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Return and Liquidity Relationships on Market and Accounting Levels in Brazil*

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ABSTRACT

This article discusses profitability-liquidity relationships on accounting and market levels for 872 shares of publicly-traded Brazilian companies, observed between 1994 and 2013. On the market level, the assumption is that share liquidity is able to reduce some of the risks incurred by investors, making them more willing to pay a higher price for liquid shares, which would lower expected market returns. On the accounting level, the basic hypothesis argues that a firm's holding more liquid assets is related to a conservative investment policy, possibly reducing accounting returns for shareholders. Under the assumption of financial constraint, however, more accounting liquidity would allow positive net present value investments to be carried out, increasing future accounting returns, which would positively affect market liquidity and share prices in an efficient market, resulting in a lower market risk/expected return premium. Under the assumption of no financial constraint, however, more accounting liquidity would only represent a carry cost, compromising future accounting returns, which would adversely affect market liquidity and share prices and result in a higher market risk/expected return premium. Among the hypotheses, the presence of a negative market liquidity premium was verified in Brazil, with shares that traded more exhibiting a higher expected market return. On the margins of the major theories on the subject, only two negative relationships between excess accounting liquidity and market liquidity and accounting return, supporting the carry cost assumption for financially unconstrained firms, were verified. In terms of this paper's contributions, there is the analysis, unprecedented in Brazil as far as is known, of the relationship between liquidity and return on market and accounting levels, considering the financial constraint hypothesis to which the firms are subject.

Keywords: market liquidity, accounting liquidity, market risk/expected return, accounting return, financial constraints.

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1 INTRODUCTION

One important aim of Accounting and Finance research is to provide elements that allow for improved analysis of financial reports, predictability of firms' future results (Fairfield, Whisenant, & Yohn, 2001), and ultimately help in agent decision making.

In informationally efficient markets (Fama, 1970, 1991), it is expected that information released relating to firms is quickly and correctly passed on into their share prices. However, researchers such as Eberhart, Maxwell, and Siddique (2004) find evidence that even the most active and developed markets, such as in the US, are slow in correctly identifying and evaluating accounting information. At times, sluggishness in transmission can result from the difficulty itself of recognizing a piece of information as positive or negative. Take, for example, the (potential) trade-off between liquidity and profitability. In the stock market setting, more liquid shares would represent lower investment exit risk for the investor. Therefore, they should be recognized as more attractive assets, enjoying a higher price and lower market risk/expected return.

Authors such as Amihud and Mendelson (1986, 2000) argue that less liquid shares in the market need to be traded with a discount in the current price that attracts investors – or, in other words, they need to offer a risk premium in order to attract investors to hold the asset in the long run. According to Demsetz (1968) and Amihud and Mendelson (1986), market liquidity can be described as the cost of immediate execution of a buy or sell order. Not unusually, market liquidity is measured by the bid-ask spread, or the difference between the price of buying and the price of selling an asset on the market, as originally proposed by Demsetz (1968). Authors who use a similar concept are: Chordia, Roll, and Subrahmanyan (2000) and Gopalan, Kadan, and Pevzner (2012); and, in Brazil, Minardi, Sanvicente, and Monteiro (2005), and Correia and Amaral (2012).

For Pastor and Stambaugh (2001), liquidity is the ability to quickly trade large quantities of assets, at a low cost and without this altering the price of the asset much. For Rösch, Subrahmanyam, and Dijk (2013), greater liquidity, represented by trading volume, implies decreased friction – or transaction costs – in the market, making it more distribution efficient. Examples of authors who used trading volume or turnover (volume in terms of the amount of securities issued) as a proxy for market liquidity in their articles are: Demsetz (1968), Datar, Naik, and Radcliffe (1998), Chordia, Roll, and Subrahmanyan (2011), and, in Brazil, Correia and Amaral (2012).

Datar et al. (1998) verified the presence of the liquidity premium witnessed by Amihud and Mendelson (1986) in the shares of non-financial companies listed on the NYSE and found that the relationship exists even after being controlled for variables such as company size, book-to-market (BTM) ratio, and beta, risk factors proposed by Fama and French (1993). They concluded that expected return is negatively correlated to the rate of turnover, supporting the results obtained by Amihud and Mendelson (1986). In Brazil, Machado and Medeiros (2012), using shares listed on the São Paulo Stock Exchange (BM&FBOVESPA) between June 1995 and June 2008, sought to price assets in function of the beta measured by the CAPM (Capital Asset Pricing Model) model from Sharpe (1964), passing through Fama and French (1993), and by the Keene and Peterson (2007) model, which considers, in the pricing of expected market return, the beta factors size, book-to-market, and market liquidity. This last model, according to its authors, was – compared to the others – the one with the greatest predictive ability. Minardi et al. (2005) also sought to verify the presence of a premium for liquidity in Brazil; highlighting the friction that exists in this market and the irrelevance of market-maker actions, the authors concluded that a premium for negative liquidity exists in the market in question, with more liquid shares exhibiting systematically higher returns.

These results bring about reflections regarding the market liquidity versus expected market risk/return relationship in Brazil. Considering the extensive timeframes and range of assets, comprising all non-financial company shares traded on the BM&FBOVESPA during the 20 years of financial stability after the implementation of the *Plano Real* in 1994, the first aim of this paper is to analyze the market liquidity versus expected market risk/return relationship for the 872 shares monitored quarterly between 1994 and 2013. But not only this; innovatively, as far as is known, and assuming that the behavior of share prices in the market can reflect the economic-financial situation of the issuing companies, cross-relationships (and potential trade-offs) between liquidity and accounting return and liquidity and expected market risk/return will be theoretically discussed and estimated for the companies that compose the sample, with joint analysis of the four indicators being the second, and main aim of this paper.

In accounting terms, what is discussed in the literature is a possible trade-off between accounting liquidity and profitability caused by the assumption that companies that carry more liquid assets would be less apt to generate greater accounting returns for shareholders (commonly defined as net income per unit of net equity, or return on equity, or simply ROE).

