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ACCRUALS QUALITY: net income perspective and comprehensive income perspective

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To my beloved family, for their enduring support.

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ABSTRACT

In the present work we develop theoretical accruals models aiming at capturing accruals' quality related errors of cash flow estimations, under a net and a comprehensive income perspective. In order to validate theoretical models, we develop an empirical measure of aggregate accrual quality as the residuals from regressions of aggregate accrual on past and future operating cash flows, present total cash flow, changes in net non-current assets and changes in net liabilities. We also derive an empirical measure of comprehensive accrual quality as the residuals from regressions of comprehensive accrual on past and future operating cash flows, current total cash flow, change in net non-current assets, change in net liabilities and change in other accumulated comprehensive income. Finally, we show that observable firm characteristics, such as, volatility of earnings and accruals can assess our empirical measure of total accruals' quality. The main contribution of this research is to extend Dechow and Dichev's (2002) model to contemplate total accruals without having to resort to an indirect Balance Sheet approach in order to calculate accruals.

Keywords: accruals quality, net income, comprehensive income, observable firm characteristics.

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1 INTRODUCTION

Cash flows have timing and matching problems when compared to Earnings and, over finite intervals, this measure of performance may be not necessarily informative. In order to minimize this problem of inter-temporal allocation, Earnings arise as an accounting information supported on an accrual basis and more closely related with the economic event than with actual cash inflow and outflow (Dechow; 1994).

As management has discretion over their recognition, accruals can improve or reduce the ability of Earnings to measure firm performance, because management can signal their private information and/or manipulate Earnings through accruals (Dechow, 1994; Dechow et al. 1998; Bowen et al, 1987).

Accounting Accruals are adjustments present on a balance sheet that represent liabilities and non-cash-based assets used in accrual-based accounting. Accruals can be decomposed into discretionary and non-discretionary. Non-discretionary accruals reflect the company's performance over a given period, while discretionary accruals reflect distortions induced by accounting standards or by earnings management. In this way, discretionary accruals can be understood as reflecting the low quality of earnings. Thus, prior studies in earnings management, such as Jones (1991), Dechow et al (1995), McNichols (2002), Kothari et al (2005), Francis et al (2005), were developed with the aim of measuring the discretionary component of accruals.

Accruals estimations in previous literature usually include only operational accruals or short-term accruals and contain specification errors (Dechow et al 2010). Such models are not able to capture accruals related to financing and investment

activities and do not have the ability to identify discretionary and non-discretionary accruals separately. It can lead to concluding that earnings management exists when no such manipulation is verified and restrict the measure of accruals' quality to short-term or operating accruals.

Since the Balance Sheet approach to calculate accruals relies on the presumed articulation between changes in Balance Sheet working capital accounts and accruals components on the Income Statement, it breaks down when non-operating events occur (Hribar; 2002). The use of this approach also contaminates computations of discretionary accruals.

Trying to circumvent specification problems, Dechow and Dichev (2002) developed a model using a new measure for accruals' quality, based in mistakes in predicting cash flow, since accruals separate the timing of cash flows from their accounting recognition. They suggest that management intent affects the incidence and magnitude of accruals estimation errors and do not separate intentional or unintentional errors because both imply low quality. So, the model does not distinguish between discretionary and non-discretionary accruals (Wysocki, 2009). But their model still included only short-term accruals. This is one important limitation of the model, because accruals related to impairment and goodwill are not contemplated and are likely to reflect earnings management and then impact accruals quality (Dechow et al 2010).

Therefore, it is necessary to verify the quality of all accruals, specially the quality of financing and investment accruals, since, according to Dechow (1994), working capital accruals are more important for mitigating timing and matching in cash flow than long-term accruals and special items accruals reduce the ability of

earnings to reflect firm performance. That may be due to long-term and special items accruals having low quality.

Thus, earnings can be regarded as more relevant than cash flows to measure firm performance, as long as accruals do act to minimize timing problems. In this perspective, earnings can be represented by net income, which contemplates income, including all recurrent revenues, gains, expenses and losses, and dirty surplus. On the other hand, earnings can be represented by comprehensive income, which is an all-inclusive concept, requiring clean surplus and that income includes all extraordinary and recurrent revenues, gains, expenses and losses.

Components of comprehensive income consist of unrealized gains and losses from certain firm activities (Chamber et al, 2007). Thus, they can lead to estimation errors, which will impact earnings quality. Besides, as comprehensive income contemplates clean surplus, which is a necessary assumption in some valuation models (Feltham and Ohlson, 1995) it would be also important to evaluate accruals' quality related to comprehensive income.

We develop two theoretical models that examine opening and closing accruals. The first model examines the origination and reversal of aggregate accruals, that is, accruals related to net income. The second model examines origination and reversal of comprehensive accruals, that is, accruals related to comprehensive income. Models show that accruals are negatively correlated to current total cash flow and positively correlated to past and future cash flows. Both models benefit of accruals reducing cash flow's timing problems, and suffer from accruals leading to estimation errors and correction errors of previous estimations.

Since estimation errors imply low quality of accruals and earnings (Dechow and Dichev, 2002), we developed our theoretical models aiming at capturing accruals' quality related errors of cash flow estimations, both intentional and unintentional.

As Dechow and Dichev (2002) consider in their model accruals that reverse within one year, they only analyze accruals related to past, current and future cash flows from operations. So, they accordingly use changes in working capital as proxy to short-term accruals. In our models, however, as we use proxies to past and future cash flows, we were able to extend Dechow and Dichev's (2002) model to embrace total accruals and we could calculate total accruals via total cash flow, instead of using indirect approximations via Balance Sheet.

Recognizing accruals as important to predict future cash flows and to measure firm performance, and that their quality should therefore be ascertained, our models contemplate all accruals, such as operating and non-operating, current and non-current accruals.

Our empirical models aim at validating the theoretical models, and we use the standard deviation of residuals from each sampled firm as a metric for accruals' quality, where higher standard deviation signifies low quality. Measures to aggregate accruals' quality and to comprehensive accruals' quality are thus obtained, and we find that observable firm characteristics, such as net income and aggregate accruals volatility, can be used as instruments for aggregate accruals' quality. We also verify that comprehensive income and comprehensive volatility can be used as instruments to comprehensive accruals' quality.

Our findings also suggest that earnings can be better than cash flows to predict future cash flows, provided that the accruals portion of earnings has enough quality. This finding corroborates Dechow (1994), that verify that earnings will be better than cash flow to reflect performance for firms with large changes in their working capitals, investment and financing activities (Dechow; 1994).

As discussed above, our main contribution is to extend Dechow and Dichev's (2002) model to contemplate total accruals without having to resort to an indirect Balance Sheet approach in order to calculate accruals. Beyond that, a metric for comprehensive accruals' quality is developed and this measure can be used under clean surplus.

The remainder of the study is organized as follows. Section 2 presents a background and our models of accruals' quality under two different perspectives. Section 3 describes the samples and methodology and Section 4 presents the results. Finally, we present our conclusions in Section 5.

2 BACKGROUND

Cash flow is an accounting information on the firm performance and it can contain inflows and outflows related to different periods. In order to minimize this problem of inter-temporal allocation, earnings arise as an accounting information supported on an accrual basis and more closely related with the economic event than with actual cash inflow and outflow.

The difference between *earnings* and *cash flow* is called *accrual*. Under this point of view, accruals are adjustments arising from accrual basis accounting. It is ascertainable that earnings are composed of Total Cash Flow and Accruals for the period.

If, looking at the usual equation where (*Earnings* = *Cash Flow* + *Accruals*), one considers Earnings as more relevant than Cash Flow to predict a firm’s future cash flows, then its relevance must be contained on Accruals.

Accruals can be decomposed into discretionary or non-discretionary and normal or abnormal. Normal accruals reflect the company's performance over a given period while abnormal accruals reflect distortions induced by accounting standards or by earnings management.

In this way, abnormal accruals can be understood as reflecting the low quality of earnings. Thus, studies in earnings management, such as Jones (1991), Dechow et al (1995), McNichols (2002), Kothari et al (2005), Francis et al (2005), were developed with the aim of measuring the discretionary component of accruals. Such component has been used as proxy for accruals quality and also for earnings quality.

However, these researches contain specification errors of Type I and/or Type II and include only operational accruals or current accruals (Dechow et al, 2010).

Recognizing the need for a model with theoretical support, Dechow and Dichev (2002) developed one based on accounting theory, relating accruals to past, current and future cash flows from operations. The standard deviation of the residuals of the model developed by the authors is considered a metric for quality, where the greater the deviation, the lower the quality of accruals.

It is important to highlight that Dechow and Dichev's model try to measure the quality related with errors of prediction. The model does not attempt a separation between discretionary and non-discretionary accruals.

However, the model developed by Dechow and Dichev (2002) still harbors one limitation, since it covers only current operating accruals. Then, its measure of accruals' quality can be used for this kind of accruals only.

2.1 ACCRUALS MODEL UNDER NET INCOME PERSPECTIVE (ANIP)

According to Dechow and Dichev (2002), earnings of period *t* can be defined as Cash Flow (CF) of period *t* plus Accruals (AC) of period *t*:

$$Earnings_t = CF_t + AC_t \quad \textbf{(Eq. 1)}$$

Cash Flow in period *t* can be segregated on Cash flow from operating activities (CFO), from investing activities (CFI) and from financing activities (CFF):

$$CF_t = CFO_t + CFI_t + CFF_t \quad \textbf{(Eq. 2)}$$

In accounting terms, there are two major events related with the cash flow. One event refers to the effective receipt or disbursement of cash; the other event refers to the recognition of input or output in earnings. Such recognition in the Income Statement may occur before, concurrently or after the effective impact on cash.

