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ORIGINAL ARTICLE

Preferences, sources, and conditionals: a new approach to testing financing decisions

Cesar Augusto Camargos Rocha[1]
https://orcid.org/0000-0001-8676-6231
Email: cesar.rocha@live.com

Marcos Antônio de Camargos[1,2]
https://orcid.org/0000-0002-3456-8249
Email: marcosac@face.ufmg.br

[1] Universidade Federal de Minas Gerais, Faculdade de Ciências Econômicas, Centro de Pós-Graduação e Pesquisas em Administração, Belo Horizonte, MG, Brazil
[2] Faculdade IBMEC de Belo Horizonte, Belo Horizonte, MG, Brazil

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ABSTRACT

This article aims to propose a new approach to the empirical testing of the pecking order theory that tackles commonly reported issues and apply it to the analysis of Brazilian companies. The main gaps bridged herein are the lack of clear definitions for *safe debt* and *financial slack*; the lack of control, in regressions, for the financing sources' capabilities; and the failure to consider future investment opportunities in financing analyses. We adopt methods that enable controlling for the information the companies have about each financing source's capabilities, at the time their financing decisions are made, while taking current and future investment opportunities into account. The proposed methodology offers a rather controlled environment to test the pecking order theory, which can be adapted to study other topics in finance, supporting advances in understanding the raising and allocation of funds by listed companies. Four *integrated financing and cash holding policies* are defined, which lead to different expected internal deficits (or surpluses). The relationships between these deficits (or surpluses), at different levels, and the flows that are observed at the external sources of funds are analyzed in cross-section and panel data quantile regressions, controlling for each source's capabilities, in unbalanced data panels with 4,465 observations of 223 companies. By studying the relationships between expected internal financing deficits (or surpluses) and the flows that are observed at the external sources of funds, we contribute with a new capital structure testing methodology, and we find strong evidence that Brazilian listed companies follow the pecking order theory.

Keywords: pecking order theory, business funding, cash holding policy, testing methodology, capital structure.

Correspondence address

Marcos Antônio de Camargos
Universidade Federal de Minas Gerais, Faculdade de Ciências Econômicas, Centro de Pós-Graduação e Pesquisas em Administração
Avenida Presidente Antônio Carlos, 6627 – CEP 31270-901
Pampulha – Belo Horizonte – MG – Brazil

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1. INTRODUCTION

The pecking order theory (POT) (Myers, 1984; Myers & Majluf, 1984) predicts that, due to information asymmetry between internal and external agents, companies finance themselves following a pre-established hierarchy of funding sources, privileging internal funds over external ones and, between the latter, debt over stocks. The testing approaches to this theory adopt both analysis of determinants for the capital structure (Titman & Wessels, 1988) and direct analysis of the funding flows at stake (Shyam-Sunder & Myers, 1999; Watson & Wilson, 2002), an approach focused on by this study.

In the seminal study by Shyam-Sunder and Myers (1999), the relationship between debt issuance and the company's internal financing deficit is analyzed, under the hypothesis of a relationship close to 1:1 existing between these two variables, which, in theory, might confirm adherence to the POT. However, Chirinko and Singha (2000) point out that this approach is not robust enough, as it is driven by proportions, without observing the conditions under which they are achieved. Therefore, it would not be possible to verify whether the depletion of a preferred source of funds occurs before using the next source, in the hierarchy predicted by the theory.

Watson and Wilson (2002) adopt a more comprehensive approach, when analyzing the relationship between companies' investments in their total assets and their potential sources of funds (earnings retention, debt issuance, and equity issuance). Despite allowing us to analyze the participation of these sources of funds in the formation of assets, this approach maintains part of the weaknesses mentioned by Chirinko and Singha (2000), because it fails to control how the relationship between variables changes depending on the capabilities of one or another source of funds.

Financing decisions were analyzed separately for cases of lack or excess of internal funds (De Jong et al., 2010), considering the companies' debt capacity (Leary & Roberts, 2010; Lemmon & Zender, 2010), their growth (Sánchez-Vidal & Martín-Ugedo, 2005), and their investment level (Chay et al., 2015), but there are still gaps to be bridged.