Higher accounting returns would be the natural compensation for an increase in operational risk brought on by greater immobilization of capital (lower accounting liquidity), as argued by Walker (1964). This author explores the accounting liquidity and accounting returns relationship for a business, elaborating a theory on working capital that postulates that accounting profitability would be a function of the ratio between

working capital held and fixed capital. If the ratio between working capital and fixed capital increased, this would mean that a company would be more liquid, that is, assuming lower operational risks, and as a result of this reduction in risk, it would also be generating lower accounting returns.

Authors such as Lazaridis and Tryfonidis (2006), using the cash conversion cycle (CCC) concept – which is defined as equal to the sum of the average timeframe for receiving payments from client and the average timeframe for storage minus the average timeframe for paying for purchases -, conclude that, in fact, there is a negative relationship between CCC and profitability, measured by the authors via gross operational return. The authors observed that low gross operational returns are associated with an increase in the number of days for accounts payable. This leads them to the conclusion that companies with lower accounting profitability wait longer to meet their obligations with suppliers, accumulating funds. The same effect is verified in the negative relationship between receivables and company accounting profitability, which would be: the higher the liquidity stored in receivables, requiring more working capital, the lower the accounting profitability.

There are, however, authors such as Chan (2010) who argue in favor of a positive relationship between accounting liquidity and profitability in a context of financial constraint, consistent with the idea postulated by Hirigoyen (1985) and verified both by Baghiyan (2013) and by Ding, Guariglia, and Knight (2010) for developing markets. Baños-Caballero, García-Teruel, and Martínez-Solano (2013) are authors who find a U-shaped relationship for the two indicators, showing that both little working capital and excess working capital can be prejudicial to firm performance.

In Brazil, Pimentel (2008) found a positive relationship between accounting liquidity and profitability in the long run. Using a sample composed of companies listed among the "500 Biggest and Best" in the *Revista Exame*, between 2000 and 2005, the concepts of current liquidity (current assets divided by current liabilities) and return on assets (net income divided by total assets) and the panel data methodology, the author found that current liquidity was positively related to return on assets, supporting the hypothesis from Hirigoyen (1985).

Following on from the paper by Pimentel (2008), Vieira (2010) also sought to verify whether there was a negative relationship between accounting liquidity and profitability in the short run, and a positive one in the long run. The sample was global, composed on 48 airline companies, observed between 2005 and 2008. Again using current liquidity as a measure of liquidity, and return on assets for profitability, the author concluded that accounting liquidity and profitability exhibited a positive relationship, contrary to the idea usually presented in the literature under the assumption of no financial constraint.

More recently, Pimentel and Lima (2011) related, over time series, dry liquidity indicators (current assets minus stock divided by current liabilities) and the profitability of companies from the textiles sector traded on the BM&FBOVESPA between March 1995 and March 2009. They concluded that, in the medium to long run, there was, in fact, a positive relationship between liquidity and profitability; that is, companies with low accounting profitability would also be those with low accounting liquidity, which would again contradict a potential trade-off between liquidity and return on the accounting level. The authors, however, could not establish a causal relationship between liquidity and profitability, with an inverse relationship being observed, for most of the companies analyzed, between profitability and liquidity. In other words, liquidity ends up resulting from the observed profitability (self-funding), and not being a determinant of this profitability.

The concepts of current and dry liquidity, however, treat different investments and financing in the same way, whether they are of a permanent nature (operational) or of a seasonal nature (financial), and greater discrimination between these items is necessary. Fleuriet, Kehdy, and Blanc (2003) argue that in order to define excess accounting liquidity, i.e., that which is really able to destroy accounting profitability, it is first necessary to reclassify current assets and liabilities. The cash balance, according to Fleuriet et al. (2003), represents a residual value obtained from the difference between Net Working Capital (long term funds raised by the company in excess of its long term investments, or simply long term liabilities minus long term assets) and the Working Capital Requirement (requirements of a permanent nature or clients plus stock minus suppliers). If Net Working Capital is not enough to fund the Working Capital Requirement, there will be a negative Cash Balance. This situation indicates that a company is funding part of its permanent requirements with short term funds, which may cause its risk of insolvency to increase. In this model, a company that has a positive cash balance finds itself in a state of greater financial security; however, if this balance is very high, the company ends up incurring liquidity carry costs, possibly generating lower accounting returns for shareholders, with many funds ceasing to be allocated to more risky assets, which could generate higher accounting profitability, respecting the theoretical relationship between risk and return. The cash balance value therefore has to be calculated, as well as its quadratic version, in order to consider, in a more precise way, excess accounting liquidity – taken care of in this paper, unlike in the others found in the literature.

As Almeida and Eid (2014) highlight, since working capital is an important component of cash flow from operations, and this is part of firms' free cash flow, it is correct to conclude that efficient management of working capital has effects on the value of firms. The authors also mention that, over the years, the study of the optimal level of working capital in order to maximize the value of firms has received attention from researchers, such

as Deloof (2003) and Howorth and Westhead (2003). Therefore, it would be interesting to verify not only the relationship between market liquidity and market risk/expected return and between accounting liquidity and accounting return, but also cross-relationships between the four indicators.

Cross-checking accounting and market liquidity, Gopalan et al. (2012) observe that papers such as those from Chordia, Roll, and Subrahmanyam (2007) and Foley, Hartzell, Titman, and Twite (2007) show a simultaneous growth in market liquidity and in the accounting liquidity of firms in a context of constraint. In the unfolding of the subprime mortgage crisis of 2008, a joint decline in the liquidity of the assets of financial companies and in the liquidity of their shares was observed. The question that naturally arises from observation of this fact is whether there is a relationship between accounting (firm) liquidity and market liquidity (of the securities that concede rights over firms' assets). And, moreover, it questions – observing the arguments from Amihud and Mendelson (1986, 2000) – whether firms with greater accounting and market liquidity trade at a higher price, reflecting greater accounting returns in a context of constraint and enjoying a lower market risk/expected return.