Therefore, the cash flow of the current period can be decomposed into three parts. The first refers to payments and receipts that have been previously recorded as earnings, but that impact cash only in the current period. The second part refers to payments and cash receipts that impact the current period and are recognized in earnings at the same time. The third part refers to payments and cash receipts that impact the current period, but will only be recorded in earnings later.

According to Baber et al (2010), if managers stay within the GAAP boundary, accruals created using current sheet items should be reverted within one fiscal year, and we can accept that these accruals are related to cash flow from operating activities. Accounts payable and inventories are examples.

Therefore, cash flow from operating activities in period *t* can be decomposed as shown in Table 1, in the same way of Dechow and Dichev (2002):

TABLE 1: SEGREGATION OF CASH FLOW FROM OPERATING ACTIVITIES

CFO_t^{t-1}	Cash flow impact occurs after the corresponding amount is recognized in earnings
CFO_t^t	Receipt or disbursement of cash flow occurs in the same period as the cash flows are recognized in earnings
CFO_t^{t+1}	Cash flow impact occurs before the corresponding amount be recognized in earnings

Source: Author (Adapted from Dechow and Dichev, 2002).

Regarding the cash flow notation in the table above, the subscript term refer to the moment of impact in cash flow, while the superscript term refers to the time of recognition in earnings. Therefore, the cash flow from operating activities of the current period can be written as follows:

$$CFO_t = CFO_t^{t-1} + CFO_t^t + CFO_t^{t+1} \quad \textbf{(Eq. 3)}$$

Baber et al (2010) also say that accruals created using non-current balance sheet items, that is non-current accruals, are reverted more slowly. Depreciation and amortization of deferred expenditures are examples.

We can thus accept that these accruals are related to cash flow from investing activities. The cash flow from investing activities in period *t* can be segregated according to Table 2:

TABLE 2: SEGREGATION OF CASH FLOW FROM INVESTING ACTIVITIES

CFI_t^{t-1}	Payments and receipts that have been previously recorded as earnings in period t-1, but that only impact cash in the current period
CFI_t^{t-2}	Payments and receipts that have been previously recorded as earnings in period t-2, but that only impact cash in the current period
CFI_t^{t-3}	Payments and receipts that have been previously recorded as earnings in period t-3, but that only impact cash in the current period
…	**…**
CFI_t^{t-n}	Payments and receipts that have been previously recorded as earnings in period t-n, but that only impact cash in the current period
CFI_t^{t}	Receipt or disbursement of cash flow occurs in the same period as the cash flows are recognized in earnings
CFI_t^{t+1}	Receipt or disbursement of cash flow on period t, but that will be recorded in earnings, in period t+1
CFI_t^{t+2}	Receipt or disbursement of cash flow on period t, but that will be recorded in earnings, in period t+2
CFI_t^{t+3}	Receipt or disbursement of cash flow on period t, but that will be recorded in earnings, in period t+3
…	**…**
CFI_t^{t+n}	Receipt or disbursement of cash flow on period t, but that will be recorded in earnings, in period t+n.

Source: Author.

Therefore, the cash flow from investing activities of the current period can be written as follows:

$$CFI_t = CFI_t^{t-1} + CFI_t^{t-2} + CFI_t^{t-3} + \cdots + CFI_t^{t-n} + CFI_t^{t+1} + CFI_t^{t+2} + CFI_t^{t+3} + \cdots + CFI_t^{t+n} \quad \textbf{(Eq. 4)}$$

Or:

$$CFI_t = \sum_{n=1}^{\infty} CFI_t^{t-n} + \sum_{n=1}^{\infty} CFI_t^{t+n} \quad \textbf{(Eq. 5)}$$

When we address the cash flow from financing activities on period *t*, we can identify receipts of cash flow related to new loans or disbursements of cash flow related to payment of a debt. Thus, obtaining a loan will impact cash flow in period *t*, but it will not be recorded in future earnings (*t+1, t+2, t+3, t+4, t+5, ... , t+n*).

However, in the forward periods, as installments of the debt are paid, an impact will again occur in cash flow, derived from financing activities. Therefore, we can segregate cash flow from financing activities as shown in Table 3:

TABLE 3: SEGREGATION OF CASH FLOW FROM FINANCING ACTIVITIES

$CFF_{t(t+1)}$	Receipt or disbursement of cash flow that occurs in period t and that will impact again cash flow in period t+1
$CFF_{t(t+2)}$	Receipt or disbursement of cash flow that occurs in period t and that will impact again cash flow in period t+2
$CFF_{t(t+3)}$	Receipt or disbursement of cash flow that occurs in period t and that will impact again cash flow in period t+3
...	**...**
$CFF_{t(t+n)}$	Receipt or disbursement of cash flow that occurs in period t and that will impact again cash flow in period t+n
$-CFF_{t-1(t)}$	Receipt or disbursement that impact the cash flow in period t, referring to an event that impacted the cash flow in period t-1
$-CFF_{t-2(t)}$	Receipt or disbursement that impact the cash flow in period t, referring to an event that impacted the cash flow in period t-2
$-CFF_{t-3(t)}$	Receipt or disbursement that impact the cash flow in period t, referring to an event that impacted the cash flow in period t-3
...	**...**
$-CFF_{t-n(t)}$	Receipt or disbursement that impact the cash flow in period t, referring to an event that impacted the cash flow in period t-n

Source: Author.

As seen on Table 3, the subscript term outside the parentheses refer to initial impact (opening) on cash flow from financing activities, and the subscript term within the parentheses refer to final impact (closing) on cash flow from financing activities.

Cash flow from financing activities of the current period can therefore be written as follows:

$$CFF_t = CFF_{t\,(t+1)} + CFF_{t\,(t+2)} + \cdots + CFF_{t\,(t+n)} - CFF_{t-1\,(t)} - CFF_{t-2\,(t)} - \cdots - CFF_{t-n\,(t)} \quad \textbf{(Eq. 6)}$$

Or:

$$CFF_t = \sum_{n=1}^{\infty} CFF_{t\,(t+n)} - \sum_{n=1}^{\infty} CFF_{t-n\,(t)} \quad \textbf{(Eq. 7)}$$

And the total cash flow of the current period can be written as follows:

$$TCF_t = CFO_t^{t-1} + CFO_t^t + CFO_t^{t+1} + \sum_{n=1}^{\infty} CFI_t^{t-n} + \sum_{n=1}^{\infty} CFI_t^{t+n} + \sum_{n=1}^{\infty} CFF_{t\,(t+n)} - \sum_{n=1}^{\infty} CFF_{t-n\,(t)} \quad \textbf{(Eq. 8)}$$

In this way, accruals can be segregated in operating, financing and investing accruals:

$$AC_t = OA_t + IA_t + FA_t \quad \textbf{(Eq. 9)}$$

Accruals related with impacts in cash flow from operating activities can be called short-term accruals and therefore the difference between earnings and cash flow should be reversed within a year. At the time the operating accrual is generated, it will be classified as an opening accrual (OA^o) and at the time this accrual is reversed it will be classified as closing accrual (OA^c).

When revenues or expenses are recognized in earnings before its impact on cash flow from operating activities, they can be visualized, in period *t*, as opening accruals or as closing accruals. In this situation, the opening accruals ($OA^o CF_{t+1}^t$) in period *t* refer to the recognition of revenue or expense in earnings in the current period, which will impact the cash flow from operations in the future period (*t +1*). In which case, as the impact in earnings occurs before the actual receipt or disbursement in cash flow, it is necessary to make estimations regarding the future impact on cash. These estimates may contain errors.

Additionally, the closing accruals ($OA^c CF_t^{t-1}$) in period *t* refer to the impact on cash in the current period regarding revenues or expenses that were recognized in earnings in a previous period (*t-1*). Thus, the closing accruals contain a term referring to the reversal of error contained in opening accruals.

Table 4 shows both the opening accrual at time *t*, and the closing accruals in period *t*, as well as their representation in terms of cash flow, when earnings is impacted before cash.

TABLE 4: OPENING ACCRUAL ($OA^{O}CF^{t}_{t+1}$) AND CLOSING ACCRUAL (OPERATING ACTIVITIES)

$OA^{O}CF^{t}_{t+1}$	$CFO^{t}_{t+1} + \varepsilon o^{t}_{t+1}$
$OA^{C}CF^{t-1}_{t}$	$-CFO^{t-1}_{t} - \varepsilon o^{t-1}_{t}$

Source: Author (Adapted from Dechow and Dichev, 2002)

When earnings and cash flows from operations are impacted at the same time, there will be no opening accrual and therefore there will be no closing accrual, since there is no difference between earnings and cash flow.

However, when there are receipts or disbursements of cash from operations before recognition occur in earnings, opening and closing accruals are generated at period *t*. The opening accruals ($OA^{o}CF^{t+1}_{t}$) in period *t*, in this situation, refer to impacts on the cash flow in the current period that will be recognized in earnings in the next period (*t +1*). Then, as the impact in cash flow occurs before the impact in earnings, no estimation error will be incurred.

The closing accruals ($OA^{c}CF^{t}_{t-1}$) in period *t*, refer to the recognition in earnings in the period *t* related to an impact that occurred in the cash flow from operations in the previous period (*t-1*).

Table 5 shows the opening and closing accrual at time *t*, when cash is impacted before earnings, as well as their representation in terms of cash flow.

