion, I expect $ERR_{GN} < 0$ and $ERR_{BN} > 0$.

In sum, the discussion in this and in the previous section supports the initial intuition that the traditional accrual models are not well specified and produce DAC estimates that contain a non-systematic measurement error induced by the lack of control for the asymmetric the impact of conservatism on earnings (accruals).

In the next section, I use a graphic methodology to present an empirical illustration that corroborates the deductive conclusions being presented.

4. AN EMPIRICAL ILLUSTRATION

To make the structuring of the current text easier, and because I consider the empirical evidence discussed in this section a mere illustration of the results deduced in the two previous sections, I display as an annex the information related to the aspects concerning accrual models definition and sample selection.[10]

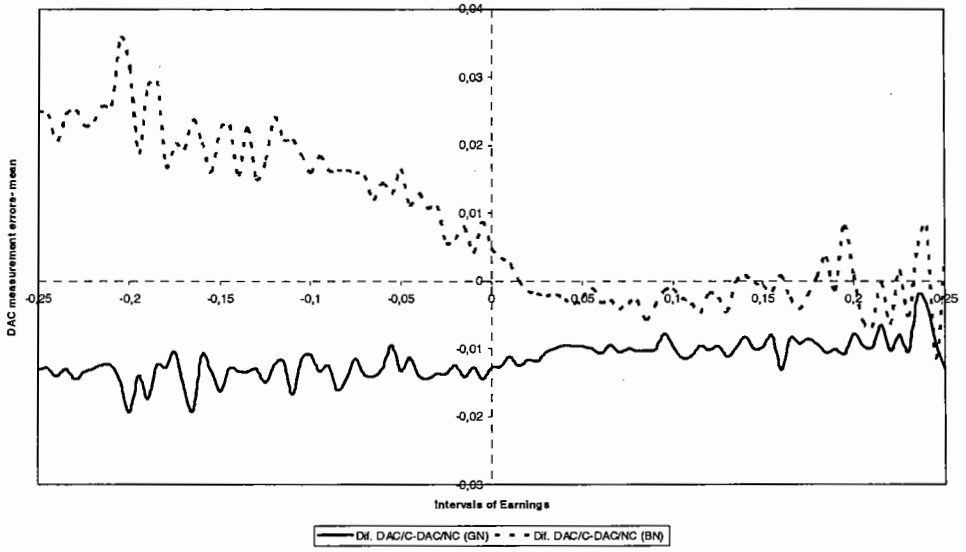
The graphical evidence provided corroborates what was said in the previous sub-section about the impact of controlling for good and bad news on DAC

[9] In the empirical illustration I display in the next section, I take as "true *DAC* estimates" those that are obtained from an accrual model that includes a control for the impact of conservatism.

[10] For greater detail see Moreira (2002).

GRAPH 1

The Jones (1991) model – Difference between *DAC* estimates controlling/not controlling for the asymmetric recognition of gains and losses, by intervals of deflated earnings.



For *GN* (solid line) and *BN* (dashed line), the graph plots the difference between the mean of *DAC* controlling (*C*)/not controlling (*NC*) for the asymmetric recognition of gains and losses, by intervals of deflated earnings The interval width of earnings deflated by average total assets is 0.005. For example, a point on the dashed line can be read as the mean of *BN*/C minus the mean of *BN*/NC for the relevant interval. The sample size is 71,409 obs.

estimation.[11] The graph shows the distribution of DAC measurement errors (ERR) by intervals of deflated earnings.[12] The horizontal (zero) axis of each graph corresponds to a situation where ERR is null. The vertical distance between the line and the axis is the effect of controlling for conservatism news, i.e. the positive or negative size of ERR.

For firms with "good news" (GN), solid line, ERR is negative throughout the distribution, and has a stable size of around one percent of average total assets in the central part of the distribution. This graphical evidence is consistent with my prediction of a negative measurement error in DAC estimates for GN firms, i.e. $ERR_{GN} < 0$).

The dashed line in the upper part of the graph plots the measurement error for "bad news" (BN) firms. ERR tends to be positive throughout most of the distribution, consistent with my prediction that DAC estimates obtained from models

[11] For the sake of parsimony, this discussion refers only to the mean. However, the evidence for the median is not qualitatively different.

[12] The intervals are 0.005 width and the earnings deflator is average total assets. I constrained the distribution to +/- 25 percent for graphical reasons only.

not controlling for conservatism effects are understated ($ERR_{BN} > 0$). However, this error decreases from the left to the right of the earnings distribution, until it becomes approximately nil for positive earnings.

I have two potential explanations for this (partially) unexpected outcome, both related to the quality of the "proxy" used to control for the type of news (*GN/BN*) affecting firms in the period (*RET*, firms market return).

The first one may be market over-reaction to firms' unexpected news (e.g. Dechow et al., 2000). Mainly for firms reporting positive earnings, there may be negative returns that the current analysis interprets as reflecting *BN* and are, to a certain extent, due to this over-reaction.