The first hypothesis from Gopalan et al. (2012) is that there is a relationship between accounting liquidity and market liquidity, but that this relationship may be both positive and negative. More accounting liquidity reduces the uncertainty related to future investments, via a reduction in financial constraint, which would increase the liquidity of shares. On the other hand, more accounting liquidity allows more discretionary future investments and implies carry costs, increasing investor risk and reducing share liquidity. The results found by the authors indicate that the two dimensions are positively related and that this relationship is more positive in firms with few growth opportunities, that is, those with less discretion in choosing projects and which face greater financial constraint. The authors measure growth opportunities using the market-to-book (MTB) ratio and capital expenditures (CAPEX). As proxies for financial constraint, the authors consider size, lack of credit ratings, and a high likelihood of default.

Gopalan et al. (2012) also argue that in markets without friction and operating according to the assumptions from Modigliani and Miller (1958), investments are independent from the source of funding. However, in markets with financial constraints and without so many investment opportunities capable of leading to overinvestment or exacerbating the constraint problem, the holding of liquid assets can bring value to firms and, according to Diamond and Verrecchia (1991), raise their price – which would reduce their market risk/expected return and cost of capital. Almeida and Eid (2014) also remind us that for financially constrained companies, greater accounting liquidity can increase the likelihood of firms implementing projects with positive net present value, which would be abandoned under the hypothesis of not maintaining accounting liquidity. For firms that are not subject to this restriction, however, this benefit would simply not exist.

In Brazil, the study by Correia and Amaral (2012), in agreement with Gopalan et al. (2012), observes that accounting liquidity – measured by financial flexibility of cash flow – is reflected in the market liquidity of shares. According to the authors, more cash in hand diminishes the uncertainty associated with future cash flow and this improves the market liquidity of shares, making them more attractive, more expensive, and with a lower market risk/expected return.

Almeida and Eid (2014), using a sample of Brazilian companies listed on the BM&FBOVESPA, between 1995 and 2009, found evidence that an increase in the level of working capital at the start of the financial year reduces the value of company shares, increasing their market risk/expected return.

Outside the context of financial constraint, another explanation for the negative relationship between accounting liquidity and market risk/expected return is provided by Hirshleifer, Hou, Teoh, and Zhang (2004). For these authors, as information is vast and the ability to process it is limited, investors end up using rules of thumb for decision making that lead to suboptimal choices. In their paper, the authors argue that the level of accounting liquidity (defined as operational assets minus operational liabilities divided by total assets) is not fully evaluated in terms of effects on future accounting returns. In a simple way, investors evaluate information of more accounting liquidity as always being positive, so that there is never conflict between accounting liquidity and accounting return. They then go on to overvalue shares in firms with greater accounting liquidity and demand a lower market risk premium for these shares.

For a potentially positive relationship between accounting return and expected market return, a similar explanation is given by Anderson and Garcia-Feijoo (2006) and Cooper, Gullen, and Schill (2008). These authors claim that growth of assets (measured by the annual variation in total assets) raises share prices – again, without a complete evaluation of the long term effects of such growth – and, therefore, depresses market risks/expected returns. Considering that total assets, or the portion of these assets funded by shareholder equity, are the most common denominators in accounting return measurements, their growth, unaccompanied by a proportional increase in profitability brought about by investments, would also reduce companies' accounting return. Therefore, there may be a positive relationship between market risks/expected returns and accounting returns in a context of incomplete evaluation of information on the part of investors.

As argued by Fairfield et al. (2001), as well as in Hirshleifer et al. (2004), these failures in the complete evaluation of information indicate market inefficiency in evaluating what would be good or bad news associated

with risk and with expected company performance and that of their shares.

That said, the second aim of this paper is not only to evaluate the trade-off between accounting return and liquidity, but also the way these two indicators are perceived by the market in terms of variation in prices, market risk/expected return, and market liquidity of company shares. As far as is known, joint observation of the four indicators (return and liquidity, at the accounting and market levels) is unprecedented in the literature.

Considering the wide set of theoretical relationships related to the issue, the results found for developed capital markets, and the still few papers relating to developing countries – which do not jointly evaluate the (potential) trade-off between liquidity and profitability at the accounting and market levels -, the theoretical concepts discussed will be tested paying special attention to the role performed by the financial constraint the firms are subject to, which will be considered via the proxies: size, market-to-book ratio (Gopalan et al., 2012), dividends per share, dividend payout, and dividend yield (Almeida & Campello, 2010), self-funding, the financial leverage multiplier, and cost and quality of debt – Table 1 contains the operational description of all of the variables used.

The hypotheses of interest, according to the theories exposed and under the assumption of no financial constraint, are:

H1a: there is a negative relationship between market risk/expected return and market liquidity;

H2a: there is a positive relationship between market risk/expected return and accounting liquidity;

H3a: there is a negative relationship between accounting return and accounting liquidity;

H4a: there is a positive relationship between accounting return and market liquidity;

H5a: there is a negative relationship between market risk/expected return and accounting return;

H6: there is a negative relationship between market liquidity and accounting liquidity.

That is, under no constraint, companies do not need to carry more liquid assets as a liquidity reserve; if they do so, they sacrifice accounting returns, are less traded in the market, have lower prices, and enjoy a higher market risk/expected return premium.

Under the assumption of financial constraint, we have:

H2b: there is negative relationship between market risk/expected return and accounting liquidity;

H3b: there is a positive relationship between accounting return and accounting liquidity;

H6b: there is a positive relationship between market liquidity and accounting liquidity.

That is, under constraint, companies would need to carry more liquid assets as reserve liquidity; when they do so, they guarantee higher accounting returns, are more traded in the market, have higher prices, and enjoy a lower market risk/expected return premium.

Hypotheses 1, 4, and 5 are not related to carrying accounting liquidity to alleviate potential financial constraints, and therefore do not change with regards to the two scenarios considered.