TABLE 5: OPENING ACCRUAL ($OA^{O}CF_{t}^{t+1}$) AND CLOSING ACCRUAL (OPERATING ACTIVITIES)

$OA^{O}CF_{t}^{t+1}$	$-CFO_{t}^{t+1}$
$OA^{C}CF_{t-1}^{t}$	CFO_{t-1}^{t}

Source: Author (Adapted from Dechow and Dichev, 2002)

Therefore, in the current period (period *t*) there may be opening accruals (OA^{O}), related both to impacts in cash flow from operations before or after recognition in earnings, as well as closing accruals (OA^{C}), related to the closure of the opening accruals. Thus, the operating accruals in period *t* (OA_t) can be decomposed as in equation 10:

$$OA_t = OA^{O}CF_{t+1}^{t} + OA^{C}CF_{t}^{t-1} + OA^{O}CF_{t}^{t+1} + OA^{C}CF_{t-1}^{t} \quad \textbf{(Eq. 10)}$$

This equation can be written according to impacts in cash flow from operating activities:

$$OA_t = CFO_{t+1}^{t} + \varepsilon o_{t+1}^{t} - CFO_{t}^{t-1} - \varepsilon o_{t}^{t-1} - CFO_{t}^{t+1} + CFO_{t-1}^{t} \quad \textbf{(Eq. 11)}$$

In the case of investing activities, when revenues or expenses are recognized in earnings before its impact on cash flow from investing activities, both opening and closing accruals can occur. The opening accruals (IA^{O}) in period *t*, in this situation, refer to the recognition of revenue or expense in earnings in the current period, which will impact the cash flow from investment in the future period. In this case, as the impact in earnings occurs before the actual receipt or disbursement of cash, it is necessary to make estimations regarding the future impact on cash and these estimates may contain errors.

The closing accruals (IA^{C}) in period *t*, by its turn, refer to the impact on cash in the current period related to revenues or expenses that were recognized in earnings

in a previous period. Thus, the closing accruals contain a term referring to the reversal of error contained in opening accruals. Table 6 presents these opening and closing accruals:

TABLE 6: OPENING AND CLOSING ACCRUALS (INVESTING ACTIVITIES)

$IA^{O}CFI^{t}_{t+1,t+2,t+3.\cdots,t+n}$	$(CFI^{t}_{t+1}+\varepsilon i^{t}_{t+1})+(CFI^{t}_{t+2}+\varepsilon i^{t}_{t+2})+(CFI^{t}_{t+3}+\varepsilon i^{t}_{t+3})+\cdots+(CFI^{t}_{t+n}+\varepsilon i^{t}_{t+n})=\sum_{n=1}^{\infty}CFI^{t}_{t+n}+\sum_{n=1}^{\infty}\varepsilon i^{t}_{t+n}$
$IA^{C}CFI^{t-1}_{t}$	$-CFI^{t-1}_{t}-\varepsilon i^{t-1}_{t}$
$IA^{C}CFI^{t-2}_{t}$	$-CFI^{t-2}_{t}-\varepsilon i^{t-2}_{t}$
$IA^{C}CFI^{t-3}_{t}$	$-CFI^{t-3}_{t}-\varepsilon i^{t-3}_{t}$
...	...
$IA^{C}CFI^{t-n}_{t}$	$-CFI^{t-n}_{t}-\varepsilon i^{t-n}_{t}$

Source: Author.

In the case of investing activities, when the cash flow from investing is impacted before an impact occur in earnings, opening and closing accruals will occur in period *t*. Thus, the opening accruals (IA^{O}) in period *t*, are accruals related to cash payments that impact the current period, but will only be recognized in earnings in future periods. The closing accruals (IA^{C}) in period *t*, by its turn, refer to the current period impact in earnings related to a previous impact in cash flow from investing activities. Table 7 presents these opening and closing accruals:

TABLE 7: OPENING AND CLOSING ACCRUALS (INVESTING ACTIVITIES)

$IA^{O}CFI_{t}^{t+1,t+2,t+3,\cdots,t+n}$	$-(CFI_{t}^{t+1}+CFI_{t}^{t+2}+CFI_{t}^{t+3}+\cdots+CFI_{t}^{t+n}) = -\left(\sum_{n=1}^{\infty} CFI_{t}^{t+n}\right)$
$IA^{C}CFI_{t-1}^{t}$	CFI_{t-1}^{t}
$IA^{C}CFI_{t-2}^{t}$	CFI_{t-2}^{t}
$IA^{C}CFI_{t-3}^{t}$	CFI_{t-3}^{t}
...	...
$IA^{C}CFI_{t-n}^{t}$	CFI_{t-n}^{t}

Source: Author.

Therefore, in period *t*, investing accruals (IA_t) can be decomposed as in equation 12:

$$IA_t = IA^{o}CF_{t+1,t+2,t+3,\cdots,t+n}^{t} + IA^{c}CF_{t}^{t-1} + IA^{c}CF_{t}^{t-2} + IA^{c}CF_{t}^{t-3} + \cdots + IA^{c}CF_{t}^{t-n} + IA^{o}CF_{t}^{t+1,t+2,t+3,\cdots,t+n} + IA^{c}CF_{t-1}^{t} + IA^{c}CF_{t-2}^{t} + IA^{c}CF_{t-3}^{t} + \cdots + IA^{c}CF_{t-n}^{t} \quad \textbf{(Eq. 12)}$$

This equation can be written according to impacts in cash flow from investing activities:

$$IA_t = \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - CFI_{t}^{t-1} - \varepsilon i_{t}^{t-1} - CFI_{t}^{t-2} - \varepsilon i_{t}^{t-2} - CFI_{t}^{t-3} - \varepsilon i_{t}^{t-3} - \cdots - CFI_{t}^{t-n} - \varepsilon i_{t}^{t-n} - \sum_{n=1}^{\infty} CFI_{t}^{t+n} + CFI_{t-1}^{t} + CFI_{t-2}^{t} + CFI_{t-3}^{t} + \cdots + CFI_{t-n}^{t} \quad \textbf{(Eq. 13)}$$

Or:

$$IA_t = \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - \sum_{n=1}^{\infty} CFI_{t}^{t-n} - \sum_{n=1}^{\infty} \varepsilon i_{t}^{t-n} - \sum_{n=1}^{\infty} CFI_{t}^{t+n} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} \quad \textbf{(Eq. 14)}$$

Regarding accruals from financing activities, impact occurs twice in cash flow but not in earnings. Thus, in period *t*, opening accruals (FA^{o}) as well as closing

accruals (FA^C) can occur. Opening accruals refer to impacts in cash flow from financing activities, but will impact cash flow again in future periods, such as the obtaining of a loan. Closing accruals refer to impacts in cash flow from financing activities in current period related to impacts in cash flow that occurred in previous periods, such as payment of installments of a debt. Table 8 shows financing accruals:

TABLE 8: OPENING AND CLOSING ACCRUALS (FINANCING ACTIVITIES)

$FA^O CFF_{t\ (t+1,t+2,t+3,\cdots,t+n)}$	$-\left(CFF_{t\ (t+1)} + CFF_{t\ (t+2)} + CFF_{t\ (t+3)} + \cdots + CFF_{t\ (t+n)}\right) = -\left(\sum_{n=1}^{\infty} CFF_{t\ (t+n)}\right)$
$FA^O CFF_{t-1\ (t)}$	$CFF_{t-1\ (t)}$
$FA^O CFF_{t-2\ (t)}$	$CFF_{t-2\ (t)}$
$FA^O CFF_{t-3\ (t)}$	$CFF_{t-3\ (t)}$
...	...
$FA^O CFF_{t-n\ (t)}$	$CFF_{t-n\ (t)}$

Source: Author.

Therefore, in period *t*, investing accruals (IA_t) can be decomposed as in equation:

$$FA_t = FA^o CFF_{t(t+1,t+2,t+3,\cdots,t+n)} + FA^c CFF_{t-1(t)} + FA^c CFF_{t-2(t)} + FA^c CFF_{t-3(t)} + \cdots + FA^c CFF_{t-n(t)} \quad \textbf{(Eq. 15)}$$

This equation can be written according to impacts in cash flow from investing activities:

$$FA_t = -\sum_{n=1}^{\infty} CFF_{t(t+1)} + \sum_{n=1}^{\infty} CFF_{t-n(t)} \quad \textbf{(Eq. 16)}$$

Thus, in period *t*, accruals from operating, investing and financing activities can be written as:

$$AC_t = CFO_{t+1}^{t} + \varepsilon_{t+1}^{t} - CFO_{t}^{t-1} - \varepsilon_{t}^{t-1} - CFO_{t}^{t+1} + CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon_{t+n}^{t} - \sum_{n=1}^{\infty} CFI_{t}^{t-n} - \sum_{n=1}^{\infty} \varepsilon_{t}^{t-n} - \sum_{n=1}^{\infty} CFI_{t}^{t+n} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} - \sum_{n=1}^{\infty} CFF_{t(t+1)} + \sum_{n=1}^{\infty} CFF_{t-n(t)} \quad \textbf{(Eq. 17)}$$

As earnings are composed of total cash flow and total accruals, we can write the equation:

$$Earnings_t = (CFO_{t}^{t-1} + CFO_{t}^{t} + CFO_{t}^{t+1} + \sum_{n=1}^{\infty} FCI_{t}^{t-n} + \sum_{n=1}^{\infty} FCI_{t}^{t+n} + \sum_{n=1}^{\infty} CFF_{t(t+n)} - \sum_{n=1}^{\infty} CFF_{t-n(t)}) + (CFO_{t+1}^{t} + \varepsilon o_{t+1}^{t} - CFO_{t}^{t-1} - \varepsilon o_{t}^{t-1} - CFO_{t}^{t+1} + CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - \sum_{n=1}^{\infty} CFI_{t}^{t-n} - \sum_{n=1}^{\infty} \varepsilon i_{t}^{t-n} - \sum_{n=1}^{\infty} CFI_{t}^{t+n} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} - \sum_{n=1}^{\infty} CFF_{t(t+n)} + \sum_{n=1}^{\infty} CFF_{t-n(t)}) \quad \textbf{(Eq. 18)}$$