A second plausible explanation relates to the previous one and builds on the relationship between the role of accounting and the market value of equity. Roychowdhury and Watts (2005) discuss the theory of conservatism and show that if accounting is not intended to report the value of the firm, then the market value of equity is not the appropriate proxy for the asymmetric impact of conservatism on earnings (accruals). A change in the market value of equity reflects not only the change in the value of separable net assets, but also potential changes in economic rents related to non-separable assets (goodwill). Because only the first of these changes is caught by accounting (conditional conservatism), the relationship between earnings (accruals) and *RET* weakens when changes in the market value of equity reflect changes in these rents. One may expect that throughout the earnings distribution, the proportion of rents in *RET* will not be constant, and is probably higher for firms reporting larger earnings (the right hand side of the distribution), and thus a non-linear relationship between *RET* and accruals will appear.

Despite such a limitation, the empirical illustration corroborates, to a great extent, the expectation about the existence of a non-systematic measurement error in the estimation of *DAC*. Moreover, it also illustrates the difficulty in finding "proxies" able to control properly in accrual models the asymmetric treatment of expected gains and losses underlying the conservatism principle.

5. CONCLUSION

Accrual models have been widely used in empirical research on earnings management and earnings quality. However, such extensive use has not been followed by the resolution of the problems and insufficiencies they have.

One insufficiency that has been "forgotten" until recently is that of the conservatism impact on those models and on the estimates they produce. The current study makes an important theoretical contribution to this domain, discussing the nature and sign of the measurement error embedded in those estimates. For

firms with "good news" in the period, I predicted such an error would be negative, and that it would be positive for firms with "bad news". An empirical illustration globally corroborated such predictions.

In practical terms, the current study is of importance for future research on the estimation of DAC, and can be taken as a starting point for reinterpreting the empirical evidence in previous studies.

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ANNEX

I synthesise in this annex some of the most relevant aspects concerning the preparation of the empirical illustration discussed in section 4.[13]

A1. Accrual models

Despite its widely recognised limitations, the Jones (1991) model has played a leading role in the earnings management literature (e.g. Peasnell et al., 2000). Moreover, most of the other accrual models are based on it, or are reconciled with it. This therefore justifies my choice of this model to serve as a basis for the following analysis.[14]

The Jones (1991) model has a structure of the type displayed in equation (3) and the accrual driver it uses is the change in sales or revenue ($\Delta\ REV$):[15]

$$ACC_t = \alpha_0 + \alpha_1 \Delta REV_t + \varepsilon_t \ , \qquad (6)$$

[13] For a more detailed analysis, see Moreira (2002).

[14] This analysis has also been based on other models (e.g. Peasnell et al., 2000). The empirical evidence is not qualitatively different.

[15] The original version of the model includes an independent variable (Gross Property, Plant and Equipment) that controls for the depreciation accrual. If one does not include depreciation in *ACC*, as I do in the current study, the complete version of the model is that of equation (6).

where α_0 and α_1 are parameters and ε_t is the error term of the regression. It was this model I adopted to estimate DAC_{NC}.

Basu (1997), Pope and Walker (1999), Moreira (2002) and Ball and Shivakumar (2006), amongst others, extensively discuss the asymmetric impact of conservatism on earnings. Based on their findings and on the definition of conservatism adopted in this paper, I adjusted the Jones (1991) model to control for the impact of conservatism. The extended model used is the following:

$$ACC_t = \beta_0 + \beta_1 \Delta REV_t + \gamma_1 D_t + \gamma_2 RET_t + \gamma_3 D_t * RET_t + \xi_t \,. \qquad (7)$$

where β_m and γ_m are parameters; RET_t is a "proxy" that reflects the asymmetric recognition of expected gains and losses (*GN/BN*); D_t is a dummy variable that takes value 1 if $RET_t \leq 0$ (it corresponds to a *BN*) and value 0 if $RET_t > 0$ (*GN*); $D^* RET_t$ is an interactive variable that reflects the incremental impact of *BN* on ACC_t, and ξ_t is the error term.[16] This was the model I adopted to estimate DAC_C. The estimation has been done cross-sectionally, by year and industry. RET_t is the firms' market return (e.g. Basu, 1997).

Because the variables ΔREV and RET are independent of each other,[17] the difference between DAC estimated by models (7) and (6) gives the measurement error (*ERR*) resulting from the lack of control for the asymmetric impact of conservatism. These errors are depicted in Graph 1.

The measure of ACC_t that I use excludes the depreciation of the period, and is the difference between earnings before extraordinary items and discontinued operations and operating cash flows.[18]

A2. Data sample

I use American company data available in *Compustat* 2004 disks. The sample covers the period 1987-2003. As in Barth et al. (2001), given their different structure of accruals, I eliminated the financial companies; because of its residual character I also eliminated "other firms".[19] All variables are deflated by average total assets, to mitigate the potential impact of heteroscedasticity in the variables (e.g. Gore et al., 2001). After excluding observations with missing data and those

[16] This type of model is labelled as a "picewise linear model". See, for example, Moreira (2002) and Ball and Shivakumar (2006).

[17] An analysis of the correlation, not displayed, supports this statement.

[18] In terms of *Compustat* codes, *ACC* = #123 (*EBEI*) - #308 (*CFO*) + #14 (*DEP*).

[19] My sample includes utility companies. Re-performing the analysis without them does not change the results.

that lie in the extreme 1 percent top and bottom, to prevent the potential impact of "outliers" (e.g. Barth et al., 1998), the working sample ended up with 71,409 firm-years.[20]

[20] Re-performing the analysis with the "outliers" does not materially affect the results.

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