Under the assumption of failure in evaluating information on the part of investors:

H5b: there is a positive relationship between market risk/expected return and accounting return.

2 METHODOLOGY

With the aim of investigating the proposed hypotheses, a database was elaborated based on the Economática® software – containing accounting and share price data for all of the companies listed on the BM&FBOVESPA, observed between the third quarter of 1994 and the third quarter of 2013. As the "market" level is important in this study, the prices and volumes traded for ordinary and preference shares and their combinations (Units) were considered, as well as active and cancelled shares, observed in order to avoid survival bias. Companies from the financial sector were excluded from the database, since their indicators are interpreted in a specific way. The final sample was composed of a maximum of 77 quarters under observation and 872 shares.

The database was constructed in panel form, or rather, predicting the variability of shares and the change in their values over time. They were piled in observational units, as suggested by Wooldridge (2010). In order to place all of the data in this same scale, the average and standard deviation for each variable was removed from the original values, returning all of the data in terms of deviations in relation to the average. In order to avoid the influence of outliers in the estimations, observations above and below 3 standard deviations were ignored.

Table 1 presents the operational description of the variables considered in this study. Table 2 presents the descriptive statistics of these variables, while Table 3 presents the correlations between them.

Analyzing the correlations larger than 5% (in magnitude) in Table 3, it is possible to verify the following linear relationships for the study sample:

1. In relation to volume traded: analyzing the VOL variable, shares that traded more exhibited a greater variation in price in the quarter, a bigger current and future beta, higher business turnover, and a bigger difference between maximum and minimum price (spread). They belonged to larger companies (both in terms of assets as well as market value), with higher accounting returns in the period, which turned over their assets less, held more net working capital and

cash balance, practiced greater self-funding, paid more dividends, and contracted loans at lower rates than the operational return from the activity (measured by the EBIT – Earnings Before Interest and Taxes). The relationships indicate that large companies with no financial constraints are concerned. The QBUS_TURN variable – also related to volume traded, but standardized by the volume of assets in circulation – brought as additional information the fact that such companies would also be those requiring more working capital. The QS _TURN variable did not contribute any additional information.

2. In relation to the spread in prices: analyzing the SPREAD variable, shares that traded with a bigger difference between maximum and minimum price were those that exhibited a greater variation in the prices for the period and a bigger current and future beta; they belonged to larger companies with less turnover, as already indicated by the VOL variable. In other words, this variable also contributed no additional information in relation to that resulting from the analysis of volumes traded.

3. In relation to the variation in prices in the quarter (VAR_PRICE) variable and the (current and future) BETA variable, shares that exhibited a greater variation in prices and a bigger beta were those with greater volume traded and spread. They were also those with greater market value and volume of assets. Again, there was no new information in relation to those presented in (1) and (2).

4. Analyzing the variables related to company size (accounting/SIZE and in market value of shares/MV_EQUITY), the two calculated proxies are quite correlated (47%). As already shown, the volume of assets held by a company is positively related to the variation in prices and beta, to the volume traded, and to the spread. Companies that were bigger were those that operate with higher margins and lower turnover, more net working capital and cash balance, a lower working capital requirement, a lower quadratic cash balance (excess liquidity), more self-funding, a better quality of funding, and that paid more dividends. These correlations indicate that financially unconstrained companies are concerned.

5. Observing the BTM and MTB variables, neither is correlated. Companies with higher BTM – such as "value" shares – and shares with higher MTB, such as "growth" companies (Fama & French, 1993), may be concerned. In the sample analyzed, companies with higher BTM traded more, generated more net margin, used more self-funding, and held more net working capital and cash balance. They also had more working capital requirements. Companies with higher MTB generated lower ROE and were more in debt.

6. In relation to accounting return, companies that generated higher ROE were the least in debt, obtained funding at suitable rates, and paid more dividends. They were those with lower MTB (growth opportunities) and traded more in the period. The results indicate that mature companies are concerned.

7. In relation to accounting liquidity, net working capital (NWCASS) and cash balance (CBASS) are perfectly correlated. The quadratic cash balance (CBASS2) is negatively correlated with both. As already shown, larger companies – with higher BTM, which used more self-funding and practiced bigger margins – presented more net working capital. These companies traded more in the market.

8. Regarding working capital requirements (WCREQ), smaller companies with higher turnover exhibited higher working capital requirements than the rest.

9. In relation to self-funding (SELFF) and the quality of funding obtained (QFUND_D), larger companies with a higher BTM ratio obtained more capital in both ways (they are less constrained). These companies exhibited a higher ROE, margin, more net working capital and working capital requirements, a lower quadratic cash balance, and paid more dividends. Their shares traded more.

10. Finally, the companies that paid more dividends (DPS, DY, and DP) were the largest, with a greater capacity for self-funding, a higher quality of funding, and a higher ROE. The shares in these companies were traded more. As indicated in (6), the results signal that mature companies are concerned.

The estimation of the four regressions of interest was carried out with the aim of verifying the liquidity--expected return relationship on the market and accounting levels. Moreover, control variables, chosen according to the literature from the area, were used in the four estimated regressions:

1. "MARKET RISK/EXPECTED RETURN" regression: according to the proposal from Fama and French (1993), this variable is related to company size (total assets and market value of shares) and the book-to--market ratio. Additionally, it was the aim of this paper to relate it to market liquidity (volume, turnover, and spread in prices), to accounting liquidity (net working capital, working capital requirement, cash balance, and quadratic cash balance) and to accounting return (ROE). As it is expected that an increase in accounting liquidity on date zero, in a context of constraint, has effects on investments and future accounting returns, the ROEF1 variable was also worked with – in the regression – which represents accounting returns 4 quarters ahead. Moreover, constraint proxies were used as independent control variables (dividend per share, dividend yield and dividend payout, market-to--book, self-funding, cost of third-party capital, quality of funding raised). As a dependent variable, the BETAF1 variable was chosen to represent the market risk/expected return premium (Sharpe, 1964). As this variable is constructed using observed returns in 60 previous months until the quarter in question, the variable was considered 4 quarters ahead. One final point is

important: under the informationally efficient markets hypothesis, favorable information regarding future income and cash flow should have the power to increase share prices on date zero and reduce their market risk/expected return premium, making it necessary to draw a distinction between the two variables, which should be negatively correlated. Thus, an additional variable was considered (VAR_PRICE), which deals with price changes resulting from new information received.