Simplifying the equation above, we obtain:

$$Earnings_t = CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} + CFO_{t}^{t} + CFO_{t+1}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon i_{t}^{t-n} + \varepsilon o_{t+1}^{t} - \varepsilon o_{t}^{t-1} \quad \textbf{(Eq. 19)}$$

Earnings can be represented as a sum of past, current and future cash flows from operating and investment activities plus an adjustment of estimation errors and their corrections. We can also verify that earnings is not composed by cash flow from financing activities. Substituting equation 1 in equation 19:

$$AC_t + CF_t = CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} + CFO_t^t + CFO_{t+1}^t + \sum_{n=1}^{\infty} CFI_{t+n}^t + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^t - \sum_{n=1}^{\infty} \varepsilon i_t^{t-n} + \varepsilon o_{t+1}^t - \varepsilon o_t^{t-1} \quad \textbf{(Eq. 20)}$$

Now, substituting in the above equation cash flow for equation 8, we obtain:

$$AC_t + \left(CFO_t^{t-1} + CFO_t^t + CFO_t^{t+1} + \sum_{n=1}^{\infty} CFI_t^{t-n} + \sum_{n=1}^{\infty} CFI_t^{t+n} + \sum_{n=1}^{\infty} CFF_{t\,(t+n)} - \sum_{n=1}^{\infty} CFF_{t-n\,(t)} \right) = \left(CFO_{t-1}^t + \sum_{n=1}^{\infty} CFI_{t-n}^t + CFO_t^t + CFO_{t+1}^t + \sum_{n=1}^{\infty} CFI_{t+n}^t + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^t - \sum_{n=1}^{\infty} \varepsilon i_t^{t-n} + \varepsilon o_{t+1}^t - \varepsilon o_t^{t-1} \right) \quad \textbf{(Eq. 21)}$$

Simplification of equation 21 leads to our theoretical accrual model under Net Income Perspective:

$$AC_t = CFO_{t-1}^t + \sum_{n=1}^{\infty} CFI_{t-n}^t - \left(CFO_t^{t-1} + CFO_t^{t+1} + \sum_{n=1}^{\infty} CFI_t^{t-n} + \sum_{n=1}^{\infty} CFI_t^{t+n} + \sum_{n=1}^{\infty} CFF_{t(t+1)} - \sum_{n=1}^{\infty} CFF_{t-n(t)} \right) + CFO_{t+1}^t + \sum_{n=1}^{\infty} CFI_{t+n}^t + \varepsilon o_{t+1}^t - \varepsilon o_t^{t-1} + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^t - \sum_{n=1}^{\infty} \varepsilon i_t^{t-n} \quad \textbf{(Eq. 22)}$$

ANIP Theoretical Model

In this model, we are considering all kinds of accruals that have impact on net income and/or in total cash flow. Total accrual can then be obtained from net income less total cash flow. We called equation 22 of “Accruals Model under Net Income Perspective (ANIP)”.

The ANIP Model shows that accruals are temporary adjustments that delay or anticipate the recognition of cash flow, plus estimation errors. Therefore, we can verify that accruals are negatively correlated to current cash flow and positively correlated to past and future cash flow. The term of error represents errors of accruals estimation referring to impacts in future cash flows and can be used as a measure of accruals' quality.

We utilized some proxies, so the model can be used empirically. Following Dechow and Dichev (2002), we used cash flow from operations in period *t–1* as proxy to CFO_{t-1}^{t}, cash flow from operations in period *t+1* as proxy to CFO_{t+1}^{t} and cash flow from operations in current period as proxy to $(CFO_{t}^{t-1} + CFO_{t}^{t+1})$. Total cash flows from operations are utilized since we cannot identify these portions of cash.

We used current cash flow from investing activities as proxy to $(\sum_{n=1}^{\infty} CFI_{t}^{t-n} + \sum_{n=1}^{\infty} CFI_{t}^{t+n})$. This variable presents an impact in current investing cash flow that will be recognized in future earnings, or an impact in current cash flow from investment already recognized in past earnings. Total cash flow from investment activities is used since we cannot identify these portions of cash. We utilized cash flow from financing activities as proxy to $(\sum_{n=1}^{\infty} CFF_{t\ (t+n)} - \sum_{n=1}^{\infty} CFF_{t-n\ (t)})$. This variable represents an impact in cash flow from financing activities, related to funding that will impact the cash in other future periods, and also represents an impact on the cash for the payment of installments of loans obtained in past periods. Total cash flow from financing is used since we cannot identify these portions of cash.

The variable $\sum_{n=1}^{\infty} CFI_{t-n}^{t}$ represents an impact in current period's earnings referring to an impact in cash flow from investing activities in previous periods. This variable represents depreciation and amortization, for example. The variable

$\sum_{n=1}^{\infty} CFI_{t+n}^{t}$ represents an impact in current period's earnings that will impact future cash flow from investing activities. This variable represents revenues of equity hold in subsidiaries, for example.

We used change in non-current assets less new investments (*NNCA*) as proxy to $(\sum_{n=1}^{\infty} CFI_{t-n}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t})$. And we also used change in liabilities less cash flow from investment activities (*NL*) as proxy to $\sum_{n=1}^{\infty} CFI_{t+n}^{t}$, because the impact in earnings in current period can impact assets or liabilities. NNCA and NL are used as proxy because we cannot identify, specifically, what is period *n*.

Accruals can be calculated as net income less total cash flow. And following usage by Dechow (1994), we called these accruals of aggregate accruals (*AA*)

Some examples may help to understand our choice of proxies. First, let's suppose that an asset in the amount of $ 1,000.00 was purchased by a company and paid in cash in the current period. Let's also suppose that this asset will be depreciated in 5 years. Then, in the current period, an opening accrual of $ 1,000.00 will be created. In the forward periods (*t+1* to *t+5*), closing accruals of $ –200 will be created, as shown in Table 9:

TABLE 9: EXAMPLE 1

Period t	$IA^{O}CFI_{t}^{t+1,t+2,t+3,t+4,t+5}$	$-(CFI_{t}^{t+1} + CFI_{t}^{t+2} + CFI_{t}^{t+3} + CFI_{t}^{t+4} + CFI_{t}^{t+5}) = -(-200 - 200 - 200 - 200 - 200) = 1{,}000$
Period t+1	$IA^{C}CFI_{t}^{t+1}$	$CFI_{t}^{t+1} = -200$
Period t+2	$IA^{C}CFI_{t}^{t+2}$	$CFI_{t}^{t+2} = -200$
Period t+3	$IA^{C}CFI_{t}^{t+3}$	$CFI_{t}^{t+3} = -200$
Period t+4	$IA^{C}CFI_{t}^{t+4}$	$CFI_{t}^{t+4} = -200$
Period t+5	$IA^{C}CFI_{t}^{t+5}$	$CFI_{t}^{t+5} = -200$

Source: Author.

Therefore, the current period's opening accrual concerns the amount invested in the asset, which is reflected in cash flow from investing activities. Closing accruals in future periods are related with a portion of the amount invested in period *t*. Thus, closing accruals are reflected in change of non-current assets less new investments.

Let's now suppose that a loan in the amount of $ 1,000.00 was granted for a company in period *t*. Let's also suppose that the company will pay the loan in four installments. The first installment will be $ 400.00 and the others will be $ 200.00. Then, an opening accrual of $ -1,000.00 will be created in current period and closing accruals of $ 400.00 and $ 200.00 will be created in forward periods, as shown in Table 10:

TABLE 10: EXAMPLE 2

Period t	$FA^{O}CFF_{t\ (t+1,t+2,t+3,t+4)}$	$-\left(CFF_{t\ (t+1)} + CFF_{t\ (t+2)} + CFF_{t\ (t+3)} + CFF_{t\ (t+4)}\right) = -(400 + 200 + 200 + 200) = -1{,}000$
Period t+1	$FA^{C}CFF_{t\ (t+1)}$	$CFF_{t\ (t+1)} = 400$
Period t+2	$FA^{C}CFF_{t\ (t+2)}$	$CFF_{t\ (t+2)} = 200$
Period t+3	$FA^{C}CFF_{t\ (t+3)}$	$CFF_{t\ (t+3)} = 200$
Period t+4	$FA^{C}CFF_{t\ (t+4)}$	$CFF_{t\ (t+4)} = 200$

Source: Author.

Therefore, the opening accrual in the current period concerns the loaned amount and is reflected in cash flow from financing activities. Closing accrual in period *t+1* is related with the amount loaned on the current period and is reflected in cash flow from financing activities in period *t+1*, and so on for subsequent periods.

Thus, applying the selected proxies in the ANIP Model (Equation 22), we obtained an empirical model:

$$AA_t = \beta_0 + \beta_1 NNCA_t + \beta_2 NL_t + \beta_3 CFO_{t-1} + \beta_4 (CFO_t + CFI_t + CFF_t) + \beta_5 CFO_{t+1} + \varepsilon_t$$

$$\boldsymbol{AA_t = \beta_0 + \beta_1 NNCA_t + \beta_2 NL_t + \beta_3 CFO_{t-1} + \beta_4 TCF_t + \beta_5 CFO_{t+1} + \varepsilon_t} \quad \textbf{(Eq. 23)}$$

ANIP Empirical Model

According to the signals of the theoretical model, we expect that $0<\beta_1<1$, $0<\beta_1<1$, $0<\beta_3<1$, $-1<\beta_4<0$ and $0<\beta_5<1$, since we can verify in theoretical model that accruals are positively correlated with future and past cash flows and negatively correlated with concurrent cash flows. Besides, in theoretical model coefficients in module are equal to one, but as we use total cash flow instead of portions of cash flow, we expect that in module empirical model coefficients be lower than one. Thus, empirical models are developed aiming at validating theoretical model.