In part of the reviewed studies (De Jong et al., 2010; Lemmon & Zender, 2010; Shyam-Sunder & Myers, 1999), the omission of equity issuance, in the models, hinders the analysis of changes in debt and equity ratios, relating them to the internal deficit (or surplus). Chay et al. (2015), Sánchez-Vidal and Martín-Ugedo (2005), and Watson and Wilson (2002) advance by analyzing the use of various sources of funds, including equity issuance, but do not incorporate overt controls regarding the depletion of each one of them, an issue common to these studies. In the end, it is hard to interpret the results, which reflect a combination of preferences and proportions of financing sources, as highlighted by Chirinko and Singha (2000) on the seminal study by Shyam-Sunder and Myers (1999).

In this study, a new methodology is proposed and applied to mitigate these weaknesses. This methodology acknowledges that (i) a company's long-term financing is related not only to deficits or surpluses resulting from its operation and current investments, but also, as suggested by Leary and Roberts (2010), to its cash holding policy, established according to its future investment opportunities; (ii) these deficits or surpluses need to be estimated from the information available at the time financing decisions are made; (iii) current investments can be better evaluated by having variations in the allocation of funds in net operating assets as a basis; (iv) prospects for future investments are reflected in the company's internal financial slack. From this perspective, it is possible to test, for more or less restrictive versions of the POT, which *integrated financing and cash holding policy* is more accurately explained. Tests are based on quantile regressions relating *expected internal deficits (or surpluses)* from each of these policies to *actually observed variations* in the external sources of funds uses, controlling for the capabilities of each of the potential financing sources.

Applying this new methodology to a sample of Brazilian listed nonfinancial companies provides evidence that they follow the POT. Based on this sample, it is found out that the financial flows observed in the companies' external sources of funds are more accurately explained by an *integrated financing and cash holding policy* that privileges self-financing and the maintenance of an internal financial slack compatible with market expectations regarding future value creation opportunities for each company. Also, by (i) not using accounting semi-identities, analyzing all sources of funds; (ii) controlling for the depletion of these sources; and (iii) using quantile regression, the proposed methodology offers the possibility of determining how the relationships between the variables under analysis change, for various levels of expected deficit (or surplus).

The results achieved have proven to be robust and suggest the possibility of using the proposed methodology not only in research on capital structure, but also on other topics in which a controlled analysis of corporate financial flows is needed.

2. LITERATURE REVIEW

The approaches proposing to explain the motivators of financing choices made by companies are diverse. The theme is controversial and its origins date back to the 1950s, with the seminal works by Durand (1952, 1959), pointing out that the company's value is impacted by its capital structure, and by Modigliani and Miller (1958, 1959), who highlight the influence, on this value, of business type and the expectations about cash flow.

Financing decisions are analyzed as motivated by the search for an optimal indebtedness level (DeAngelo & Masulis, 1980; Fischer et al., 1989), by market opportunities (Baker & Wurgler, 2002) or by aspects related to information asymmetry between players inside and outside the company. In the presence of such asymmetries, these decisions may be conditioned by costs associated with conflicts of interest (Jensen & Meckling, 1976) or by risks of adverse selection (Donaldson, 1961; Myers, 1984; Myers & Majluf, 1984). Comprehensive literature reviews on capital structure are found in Harris and Raviv (1991), Graham and Leary (2011), and Kumar et al. (2017) and, in the Brazilian literature, in Bittencourt and Albuquerque (2018).

The POT, originated in the study carried out by Donaldson (1961) and consolidated in the studies by Myers (1984) and Myers and Majluf (1984), starts from the perspective that executives are better informed about the company than other stakeholders and prioritize the interests of their shareholders over those of new investors. There is, in this context, a trend of adverse selection regarding securities issues, especially stocks, which induces potential investors to a self-protective interpretation of decisions made by the company.