2. "MARKET LIQUIDITY" regression: this variable was related to the market risk/expected return (beta and future beta, size, and book-to-market ratio), to accounting liquidity (net working capital, working capital requirement, cash balance, and quadratic cash balance), and accounting return (ROE and future ROE), to price variations, and to the constraint proxies (dividend per share, dividend yield, and dividend payout, market-to-book, self-funding, cost of third-party capital, quality of funding raised). As a dependent variable, the QBUS_ TURN (business turnover over the stock of shares issued) variable was chosen to represent market liquidity, since it is less subject – in comparison to the VOL and SPREAD variables – to the scale effect of the market value of shares. The VOL and SPREAD variables, however, were used as controls in this regression.

3. "ACCOUNTING RETURN" regression: according to the thoughts of Correia and Amaral (2012), Soares and Galdi (2011), and Matarazzo (2003), shareholder accounting return is related to net margin, to asset turnover, and to the financial leverage multiplier. Additionally, it was the aim of this study to relate it to market risk/expected return (current and future beta, size, and book-to-market ratio), to market liquidity (volume, turnover, and spread in prices), to accounting liquidity (net working capital, working capital requirement, cash balance, and quadratic cash balance), and to the variation in share prices. Moreover, the same constraint proxies were used as controls. As a dependent variable, as it is expected that an increase in accounting liquidity at date zero, in a context of constraint, has effects on investments and future accounting returns, the ROEF1 variable was worked with, which represents accounting returns 4 quarters ahead.

4. "ACCOUNTING LIQUIDITY" regression: it was the aim of this study to relate it to market risk/expected return (beta and future beta, size, and book-to-market ratio), to market liquidity (volume, turnover, and spread in prices), and to accounting return (ROE and future ROE), as well as verifying its effects on variations in share prices, these were the independent variables considered in this regression. Moreover, the constraint proxies were again used as controls. As a dependent variable, the NWCASS (net working capital per unit of total assets) variable was chosen to represent market liquidity, given its perfect correlation with cash balance. Quadratic cash balance was also considered as a control variable in this regression, together with working capital requirement.

Table 1 *Operational description of the variables used in the study*

Nº	Name	Variable	Functional Form	Reference
1	Dividend per Share	DPS	$\frac{Dividends\ Paid}{Total\ outstanding\ shares\ (issued)}$	Correia and Amaral (2012)
2	Income per Share	IPS	$\frac{Net\ Income}{Total\ outstanding\ shares\ (issued)}$	Assaf and Lima (2009)
3	Market-to-Book	MTB	$\frac{Market\ Value}{Accounting\ Value} = \frac{Price_{fech} * Total\ outstanding\ shares\ (issued)}{Net\ Equity}$	Gopalan et al. (2012)
4	Book-to-Market	BTM	$\frac{Accounting\ Value}{Market\ Value} = \frac{Net\ Equity}{Price_{fech} * Total\ outstanding\ shares\ (issued)}$	Fama and French (1993), and Datar et al. (1998)
5	Market size	MV_EQUITY	$\ln(Market\ Value) = \ln(Price_{fech} * Total\ outstanding\ shares\ (issued)$	Fama and French (1993), Pastor and Stambaugh (2001), and Amihud (2002)
6	Return on Equity (ROE)	ROE	$\frac{Net\ Income}{Net\ Equity}$	Kania and Bacon (2005), Assaf and Lima (2009), Soares and Galdi (2011), and Correia and Amaral (2012)
7	Turnover – Quantity of Securities	TURN_QS	$\frac{Quantity\ of\ Securities\ Traded}{Total\ outstanding\ shares\ (issued)}$	Demsetz (1968), Datar et al. (1998), Machado and Medeiros (2012), and Correia and Amaral (2012)
8	Turnover – Quantity of Business	TURN_QBUS	$\frac{Quantity\ of\ business\ carried\ out}{Total\ outstanding\ shares\ (issued)}$	Demsetz (1968), Chordia et al. (2000), and Correia and Amaral (2012)
9	Volume	VOL	$\ln(Volume\ of\ Business\ in\ R\$)$	Chordia et al. (2000), Minardi et al. (2005), Machado and Medeiros (2012), and Correia and Amaral (2012)
10	Spread	SPREAD	$\ln\left(\frac{Price_{maximum_t}}{Price_{minimum_t}}\right)$	Own Elaboration

Table 1 *Cont.*

11	Accounting Size	SIZE	ln *(Total Assets)*	Beaver, Kettler, and Scholes (1970), and Oda, Yoshinaga, Okimura, and Securato (2005)
12	Cost of Debt	CSTER	$\frac{Financial\ Expenses}{Total\ ST\ Loans+Total\ LT\ Loans}$	Matarazzo (2003)
13	Net Margin	NETMAR	$\frac{Net\ Income}{Net\ Revenue\ (Sales)}$	Correia and Amaral (2012)
14	Asset Turnover	TURN	$\frac{Net\ Revenue\ (Sales)}{Total\ Assets}$	Matarazzo (2003)
15	Self-funding	SELFF	$\frac{Net\ Income+Depreciation-Dividends\ Paid}{Total\ Assets}$	Fleuriet et al. (2003)
16	Dividend Payout	DP	$\frac{DPS}{IPS}$	Beaver et al. (1970), Oda et al. (2005) and Kania and Bacon (2005)
17	Dividend Yield	DY	$\frac{DPS}{Price_{fech}}$	Correia and Amaral (2012)
18	Net Working Capital	NWCASS	$\frac{Net\ Working\ Capital}{Total\ Assets}$	Fleuriet et al. (2003)
19	Working Capital Requirement	WCRASS	$\frac{Working\ Capital\ Requirement}{Total\ Assets}$	Fleuriet et al. (2003)
20	Accounting Liquidity	CBASS	$\frac{Cash\ Balance}{Total\ Assets}$	Fleuriet et al. (2003)
21	Excess Accounting Liquidity	CBASS2	$\left(\frac{Cash\ Balance}{Total\ Assets}\right)^2$	Own Elaboration
22	Financial Leverage Multiplier	FLM	$\frac{Total\ Assets}{Net\ Equity}$	Soares and Galdi (2011)
23	Variation in price	VAR_PRICE	$\ln\left(\frac{Price_{fech_t}}{Price_{fech_{t-1}}}\right)$	Own Elaboration
24	Quality of Funding Dummy	QFUN_D	"IF" Function $\frac{EBIT}{Total\ Assets}$ > ccthird = 1 (true)	Own Elaboration
25	Market Risk	BETA	$\frac{Cov(i,m)}{Var(m)}$ *,with: i=share; m=market (IBOVESPA)*	Sharpe (1964)