2.2 ACCRUALS MODEL UNDER COMPREHENSIVE INCOME PERSPECTIVE (ACIP)

According to Dechow and Dichev (2002), earnings of period *t* can be defined as Cash Flow (*CF*) of period *t* plus Accruals (*AC*) of period *t*. In the ANIP model, we considered earnings as net income. But we can examine the accruals' amount using comprehensive income less total cash flow, since components included in comprehensive income are essentially accrued items. These components can impact cash flow in future periods and be important to predict future cash flows. Then, it is important to verify errors of estimation of all accruals to measure earnings quality.

Net income contemplates dirty surplus and income including all recurrent revenues, gains, expenses and losses. Comprehensive income, on the other hand, is an all-inclusive concept, which requires clean surplus and income, including all extraordinary and recurrent revenues, gains, expenses and losses.

Thus, utilization of comprehensive income to calculate accruals can be relevant, since valuation models require clean surplus. In this context, we called these accruals of *comprehensive accruals*.

Four items are included in comprehensive income statement: unrealized gains and losses on available-for-sale securities, net loss associated with the minimum liability pension adjustment and foreign currency translation adjustments and adjustments on derivative securities for cash flow or foreign currency hedge (Chambers et al, 2007).

The Statement of Financial Accounting Standards n° 130 (SFAS 130) requires the comprehensive income to be reported in a financial statement. It is important to note that SFAS does not demand additional disclosures. It only requires that specified items that were reported as adjustments to equity, which violated clean surplus, be reported as adjustments to net income. Then, when comprehensive income is used, accounting principles can be supported on clean surplus.

It is difficult to verify how these items can have implications for a firm´s future cash flow. Some adjustments can add noise to reported earnings. Dhaliwal et al (1999) found no evidence that comprehensive income is better to predict future cash flow or future income than net income. However, they verified that marketable securities are the only component of comprehensive income that improves the relation between income and return. It is important to emphasize, though, that the sample used by the authors is limited, since it only covers two years (1994 e 1995). Additionally, these years are prior to 1997, when SFAS n° 130 started to be mandatory.

However, Chambers et al (2007) found evidence in post-SFAS 130 period that other comprehensive income (*OCI*) is priced as predicted by the economic theory for transitory earnings. Besides, they verified that foreign currency translation adjustment and unrealized gains/losses on marketable securities (components of other comprehensive income) are priced by investors. According to Ohlson (1999), transitory components should be valued dollar-for-dollar and *OCI* components are transitory in nature.

In this way, it is important to valuate total accruals quality, including aggregate accruals and accruals contained in comprehensive income. Accruals contained in comprehensive income impact earnings before cash flow from operating or investing activities does, since, according to Chamber et al (2007), “components of OCI consist of unrealized gains and losses from certain firm activities”.

Thus, the total cash flow in current period segregated in the ANIP model can be modified to be used in ACIP model.

According to equation 2, total cash flow for current period can be decomposed in cash flows from operating, investing and financing activities. Equations 5 and 7 represent the segregation of cash flow from investing and financing activities, respectively, and can still be used in the ACIP model. But equation 3 decomposes cash flow from operating activities and should be modified to be used in ACIP model. Cash flow from operations can be decomposed as shown in Table 11:

TABLE 11: SEGREGATION OF CASH FLOW FROM OPERATING ACTIVITIES (ACIP MODEL)

CFO_t^{t-1}	Payments and receipts that have been previously recorded as earnings in period t-1, but that only impact the cash in the current period
CFO_t^{t-2}	Payments and receipts that have been previously recorded as earnings in period t-2, but that only impact the cash in the current period
CFO_t^{t-3}	Payments and receipts that have been previously recorded as earnings in period t-3, but that only impact the cash in the current period
...	**...**
$CFO_t^{t-\mathrm{n}}$	Payments and receipts that have been previously recorded as earnings in period t-n, but that only impact the cash in the current period
CFO_t^t	Receipt or disbursement of cash flow occurs in the same period as the cash flows are recognized in earnings
CFO_t^{t+1}	Cash flow impact occurs before the corresponding amount be recognized in earnings

Source: Author.

Thus, Cash flow from operating activities can be decomposed according to equation 24:

$$CFO_t = \sum_{n=1}^{\infty} CFO_t^{t-n} + CFO_t^t + CFO_t^{t+1} \quad \textbf{(Eq. 24)}$$

Therefore, total cash flow in current period can be written as:

$$TCF_t = \sum_{n=1}^{\infty} CFO_t^{t-n} + CFO_t^t + CFO_t^{t+1} + \sum_{n=1}^{\infty} CFI_t^{t-n} + \sum_{n=1}^{\infty} CFI_t^{t+n} + \sum_{n=1}^{\infty} CFF_{t\,(t+n)} - \sum_{n=1}^{\infty} CFF_{t-n\,(t)} \quad \textbf{(Eq. 25)}$$

Opening and closing accruals related to investing and financing activities are expressed in the ANIP model and can be used in the ACIP model. But opening and closing accruals related to operating activities need to be adapted for use in the ACIP model.

When revenues or expenses are recognized in earnings before its impact on cash flow from operating activities, we can observe them in period *t*, as opening

accruals or as closing accruals. Table 12 shows both the opening accrual at time *t* and the closing accruals in period *t*, as well as their representation in terms of cash flow.

TABLE 12: OPENING ACCRUAL ($OA^O\ CF^t_{t+1}$) AND CLOSING ACCRUAL (ACIP MODEL)

$OA^O CFO^t_{t+1,t+2,t+3,\cdots,t+n}$	$(CFO^t_{t+1} + \varepsilon o^t_{t+1} + CFO^t_{t+2} + \varepsilon o^t_{t+2} + CFO^t_{t+3} + \varepsilon o^t_{t+3} + \cdots + CFO^t_{t+n} + \varepsilon o^t_{t+n}) = \sum_{n=1}^{\infty} CFO^t_{t+n} + \sum_{n=1}^{\infty} \varepsilon o^t_{t+n}$
$OA^C CFO^{t-1}_t$	$-CFO^{t-1}_t - \varepsilon o^{t-1}_t$
$OA^C CFO^{t-2}_t$	$-CFO^{t-2}_t - \varepsilon o^{t-2}_t$
$OA^C CFO^{t-3}_t$	$-CFO^{t-3}_t - \varepsilon o^{t-3}_t$
...	...
$OA^C CFO^{t-n}_t$	$-CFO^{t-n}_t - \varepsilon o^{t-n}_t$

Source: Author.

When earnings and cash flows from operations are impacted at the same time, there will be no opening accrual and therefore there will be no closing accrual, since there is no difference between earnings and cash flow.

However, when there are receipts or disbursements of cash flow from operations before this recognition occur in earnings, opening and closing accruals are generated at period *t*. Table 5 presents these accruals.

Thus, the operating accruals in period *t* can be decomposed as in equation 26:

$$OA_t = OA^O CF^t_{t+1,t+2,t+3,\cdots,t+n} + OA^C CF^{t-1}_t + OA^C CF^{t-2}_t + OA^C CF^{t-3}_t + \cdots + OA^C CF^{t-n}_t + OA^O CF^{t+1}_t + OA^C CF^t_{t-1} \quad \textbf{(Eq. 26)}$$

This equation can be written according to impacts in cash flow from operating activities:

$$OA_t = \sum_{n=1}^{\infty} CFO_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon o_{t+n}^{t} - \sum_{n=1}^{\infty} CFO_{t}^{t-n} - \sum_{n=1}^{\infty} \varepsilon o_{t}^{t-n} - CFO_{t}^{t+1} - CFO_{t-1}^{t} \quad \textbf{(Eq. 27)}$$

Thus, in period *t*, accruals related to operating, investing and financing activities can be written as:

$$\begin{aligned} AC_t = {} & \sum_{n=1}^{\infty} CFO_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon_{t+n}^{t} - \sum_{n=1}^{\infty} CFO_{t}^{t-n} - \sum_{n=1}^{\infty} \varepsilon_{t}^{t-n} - CFO_{t}^{t+1} + CFO_{t-1}^{t} \\ & + \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon_{t+n}^{t} - \sum_{n=1}^{\infty} CFI_{t}^{t-n} - \sum_{n=1}^{\infty} \varepsilon_{t}^{t-n} - \sum_{n=1}^{\infty} CFI_{t}^{t+n} \\ & + \sum_{n=1}^{\infty} CFI_{t-n}^{t} - \sum_{n=1}^{\infty} CFF_{t(t+1)} + \sum_{n=1}^{\infty} CFF_{t-n(t)} \end{aligned} \quad \textbf{(Eq. 28)}$$

As earnings (comprehensive income) is composed of total cash flow and total accruals, we can write equation 29:

$$\begin{aligned} Earnings_t = {} & CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} + CFO_{t}^{t} + \sum_{n=1}^{\infty} CFO_{t+n}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t} \\ & + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon i_{t}^{t-n} + \sum_{n=1}^{\infty} \varepsilon o_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon o_{t}^{t-n} \end{aligned} \quad \textbf{(Eq. 29)}$$

Or:

$$\begin{aligned} AC_t + TCF_t = {} & CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} + CFO_{t}^{t} + \sum_{n=1}^{\infty} CFO_{t+n}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t} \\ & + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon i_{t}^{t-n} + \sum_{n=1}^{\infty} \varepsilon o_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon o_{t}^{t-n} \end{aligned} \quad \textbf{(Eq. 30)}$$

Now, substituting above total cash flow for equation 25, we obtain a theoretical Accrual Model under Comprehensive Income Perspective:

$$AC_t = CFO_{t-1}^{t} + \sum_{n=1}^{\infty} CFI_{t-n}^{t} - \left(CFO_{t}^{t-1} + CFO_{t}^{t+1} + \sum_{n=1}^{\infty} CFI_{t}^{t-n} + \sum_{n=1}^{\infty} CFI_{t}^{t+n} + \sum_{n=1}^{\infty} CFF_{t\,(t+1)} - \sum_{n=1}^{\infty} CFF_{t-n\,(t)} \right) + CFO_{t+1}^{t} + \sum_{n=2}^{\infty} CFO_{t+n}^{t} + \sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=1}^{\infty} \varepsilon o_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon o_{t}^{t-n} + \sum_{n=1}^{\infty} \varepsilon i_{t+n}^{t} - \sum_{n=1}^{\infty} \varepsilon i_{t}^{t-n} \quad \textbf{(Eq. 31)}$$

ACIP Theoretical Model

In this model, we are considering all kind of accruals that have impact on comprehensive income and/or in total cash flow. Then total accrual can be obtained from comprehensive income less total cash flow. We called equation 31 of “Accruals Model under Comprehensive Income Perspective (ACIP)”.