In general terms, from the POT perspective, internal financing of new investments is perceived by the market as indicative of managerial expectation of good returns. The existence of financial slack is appreciated, insofar as it enables the execution of investments that create value for shareholders, using the company's cash or debt capabilities and avoiding the opportunity cost of failing to execute them or partially executing them. On the other hand, the issuance of new shares may raise suspicions about possible excessive valuation of existing shares, leading to decreased prices. Thus, management will only issue equity if the expected return on investment projects is greater than the expected loss in the current stock price.

Considering these assumptions, the POT predicts a previously established order of preference for a company's financing sources, namely: (i) retained earnings; (ii) debt; and (iii) equity. In the presence of restrictions, such as the exhaustion of a preferred source, adopting an alternative choice might observe this hierarchy of preferences. Thus, with regard to the POT, capital structure is the *result* of a sequence of financing decisions based on a pre-established hierarchy and not a goal to be achieved.

Approaches to the empirical testing of companies' adherence to the POT are varied, covering both analyses of the relationship between indebtedness level and its indirect determinants, just as in Titman and Wessels (1988), and the relationship between indebtedness variation and deficit or surplus of internal financing, just as in Shyam-Sunder and Myers (1999). And other authors, like Watson and Wilson (2002), Sánchez-Vidal and Martín-Ugedo (2005), and Chay et al. (2015), analyze the relationship between investments and divestments in assets financial flows in internal and external sources of funds.

In the reviewed national literature, as mentioned by Bittencourt and Albuquerque (2018), there is a predominance of approaches that analyze the relationship between a company's indebtedness level and its indirect determinants, from the perspective of various theories of capital structure. In this type of approach, with variations, evidence could be identified that Brazilian companies follow the POT, just as in Bastos and Nakamura (2009), Cardoso and Pinheiro (2020), and Correa et al. (2013). Tristão and Sonza (2019), in turn, identified results consistent with the search for an optimal indebtedness level and Nakamura et al. (2007) and Oliveira et al. (2013) identified mixed results, which did not allow the corroboration of any theory, based on the Brazilian companies under analysis.

Considering the purpose of proposing and applying a new methodology to analyze financing decisions based on corporate financial flows, the main methodological contributions and limitations of studies in this line are highlighted below. A significant part of the studies on capital structure resorting to this type of approach are inspired, directly or indirectly, by the seminal model of Shyam-Sunder and Myers (1999). In it, the authors seek to explain long-term debt variation based on the company's internal financing deficit. Financial flows are contemporary and taken as realized, *ex post*, with the relationship being analyzed from an accounting semi-identity that omits the flows referring to equity issuance or repurchase. The authors indicate that the closer to one unit the coefficient associated with internal deficit is, the more the hypothesis of preference for debt financing and, thus, the POT would

be corroborated. In their study, they obtain coefficients in line with expectations, concluding that financing for the companies at stake adheres to the POT.

However, Chirinko and Singha (2000) warn that the test proposed by Shyam-Sunder and Myers (1999) does not adequately assess adherence to the POT, leading to its confirmation when debt issuance occurs in a greater proportion than equity issuance, even if equity issuance takes place before debt issuance. They also indicate the possibility of erroneous refutation of the POT, if equity issuance has a greater proportion, even if it occurs after debt issuance. The lack of controls regarding debt capacity prevents confirming whether equity issuance is due to preference or to the exhaustion of this capacity.

Leary and Roberts (2010) highlight, in addition to the limitations exposed by Chirinko and Singha (2000), the inaccuracy of key concepts for the POT, such as 'financial slack' and 'safe debt' (Myers, 1984; Myers & Majluf, 1984) and the connections between cash holding and financing policies. When analyzing the POT ability to predict debt and equity issuance, for various cash holding and financing policies, they conclude that it only increases when models incorporate debt determinants associated with other theories.