Note. In the SPREAD variable the maximum value divided by the minimum share quotation was considered, since that way there would be positive values and the natural logarithm could be applied, with the intention of linearizing the measurement. The BETA variable used the returns from 60 months before the quarter of reference. The variables related to dividends, because they contained many missing values, were completed with the average for each share, with the aim of making better use of the database without fundamentally influencing the results obtained.

Table 2 *Descriptive Statistics*

Variable	N	Average	Standard Deviation	Min.	Max.
var_price	36832	-0.0270	0.7270	-2.9920	2.9820
beta	36832	-0.0220	0.1770	-2.8300	2.9710
betaf1	33369	-0.0220	0.1800	-2.8300	2.9710
size	36832	0.0130	0.9550	-2.9840	2.9970
mv_equity	36832	-0.0070	0.9090	-2.9150	2.9970
btm	36832	-0.0100	0.0000	-0.0350	0.0000
vol	36832	0.0010	0.9250	-2.9610	2.5970
qs _turn	36832	-0.0090	0.0010	-0.0090	0.2100
qbus_turn	36832	-0.0120	0.0910	-0.0360	2.2280
spread	36832	-0.3290	0.8420	-1.2730	2.9980
roe	36832	0.0290	0.2040	-2.9980	2.9880
netmar	36832	-0.0180	0.0810	-2.7330	2.1320
turn	36832	-0.2440	0.7230	-1.8740	2.9870

Table 2 *Cont.*

flm	36832	-0.0360	0.2120	-2.9230	2.9770
nwcass	36832	0.0320	0.1690	-2.9870	0.3220
wcrass	36832	0.0120	0.4730	-2.9720	2.9940
cbass	36832	0.0320	0.1680	-2.9880	0.3200
cbass2	36832	-0.0110	0.0420	-0.0140	2.5850
selff	36832	0.0140	0.1120	-2.8220	2.3040
ccthird	36832	-0.0400	0.1010	-2.1900	2.6930
Qfun_ d	36832	0.0000	1.0000	-0.3550	2.8130
dps	36832	-0.1020	0.0740	-0.2470	2.7770
dy	36832	-0.0950	0.0760	-0.4280	2.9870
dp	36832	-0.0530	0.0730	-2.7010	2.4390
mtb	36832	-0.0070	0.0860	-2.9850	2.9640