The ACIP Model shows that accruals are temporary adjustments that delay or anticipate the recognition of cash flow, plus estimation errors. Therefore, we can verify that accruals are negatively correlated to current cash flow and positively correlated to past and future cash flow. The term of error represents errors of accruals estimation referring to impacts in future cash flows and can be used as a measure of accruals quality.

We used the same proxies selected for the ANIP model and included new proxies so that the model could be used empirically. The variables $\sum_{n=1}^{\infty} CFI_{t+n}^{t}$ and $\sum_{n=2}^{\infty} CFO_{t+n}^{t}$represent impacts in current earnings that will impact future cash flow from investing and operating activities. Change in accumulated other comprehensive income (Δ*OCI*) can be used as proxy to a portion of $\sum_{n=1}^{\infty} CFI_{t+n}^{t} + \sum_{n=2}^{\infty} CFO_{t+n}^{t}$, because *NNCA* and *NL* can be similarly used as explained previously.

Accruals can be calculated as comprehensive income less total cash flow. We called these accruals of comprehensive accruals (*CA*)

Thus, applying the selected proxies to the ACIP Model (Equation 31), we can obtain an empirical model:

$$CA_t = \beta_0 + \beta_1 NNCA_t + \beta_2 NL_t + \beta_3 CFO_{t-1} + \beta_4 TCF_t + \beta_5 CFO_{t+1} + \beta_6 \Delta OCI_t + \varepsilon_t \quad \textbf{(Eq. 32)}$$

ACIP Empirical Model

Then according to the signals of the theoretical model, we expect that $0<\beta_1<1$, $0<\beta_1<1$, $0<\beta_3<1$, $-1<\beta_4<0$, $0<\beta_5<1$ and $0<\beta_6<1$.

2.3 OBSERVABLE FIRM CHARACTERISTICS

Dechow e Dichev (2002) confronted observable firm characteristics with accruals quality. In the present paper, we analyzed the following characteristics: firm size; sales, cash flow, accruals and earnings volatility, frequency of negative earnings reporting and magnitude of accruals.

The goal here is to uncover possible relations between non-observable standard deviations errors and easily observable firm characteristics. Then, these characteristics can be used as instruments to accruals quality, since standard deviation of errors is an accrual quality measurement.

It is likely that firms immersed in volatile and highly uncertain operating environments will have more errors of accruals estimation. So we expect that all firm characteristics, except firm size, will have a positive correlation with standard deviation of errors and a negative correlation with accruals quality, due to higher values for these characteristics, like higher uncertainty and instability. We additionally

expect a positive relation between firm size and accruals quality, because the bigger the firm, more likely is its operating stability.

3 METHODOLOGY

3.1 SAMPLE SELECTION

Our sample is obtained from the Compustat annual industrial and research files over 1987 to 2010. We selected this period because firms were required to present the Statement of Cash Flow for fiscal years ending after July15, 1988, according to Statement of Financial Accounting Standards No 95. However, following Dechow and Dichev (2002), we select data one year early because some firms adopted this standard in 1987.

For the ANIP model, the sample is restricted to firms with complete data for assets, net income, cash flow from operating activities, financing activities and investing activities.

For the ACIP model, the data encompasses only years 2000 to 2009, since the Statement of Financial Accounting standards nº 130 became effective for fiscal years beginning after December 15, 1997, but according to Chambers et al (2007) the Compustat item denominated “Acumulated Other Comprehensive Income (loss)” is available sporadically for data-year 2000 and more completely in the subsequent years. The sample is restricted to firms with complete data from assets, accumulated other comprehensive income, cash flow from operating activities, cash flow from financing activities and cash flow from investing activities.

Cash flow from operating activities is Compustat item *OANCF*, cash flow from investing activities is item *IVNCF* and cash flow from financing activities is *FINCF*. Total cash flow (*TCF*) is computed as *OANCF*+ *IVNCF*+ *FINCF*. Change in Other Comprehensive income is computed as $\Delta ACOMINC$. Comprehensive Income is

calculated as *NI*+∆*ACOMINC*. Aggregate Accrual (*AA*) is computed as *NI–TCF* and Comprehensive Accrual (*CA*) is calculated as *CI–TCF*.

The change in working capital from year *t-1* to *t* (∆*WC*) is computed as ∆*RECT*+ ∆*INVT*- ∆*AP*- ∆*TXP* + *UAOLOCH*. We calculated Net Non-current Assets (*NNCA*) as ∆*AT* – ∆*ACT* – *IVCH* and Net Liabilities (*NL*) as ∆*LT* – *FINCF*.

All variables were scaled by average total assets and winsorised at p(0.025).

3.2 DESCRIPTIVE STATISTICS AND CORRELATIONS

Table 13 reports the sample descriptive statistics. One can see that average aggregate and comprehensive accruals are negative (-0.1409 and -0.2614, respectively). Average comprehensive accruals are more negative than average aggregate accruals, because average comprehensive income is more negative than average net income (-0.2350 and -0.1063, respectively).

TABLE 13: DESCRIPTIVE STATISTICS

	Descriptive Statistics 1987 - 2010				
	Mean	St. Dev.	Perc. 1	Median	Perc. 99
∆OCI	0.0001	0.0179	-0.0845	0	0.0750
Comprehensive Accrual	-0.2614	1.1662	-8.7722	0.0052	0.5176
Net liabilities	-0.0615	0.4174	-2.3324	0.0169	0.8815
Net Non-current Assets	0.0177	0.2491	-0.9952	0.0086	0.9307
Total Cash flow	0.0161	0.1696	-0.5597	0.0009	0.8370
Aggregate Accrual	-0.1409	0.6039	-4	0.0121	0.4671
Net Income	-0.1063	0.5177	-3.4987	0.0175	0.4397
Comprehensive Income	-0.2350	1.1082	-8.4151	0.0119	0.5475
Total Assets (in millions)	5,2000	52,664	0.0980	46.60	80,175

Source: Author.

Sample correlations are shown in Table 14. We can verify a positive correlation between net income and total cash flow (0.011), and a negative correlation between comprehensive income and total cash flow (-0.01). We also

verify that the theoretical models' expected signals are supported by correlations. The correlation between total cash flow and aggregate accruals is negative (-0.22), while the correlations between *AA* and past *CFO*, between *AA* and future *CFO*, between *AA* and *NL*, and between *AA* and *NNCA* are positive (0.718; 0.754; 0.433; 0.087).

Additionally, the correlation between total cash flow and comprehensive accruals is negative (-0.17), while the correlations between *CA* and past *CFO*, between *CA* and future *CFO*, between *CA* and *NL*, between *CA* and *NNCA*, between *CA* and ∆*OCI* are positive (0.679; 0.71; 0.369; 0.069; 0.036).

TABLE 14: SAMPLE CORRELATIONS

Correlations 1987-2010										
	∆OCI	CA	NL	NNCA	TCF	AA	NI	CI	CFO_{t-1}	CFO_{t+1}
∆OCI	1									
CA	0.036	1								
NL	-0.005	0.369	1							
NNCA	0.047	0.069	0.070	1						
TCF	0.000	-0.17	-0.27	0.059	1					
AA	0.010	0.945	0.433	0.087	-0.22	1				
NI	0.010	0.909	0.385	0.108	0.011	0.965	1			
CI	0.037	0.985	0.331	0.09	-0.01	0.925	0.933	1		
CFO_{t-1}	0.007	0.679	0.417	0.106	0.05	0.718	0.759	0.706	1	
CFO_{t+1}	0.010	0.710	0.478	0.050	-0.070	0.754	0.762	0.710	0.100	1

Source: Author.

3.3 ANIP MODEL

Regressions of the Aggregate Accrual on Net Non-Current Assets, Net Liabilities, Past and Future Cash Flow from Operations and Total Cash Flow for Firm-years between 1987 and 2009 were performed according to the model developed in this research. The standard deviation of residuals was used as aggregate accruals'

quality measure, where high standard deviation denotes low aggregate accruals quality.

Since the empirical model is an approximation of the theoretical model, we expect, according to the theory, the coefficient values to be $0<\beta_1<1$, $0<\beta_2<1$, $0<\beta_3<1$, $-1<\beta_4<0$ and $0<\beta_5<1$and that R^2 be smaller than 100%.

3.4 ACIP MODEL

Regressions of the Comprehensive Accrual on Net Non-current Assets, Net Liabilities, Past and Future Cash Flow from Operations and Total Cash Flow and Change in Accumulated Other Comprehensive Income for Firm-years between 2000 and 2009 were performed according to the model developed in this research. The standard deviation of residuals was used as comprehensive accruals' quality measure, where high standard deviation denotes low comprehensive accruals' quality.

Since the empirical model is an approximation of the theoretical model, we expect, according to the theory, the coefficient values to be $0<\beta_1<1$, $0<\beta_2<1$, $0<\beta_3<1$, $-1<\beta_4<0$, $0<\beta_5<1$ and $0<\beta_6<1$and that R^2 be smaller than 100%.

3.5 FIRM CHARACTERISTICS AND AGGREGATE ACCRUALS QUALITY

The standard deviation of residuals from ANIP model is used as aggregate accruals' quality measure. This measure of quality is confronted with observable firm characteristics, according to the following regression of standard deviation of residuals on observable firm characteristics.

$$\text{StdDev}AA_i = \beta_0 + \beta_1 Characteristic_i + \varepsilon_i \quad \textbf{(Eq. 33)}$$

We expect β_1 signal to be positive for all characteristics, except firm size. For this specific independent variable, we expect β_1 signal to be negative.

3.6 FIRM CHARACTERISTICS AND COMPREHENSIVE ACCRUALS QUALITY

The standard deviation of residuals from ACIP model is used as a comprehensive accruals quality measure. This measure of quality is confronted with observable firm characteristics, according to the following regression of standard deviation of residuals on observable firm characteristics.

$$\text{StdDev}CA_i = \beta_0 + \beta_1 Characteristic_i + \varepsilon_i \quad \textbf{(Eq. 34)}$$

We also expect β_1 signal to be positive for all characteristics, except firm size. For this specific independent variable, we expect β_1 signal to be negative.

4 RESULTS

4.1 ACCRUALS MODEL UNDER A NET INCOME PERSPECTIVE (ANIP)

Table 15 presents the regressions results of aggregate accrual on net non-current assets, net liabilities, past and future cash flow from operations and total cash flow for firm-years between 1987 and 2009. Table 15 is divided in 3 panels. Panel A presents firm-level regressions, Panel B presents industry-specific regressions and Panel C presents a pooled regression.

When we focus on mean values of firm-level regressions, the model's expected signals are observed. But some coefficients are not significant at 10% significance level, while all mean values of industry-specific regressions have expected signals and are significant at 1% level.

It is important to highlight that all firm-level coefficients, in module, are in accordance to the theoretical model, as they are higher than 0 and lower than 1. Additionally, the median adjusted R^2 is 0.5869.

Finally, when we analyze the results for the pooled regression, we can observe the expected signals and values of the model. That is, β_1, β_2, β_3 and β_5 coefficients are higher than 0 and lower than 1 (0.1293; 0.0995; 0.6725; 0.5365) and the β_4 coefficient is higher than -1 and lower than 0 (-0.8713). The R^2 is also in accordance with the model's expected value (0.6485).

TABLE 15: ANIP MODEL

Regressions of the Aggregate Accrual on Net Non-current Assets, Net Liabilities, Past and Future Cash Flow from Operations and Total Cash Flow for Firm-years between 1987 and 2009

$$AA_t = \beta_0 + \beta_1 NNCA_t + \beta_2 NL_t + \beta_3 CFO_{t-1} + \beta_4 TCF_t + \beta_5 CFO_{t+1} + \varepsilon_t$$

Panel A: Firm-specific regressions (11,683 firms)

	Intercept	β_1	β_2	β_3	β_4	β_5	Adj. R^2
Mean	-0.09	0.2118	0.035	0.2294	-0.69	0.441	0.5869
t statistic	0.6614	-1.003	-0.4936	2.399**	-1.753*	2.158**	
Perc. 25	-0.053	-0.04	-0.191	-0.053	-1.12	-0.068	0.4088
Median	0.143	0.111	-0.025	0.143	-0.729	0.123	0.6881
Perc. 75	0.5769	0.5048	0.033	0.576	0	0.4908	0.8670

Panel B: Industry-specific regressions (463 industries)

	Intercept	β_1	β_2	β_3	β_4	β_5	Adj. R^2
Mean	-0.066	0.1903	0.0433	0.5093	-0.8383	0.3886	0.5817
t statistic	-18.30***	15.57***	4.34***	26.44***	-42.60***	25.49***	
Perc. 25	-0.0965	0.053	-0.067	0.2634	-0.9773	0.1721	0.4592
Median	-0.0610	0.1622	0.0426	0.4804	-0.8066	0.3716	0.6059
Perc. 75	-0.0192	0.2948	0.1497	0.7397	-0.6521	0.5686	0.7129

Panel C: Pooled Regression (120,686 observations)

	Intercept	β_1	β_2	β_3	β_4	β_5	Adj. R^2
Coefficient	-0.0933	0.1293	0.0995	0.6725	-0.8713	0.5365	0.6485
t statistic	-83.30***	21.37***	15.53***	66.11***	-84.69***	61.78***	

*, **, *** for 10%, 5% and 1% significance respectively (p-Value).

AA_t= net income less total cash flow, in current period; $NNCA_t$= Net non-current assets, in previous period, calculated as non-current assets less new investments; NL_t= Net liabilities, in current period, calculated as total liabilities less cash flow from financing activities; CFO_{t-1}= Cash flow from operating activities in previous period; TCF_t= total cash flow in current period; CFO_{t+1}= Cash flow from operating activities in next period.

All variables scaled by average assets. Pooled regressions with clustered robust in firm. Sample: Firms between 1987 and 2009 with at least 8 observations. Mean values were winsorised at 1% level.

Source: Author.

4.2 ACCRUALS MODEL UNDER A COMPREHENSIVE INCOME PERSPECTIVE (ACIP)

Table 16 presents the results of regressions of comprehensive accruals on net non-current assets, net liabilities, past and future cash flow from operations, total cash flow and change in other comprehensive income for firm-years between 2000 and 2009. Table 16 is divided in 3 panels. Panel A presents firm-level regressions,

Panel B presents industry-specific regressions and Panel C presents a pooled regression.

The results of firm-specific and industry-specific regressions agree with the model's expected values That is, all coefficients, in module, are larger than 0 and smaller than 1, except for β_6 (1.311; 1.835, respectively). But β_6 is not significant. This may be due to most of the values for change in other comprehensive income being zero.

Panel C shows that all coefficients have the expected signals. In accordance to the model, β_1, β_2, β_3 and β_5 coefficients are higher than 0 and lower than 1 (0.099; 0.033; 0.9215; 0.8569) and β_4 coefficient is higher than -1 and lower than 0 (-0.9215). β_6, however, is higher than 1. All coefficients are significant at 1% level. The R^2 is 0.6312 and is according to the model.

TABLE 16: ACIP MODEL

Regressions of the Comprehensive Accrual on Net Non-Current Assets, Net Liabilities, Past and Future Cash Flow from Operations, Total Cash Flow and Change in Other Comprehensive Income for Firm-years between 2000 and 2009

$$CA_t = \beta_0 + \beta_1 NNCA_t + \beta_2 NL_t + \beta_3 CFO_{t-1} + \beta_4 TCF_t + \beta_5 CFO_{t+1} + \beta_6 \Delta OCI_t + \varepsilon_t$$

Panel A: Firm-specific regressions (6,101 firms)

	Intercept	β_1	β_2	β_3	β_4	β_5	β_6	Adj. R^2
Mean	-0.099	0.2115	0.052	0.2283	-0.7121	0.02776	1.311	0.6391
t statistic	-1.736*	2.38**	1.97**	3.22***	-2.94***	1.4462	0.05	
Perc. 25	-0.166	-0.173	-0.353	-0.2865	-1.2963	-0.2686	0	0.5618
Median	-0.014	0.07	0	0.0367	-0.6811	0.6564	0	0.8675
Perc. 75	0.0761	0.659	0.4396	0.7757	0	0.6997	1.574	0.9711

Panel B: Industry-specific regressions (418 industries)

	Intercept	β_1	β_2	β_3	β_4	β_5	β_6	Adj. R^2
Mean	-0.079	0.233	0.0418	0.5295	-0.7878	0.5170	1.835	0.6365
t statistic	-10.84***	7.02***	1.92*	13.53***	-8.09***	1.192***	-0.432	
Perc. 25	-0.1358	0.0055	-0.133	0.1458	-1.091	0.1292	0.255	0.5205
Median	-0.0575	0.1494	0.036	0.4988	-0.8367	0.4031	1.343	0.6516
Perc. 75	-0.0053	0.3892	0.2161	0.9184	-0.0522	0.7865	2.364	0.799

Panel C: Pooled Regression(4,749 clusters in firms; 41,023 observations)

	Intercept	β_1	β_2	β_3	β_4	β_5	β_6	Adj. R^2
Coefficient	-0.1476	0.099	0.033	0.9215	-0.9926	0.8569	1.851	0.6312
t statistic	-49.45***	6.82***	1.90***	34.54***	-39.34***	33.06***	14.37***	

*, **, *** for 10%, 5% and 1% significance respectively (p-Value)

CA_t= comprehensive income less total cash flow in current period; $NNCA_t$= net non-current assets, in current period, calculated as non-current assets less new investments; NL_t= net liabilities, in current period, calculated as total liabilities less cash flow from financing activities; CFO_{t-1}= Cash flow from operating activities in previous period; TCF_t= total cash flow in current period; CFO_{t+1}= Cash flow from operating activities in next period; ΔOCI_t= change in other comprehensive income in current period.