Table 3 *Correlations between variables*

	var_price	beta	beta_f1	size	mv_ equity	btm	mtb	vol	turn_qs	turn_ qbus	bid	bid_qs	bid_ qbus	roe	roe_f1	netmar	turn	flm	nwcass	wcrass	stat	stat2	selff	qfun_d	ccthird	dps	dy	dp
var_ price	1																											
beta	0.0111	1																										
beta_ f1	0.0031	0.1075	1																									
size	0.0414	0.1355	0.1203	1																								
mv_ equity	0.0474	0.1019	0.0907	0.4658	1																							
btm	0.0046	0.0047	0.0077	0.0435	0.0393	1																						
mtb	-0.0171	-0.0009	0.0035	-0.0171	0.076	0.0007	1																					
vol	0.0592	0.2069	0.1745	0.5026	0.3456	0.0448	-0.0104	1																				
turn_ qs	0.0257	0.0158	0.012	0.0023	-0.0447	0.0599	-0.0017	0.0407	1																			
turn_ qbus	0.0086	0.1081	0.0886	0.1792	0.0039	0.0051	-0.0112	0.3775	0.078	1																		
bid	0.0801	0.165	0.1149	0.0833	0.0315	0.0155	0.0335	0.2186	0.0379	0.0969	1																	
bid_qs	-0.0022	-0.0108	-0.0017	0.003	0.0855	0.0008	-0.0005	-0.0637	-0.0019	-0.0128	0.0358	1																
bid_ qbus	0.0058	-0.0046	-0.003	0.0416	0.138	0.0019	0.0694	-0.1169	-0.0046	-0.0306	0.0851	0.3012	1															
roe	0.0407	-0.0047	0.0001	0.0326	-0.0054	-0.004	-0.0736	0.0541	0.0023	0.0317	-0.0033	-0.0164	-0.0044	1														
roe_f1	0.0261	0.0071	-0.0058	0.0252	0.0017	-0.0025	-0.0214	0.0394	0.0012	0.026	-0.0006	-0.02	-0.0065	0.0496	1													
netmar	0.0147	-0.0042	-0.0112	0.0819	0.0524	0.0453	0.0007	0.0406	-0.0008	0.0258	-0.0178	0.0006	0.0016	0.0003	0.0006	1												
turn	0.0189	-0.0364	-0.0372	-0.1274	-0.1112	0.0173	0.005	-0.0923	-0.004	-0.0283	-0.0456	0.0042	-0.0051	0.0176	0.005	0.011	1											
flm	-0.0045	-0.0183	-0.0008	0.0292	0.0276	0.0104	0.0626	-0.0374	-0.003	-0.0124	-0.0095	0.0061	0.0533	-0.4031	-0.0056	0.01	0.0544	1										
nw-cass	0.0222	0.0174	0.0185	0.1788	0.1204	0.1738	0.007	0.0891	0.0011	0.0144	0.0052	0.0024	0.0067	-0.0177	-0.0064	0.3295	0.0129	0.0356	1									
wcrass	-0.0089	0.0066	0.0045	-0.0835	-0.0901	0.0469	-0.0141	0.0289	0.0079	0.0556	-0.0319	-0.0312	-0.0471	0.0098	-0.015	0.0552	0.1898	-0.0089	0.1276	1								
stat	0.0222	0.0174	0.0183	0.1812	0.1223	0.1739	0.0073	0.0892	0.001	0.0133	0.0063	0.003	0.0076	-0.0177	-0.006	0.3304	0.0088	0.0357	0.9992	0.1082	1							
stat2	-0.0128	0.0035	0.0058	-0.0966	-0.0534	-0.0356	-0.0026	-0.0241	-0.0002	-0.0094	0.0084	-0.003	-0.0067	0.0076	0.0029	-0.1827	-0.0198	-0.0194	-0.1629	-0.0359	-0.1633	1						
selff	0.0337	0.014	0.0105	0.2016	0.0979	0.091	0.0018	0.0916	0.0016	0.0322	-0.0066	0.0016	0.004	-0.0039	0.0032	0.2175	0.0418	0.0321	0.5363	0.0854	0.5378	-0.3787	1					
qfun_d	0.0444	0.041	0.0349	0.2035	0.0759	0.0002	0.0001	0.1629	-0.0018	0.0958	0.0123	-0.0092	-0.0135	0.072	0.0429	0.025	0.032	-0.0066	0.0383	0.0464	0.0376	-0.0071	0.0736	1				
ccthird	0.0009	-0.0201	-0.0032	-0.0453	-0.0033	-0.0056	-0.0078	-0.0274	-0.0031	-0.0153	-0.0155	0.0008	-0.006	0.0056	-0.0061	-0.0084	0.0175	0.005	-0.0119	0.0018	-0.012	0.0138	-0.0309	-0.0474	1			
dps	0.005	0.0105	0.0083	0.155	0.0216	0.0032	-0.0079	0.116	0.0015	0.1407	-0.0299	-0.009	-0.0214	0.05	0.0311	0.0234	0.0315	-0.0054	0.0248	0.0377	0.024	-0.01	0.0606	0.1108	-0.0125	1		
dy	-0.0025	0.0134	0.0103	0.1071	-0.0347	0.0084	-0.0074	0.0958	0.0076	0.1076	-0.0049	-0.0085	-0.0198	0.0369	0.0278	0.0233	0.0359	-0.0071	0.0263	0.0217	0.0258	-0.0093	0.0541	0.0856	-0.0126	0.4535	1	
dp	0.0061	0.0155	0.0116	0.0897	0.0257	0.0018	-0.0046	0.0883	0.0011	0.0876	-0.0025	-0.0039	-0.0107	0.0174	0.0104	0.0099	0.0034	-0.0029	0.016	0.0215	0.0155	-0.0061	0.0283	0.0476	-0.0112	0.204	0.1861	1

3 RESULTS AND ANALYSES

As explained, four panel regressions were estimated for market risk/expected return (dependent variable = BETAF1); market liquidity (dependent variable = QBUS_TURN); accounting return (dependent variable = ROEF1), and accounting liquidity (dependent variable = NWCASS). The Hausman test was then carried out, comparing the fixed and random effects models and verifying the null hypothesis that there is no systematic difference in the coefficients generated by the two models (Wooldrige, 2010). In rejecting the null hypothesis, the use of fixed effects is admitted with the best estimator. All of the tests revealed the presence of fixed effects and these will be the results discussed. The time fixed-effects were also tested, which involved including a dummy variable for each year. However, the results were not affected and, for prudence, we kept only that related to 2008, due to the global crisis. Additionally, all of the regressions were estimated with cluster corrections related to the shares, which eliminates the effect of autocorrelation and heteroskedasticity in the panel estimation. The significant variables in each regression are shown in Tables 4, 5, 6, and 7 and are discussed following each table.

Table 4 *Regression 1 (Market risk/expected return)*

	betaf1
var_price	-0.002
	(0.001)
vol	0.011***
	(0.003)
spread	0.009***
	(0.002)
size	0.014**
	(0.005)
dps	-0.028*
	(0. 012)
yd2008	-0.013***
	(0.003)
Constant	-0.021***
	(0.001)
Observations	33,369
R^2	0.004
ρ	0.116
p-value for F (6,852)	0.000

Note. Standard deviations in brackets.
** p < 0.05, ** p < 0.01, *** p < 0.001*

According to the first regression of interest, there is an indication (despite not being statistically significant with fixed effects and correction for autocorrelation and heteroskedasticity, but significant in the estimations for minimum squares and for random effects) that the beta coefficient four quarters ahead is negatively related to the variation in prices in the current quarter, which allows it to be used as a proxy for market risk/expected return. Statistically, the regression revealed that a higher market risk/expected return was positively related to a higher volume of trading, turnover, and spread in prices for the assets in the sample and the period in question. Additionally, shares that exhibited higher market risk/expected return belonged to larger companies, but which paid fewer dividends per share. These shares performed worse in 2008. Thus, no hypotheses relating to market risk/expected return and firms' accounting return and accounting liquidity (H2 and H5) were supported. The positive relationship between market risk/expected return and turnover, volume, and spread in prices indicates a negative premium for market liquidity in the Brazilian market, as already verified by Minardi et al. (2005).