All variables scaled by average assets. Pooled regressions with clustered robust in firm. Sample: Firms between 1987 and 2009 with at least 8 observations. Mean values were winsorised at 1% level.

Source: Author.

4.3 AGGREGATE ACCRUALS QUALITY AND FIRM CHARACTERISTICS

The standard deviation of the residuals from the pooled regression (Table15, Panel C) was used as a measure of aggregate earnings quality. The higher the standard deviation, the lower is aggregate accrual's quality considered.

Firm characteristics, such as firm size, magnitude of sales volatility, magnitude of cash flow volatility, magnitude of aggregate accrual volatility, magnitude of earnings volatility, frequency of reporting negative net income and magnitude of aggregate accrual, were confronted with aggregate earnings quality.

Panel A of Table 17 presents the descriptive statistics of firm characteristics and aggregate accruals quality. Panel B shows the correlations between aggregate accruals quality and firm characteristics. We can observe that all firm characteristics have a positive correlation with aggregate accruals quality, except firm size which has a negative correlation. We can also observe the highest correlations for the standard deviation of net income (0.8516), the standard deviation of accruals (0.8457) and the magnitude of accruals (0.7420). Such strong correlations suggest that these variables can be used as instruments for aggregate accruals quality.

In panel C, Table 17 presents the results of regressing the standard deviation of aggregate accrual on firm characteristics. Model 1 shows R^2 of 0.7580 for standard deviation of net income, while Model 2 presents R^2 of 0.2893 for standard deviation of cash flow. Model 3 has R^2 increasing to 0.7664 for volatility of net income and volatility of aggregate accruals. Additionally, Model 4 has R^2 of 0.5996 for all remaining firm characteristics.

Therefore, we can verify that volatility of accruals and volatility of net income, together, can be used as instruments for aggregate accruals quality.

TABLE 17: AGGREGATE ACCRUALS QUALITY AND FIRM CHARACTERISTICS

Descriptive Statistics and the Correlations between Quality of Aggregate Accruals (SResidAA) and Selected Firms Characteristics between 1987 and 2009

Panel A: Descriptive Statistics

	Mean	Standard Deviation	25th Percentil	Median	75th Percentil
Std. Dev. of the Residuals (SResidAA)	0.207	0.291	0.058	0.108	0.219
Log(Total Assets)	5.225	2.539	3.438	5.238	6.936
Std. Dev. of Sales	0.301	0.306	0.096	0.217	0.394
Std. Dev. of Net Income	0.188	0.301	0.034	0.082	0.198
Std. Dev. of TCF	0.118	0.128	0.028	0.067	0.164
Std. Dev. of AA	0.238	0.351	0.053	0.114	0.252
Proportion of Negative Earnings	0.620	0.273	0.400	0.636	0.875
Average |AA|	0.167	0.339	0.031	0.069	0.145

Panel B: Correlations between Standard Deviation of the Residuals (SResidAA) and Selected Firm Characteristics

Log(Total Assets)	Std. Dev. of Sales	Std. Dev. of Net Income	Std. Dev. of TCF	Std.Dev. of Residuals	Prop. of Neg. Earnings	Average |AA|
-0.5439	0.3494	0.8516	0.4706	0.8457	0.4319	0.7420

Panel C: Regressions where the Dependent Variable is the Standard Deviation of the Residuals and the Independent Variables are Firm Characteristics

		Intercept	Std. Dev. of Net Income	Std. Dev. of AA	Std. Dev. of TCF		R^2
Model 1	Coefficient	0.033	0.794				0.7580
	t Statistic	68.09***	241.64***				
Model 2	Coefficient	0.051			1.190		0.2893
	t Statistic	73.98***			166.04***		
Model 3	Coefficient	0.027	0.503	0.262			0.7664
	t Statistic	52.28***	69.61***	43.16***			
		Intercept	**Prop. of Neg. Earnings**	**Log(Total Assets)**	**Average |AA|**	**Std. Dev. of Sales**	**R^2**
Model 4	Coefficient	0.169	0.045	-0.024497	0.425	0.163	0.5996
	t Statistic	34.26***	9.86***	-42.18***	81.33***	36.49***	

*, **, *** for 10%, 5% and 1% significance respectively (p-Value)

Source: Author.

4.4 COMPREHENSIVE ACCRUALS QUALITY AND FIRM CHARACTERISTICS

The standard deviation of the residuals from pooled regression (Table 16, Panel C) was used as measure to comprehensive earnings quality, where the higher the standard deviation, the lower is considered the comprehensive accrual quality.

Thus, firm characteristics, such as firm size, magnitude of sales volatility, magnitude of cash flow volatility, magnitude of aggregate accrual volatility, magnitude of earnings volatility, frequency of reporting negative net income and magnitude of aggregate accrual, were confronted with comprehensive earnings quality.

Panel A of Table 18 presents the descriptive statistics of firm characteristics and comprehensive accruals quality. Panel B shows the correlations between comprehensive accruals quality and firm characteristics. We can observe that all firm characteristics have a positive correlation with comprehensive accruals quality, except for firm size, which has a negative correlation. We can observe the highest correlations for the standard deviation of comprehensive income (0.719), the standard deviation of accruals (0.714) and the magnitude of accruals (0.642). Such strong correlations suggest that these variables can be used as instruments for comprehensive accruals quality.

In panel C, Table 18 presents the results of regressing the standard deviation of comprehensive accrual on firm characteristics. Model 1 shows R^2 of 0.5116 for standard deviation of net income, while Model 2 presents R^2 of 0.5061 for standard deviation of cash flow and standard deviation of comprehensive accrual. Then, when deviation of comprehensive accruals is introduced to the model, the explanatory power of standard deviation of cash flow is reduced. Model 3 has R^2 increasing to

0.5120 for volatility of net income and volatility of aggregate accruals. Model 4 has R^2 of 0.4476 for all remaining firm characteristics.

Therefore, we can verify that volatility of comprehensive accruals and volatility of comprehensive income, together, can be used as instruments for comprehensive accruals quality.

TABLE 18: COMPREHENSIVE ACCRUAL QUALITY AND FIRM CHARACTERISTICS

Descriptive Statistics and the Correlations between Quality of Comprehensive Accruals (SResidCA) and Selected Firms Characteristics between 2000 and 2009

Panel A: Descriptive Statistics

	Mean	Standard Deviation	25th Percentil	Median	75th Percentil
Standard Deviation of the Residuals (SResidCA)	0.159	0.3205	0.0464	0.084	0.1592
Log(Total Assets)	5.109	2.559	3.299	5.103	6.835
Std. Dev. of Sales	0.289	0.303	0.086	0.204	0.379
Std. Dev. of Comprehensive Income	0.250	0.624	0.029	0.070	0.172
Std. Dev. of TCF	0.119	0.135	0.026	0.066	0.162
Std. Dev. of CA	0.288	0.655	0.047	0.097	0.211
Proportion of negative earnings	0.410	0.231	0.222	0.375	0.583
Average |CA|	0.084	0.369	0	0.005	0.039

Panel B: Correlations between Standard Deviation of the Residuals (SResidCA) and Selected Firm Characteristics

Log(Total Assets)	Std. Dev. of Sales	Std. Dev. of Comprehensive Income	Std. Dev. of TCF	Std. Dev. of CA	Prop. of Neg. Earnings	Average |CA|
-0.459	0.272	0.719	0.350	0.714	0.270	0.642

Panel C: Regressions where the Dependent Variable is the Standard Deviation of the Residuals and the Independent Variables are Firm Characteristics

		Intercept	Std. Dev. of Comprehensive Income	Std. Dev. of CA	Std. Dev. of TCF		R^2
Model 1	Coefficient	0.069	0.490				0.5116
	t Statistic	56.95***	51.01***				
Model 2	Coefficient			0.444	0.166		0.5061
	t Statistic			2.67***	10.69***		
Model 3	Coefficient		0.408	0.079			0.5120
	t Statistic		16.20***	3.59***			
		Intercept	**Prop. of Neg. Earnings**	**Log(Total Assets)**	**Average |CA|**	**Std. Dev. of Sales**	**R^2**
Model 4	Coefficient	0.334	-0.1015	-0.037	0.427	0.141	0.4475
	t Statistic	19.35***	-4.58***	- 16.58***	17.60***	6.51	

*, **, *** for 10%, 5% and 1% significance respectively (p-Value)

Source: Author.

5 CONCLUSION

This research proposes a new measure of aggregate and comprehensive accruals quality. Theoretical and empirical models regarding aggregate and comprehensive income were developed. Aggregate accruals' quality is a measure that captures quality of total non-transitory accruals, that is, current and non-current accruals and operating and non-operating accruals. Additionally, comprehensive accruals' quality is a measure that captures quality of total non-transitory and transitory accruals and then, this measure can be support over clean surplus.

It is important to highlight that these models valuate accruals' quality related errors of cash flow estimations, including intentional and unintentional errors. Dechow and Dichev (2002) developed a model following a similar approach, but those authors limited their model to working capital accruals. The measurement presented in this work is an innovation in the literature, considering impacts over cash flows from operating activities, financing activities and investing activities.

We verify that observable firm characteristics, such as net income and aggregate accruals' volatility, can be used as instruments to aggregate accruals' quality. We also verify that comprehensive income and comprehensive volatility can be used as instruments to comprehensive accruals' quality.

Our findings also suggest that accruals improve earnings ability to predict future cash flows, but they introduce noise on these predictions, since they are prone to errors of estimation. We can observe it, because the higher the magnitude of accruals, the lower the earnings' quality. Such can occur because, according to Sloan (1996), accruals are components less persistent than cash flows. So, earnings

can be better than cash flows to predict future cash flows, provided that the accruals portion of earnings has enough quality.

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