Table 5 *Regression 2 (Market Liquidity)*

	vol
spread	0.051***
	(0.009)
var_price	0.051***
	(0.004)
beta	0.184***
	(0.026)
betaf1	0.092***
	(0.024)
size	0.342***
	(0.052)
btm	129.024***
	(14.886)
flm	-0.080**
	(0.027)
wcrass	0.053*
	(0.027)
qfun_d	0.032***
	(0.006)
dp	0.229***
	(0.055)
dps	0.179*
	(0.078)
yd2008	0.155***
	(0.018)
Constant	1.348***
	(0.152)
Observations	33,369
R^2	0.069
ρ	0.603
p-value for F (12,852)	0.000

Note. Standard deviations in brackets.
** p < 0.05, ** p < 0.01, *** p < 0.001*

Analyzing the regressions related to market liquidity, it was observed that shares with higher turnover per unit of shares issued were of lower market value (scale factor), but also exhibited greater trading volume and higher spread in prices and belonged to companies with more assets. Because they had more assets, these companies turned over less, were less in debt, and carried less net working capital, despite contracting loans at favorable rates and paying more dividends. The results indicate that financially unconstrained companies are concerned. Again, it is verified that these companies' shares enjoyed greater market risk/expected return, generating a negative premium for liquidity. The negative relationship between market and accounting liquidity (NWCASS) supports H6 in a context of no constraint. H4 (relationship between market liquidity and accounting return) cannot be confirmed.

Table 6 *Regression 3 (Accounting Return)*

	roef1
flm	0.026*
	(0.012)
var_price	0.005**
	(0.002)
qfun_d	0.005***
	(0.001)
dps	0.032***
	(0.009)
dy	0.017*
	(0.007)
yd2008	0.012*
	(0.005)
mtb	-0.053*
	(0.022)
wcrass	-0.017**
	(0.006)
Constant	0.034***
	(0.001)
Observações	33,369
R^2	0.003
ρ	0.107
p-value for F (8,852)	0.000

Note. Standard deviations in brackets.
** p < 0.05, ** p < 0.01, *** p < 0.001*

Observing the third regression, related to accounting return (ROEF1), it can be verified that companies with higher accounting return 4 quarters ahead were those that held more self-funding, were more in debt, captured favorable rates, paid more dividends, but were smaller (in total assets and market value) and faced fewer growth opportunities (lower MTB) in the period. In relation to the market variables, their assets experienced greater variations in prices. Again, it appears that unconstrained companies are concerned, but with few growth opportunities. The hypotheses relating ROE to accounting liquidity (H3), to market liquidity (H4), and to market risk/expected return (H5) could not be confirmed.

Table 7 *Regression 4 (Accounting Liquidity)*

	nwcass
netmar	0.075
	(0.043)
flm	0.005*
	(0.002)
wcrass	0.033**
	(0.012)
selff	0.423***
	(0.068)
ccthird	0.013
	(0.008)
dps	-0.030***
	(0.009)
mtb	0.004***
	(0.001)
Constant	0.024***
	(0.002)
Observations	36,832
R^2	0.113
ρ	0.372
p-value for F (7,871)	0.000

Note. Standard deviations in brackets.
** p < 0.05, ** p < 0.01, *** p < 0.001*

In the fourth and last regression, related to accounting liquidity (NWCASS), it can be observed that companies that carried more net working capital in the period were those with more working capital requirement, but opted to hold excess liquidity (CBASS2), practicing more self-funding and fewer dividend payments. They were also the ones that operated with higher margins (NETMAR). These companies exhibited lower accounting returns and lower market liquidity, supporting H3 and H6. It is believed that the first order effect in this regression is not one of constraint, but of carrying excess liquidity. The hypothesis related to market risk/expected return (H2) cannot be confirmed.

4 FINAL REMARKS

As the first proposed aim, we sought to identify whether more liquid shares exhibited lower market risk/expected return. In Regression 1, it was observed that shares that enjoyed greater market risk/expected return

traded more and with a higher spread in prices, generating a negative market liquidity premium in the sample and period considered, as in Minardi et al. (2005). These shares belonged to companies with more assets and with fewer dividend payments per share.

With regards to market liquidity, it was observed that shares with higher turnover in the period were those with a lower market value of shares (scale factor). These shares also exhibited a higher spread in prices and belonged to companies with more assets. Because they had more assets, these companies turned over more, were less in debt, and carried more net working capital, despite contracting loans at favorable rates and paying more dividends. The results indicate that financially unconstrained companies are concerned.

The second aim of this paper was to verify whether carrying more liquid assets, or rather, more accounting liquidity, would entail lower accounting return, given that operational risk would decrease with a more conservative investment policy, or whether the presence of financial constraint would make this relationship positive, as well as observing the breakdown of accounting measures regarding return and market liquidity indicators.

In Regression 3, it could be verified that higher future accounting return was observed in companies that held more self-funding, were more in debt, captured favorable rates, paid more dividends, but were smaller (in total assets and market value) and faced fewer investment opportunities. In relation to the market variables, their assets experienced greater price variations. It appeared that mature, unconstrained companies with fewer growth opportunities were concerned. The accounting results of these companies only generated effects on short term price variations, not having a relationship with accounting liquidity, with market liquidity, or with market risk/expected return.

Finally, in relation to accounting liquidity, it could be observed that companies that carried more net working capital in the period were those with more working capital requirement, but also those that opted to hold excess liquidity, practicing more self-funding and fewer dividend payments. They were also those that operated with higher margins. These companies exhibited a lower accounting return and lower market liquidity. It is believed that both effects result from choosing excess accounting liquidity and not from potential financial constraints, supporting hypothesis H3 (negative relationship between accounting return and excess accounting liquidity) and H6 (negative relationship between market liquidity and excess accounting liquidity).

No relationship between market risk/expected return and accounting return and liquidity could be established in the – still underdeveloped – Brazilian market, with investors preferring to trade shares in larger and less constrained companies enjoying a negative liquidity premium.

On the margins of the main theories regarding the issue, only the negative relationships between accounting liquidity and market liquidity (H6) and accounting return (H3) – in a context of no financial constraint – were correctly verified with regards to Brazil.

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