Lemmon and Zender (2010) incorporate a quadratic deficit term to the model proposed by Shyam-Sunder and Myers (1999), aiming to differentiate the relationship between debt variation and internal deficit for small and large deficits. Six subsamples of companies are analyzed, separated by size and probability – established by a predictive model – of being able to issue debt securities. The authors identify evidence consistent with the POT, including that small and high-growth companies issue more equity not out of preference, but due to their inability to cover their deficit with debt.

De Jong et al. (2010) incorporate dummies into the model proposed by Shyam-Sunder and Myers (1999) to identify the presence of surplus or deficit and, in the latter case, the deficit size. Also, they analyze the company's capability of issuing new debt, based on the existence of debt with a rating and proxies for financial restrictions. The authors identify that the coefficient relating long-term debt variation to deficit (or surplus) is greater for surpluses when compared to deficits, and greater for normal deficits when compared to large deficits. They also find out that the proportion of companies with no financial restrictions that issue debt in the presence of large deficits is significantly higher than the proportion of those with restrictions that do so. Smaller companies showed large deficits with greater frequency and difficulties to follow the POT, due to their limited debt capacity. These conclusions are in line with those reported by Lemmon and Zender (2010), evidencing consistency with the POT, once the capability of issuing new debt is taken into account.

Watson and Wilson (2002) and Sánchez-Vidal and Martín-Ugedo (2005) analyze adherence to the POT through the relationship between investments made by companies in their total assets and the flows observed in internal and external financing sources. Their models are accounting semi-identities in which variations in non-interest-bearing liabilities randomly fluctuate around the company's growth rate, being addressed in fixed effects. The authors obtain results that adhere to the POT, and Sánchez-Vidal and Martín-Ugedo (2005) highlight a certain indifference between using debt and retained earnings to finance investments.

Chay et al. (2015) adopt models relating investments made in companies with financial flows in their sources of funds, controlling for other variables and analyzing the relationships for various investment levels, through quantile regression. In their study, the authors identify a preference for internal rather than external funds, in line with the POT, but, on the other hand, the predominance of equity issuance over debt issuance, for low and mid investment levels. They also notice a propensity to use internal funds to finance organic growth and external funds to finance acquisitions. Finally, companies with high investment levels showed greater retention of cash and cash equivalents, including funds from equity issuance.

In the reviewed national literature, approaches derived from the models proposed by Shyam-Sunder and Myers (1999) are also identified, being highlighted here the adaptations promoted by two of them. F. N. De Oliveira and P. G. M. De Oliveira (2009) identify, based on the models proposed by Shyam-Sunder and Myers (1999), that Brazilian companies follow the POT. However, when analyzing the probabilities of issuing debt and equity by using *Probit* models, they have noticed a contradiction: although the probability of issuing debt is greater, the lower the company's indebtedness, compared to the industry average, the probability of issuing equity is not related to this indicator, regarded by the authors as an upper limit for the company's indebtedness. Among other factors, the probability of a company issuing equity was positively influenced by its growth opportunities, which led them to the conclusion that the companies studied follow a 'complex' version of the POT, in which there is equity issuance, subject to perceived opportunities for the company.

In their turn, Iquiapaza et al. (2008) adapt the model proposed by Shyam-Sunder and Myers (1999) to the analysis of twelve profiles of Brazilian companies,

segmented according to their size, profitability, and growth. In their model, the authors identify average companies with negative profitability and low growth as those most adherent to the POT and companies with high growth and profitability (regardless of size) as those with the highest equity issuance, in median terms, concluding that the POT may not to able to explain, in general, the behavior of Brazilian companies.

Despite the advances achieved by POT tests based on financial flows, limitations pointed out by Chirinko and Singha (2000) and Leary and Roberts (2010) persist. Even in the models proposed by Chay et al. (2015), Sánchez-Vidal and Martín-Ugedo (2005), and Watson and Wilson (2002), which incorporate variables associated with equity issuance, advancing in the mitigation of problems arising from its possible omission, the authors do not control the addressed relationships for the financing sources' capacities, hindering the differentiation of their uses by preference or need and leading to persistence of the gaps that this study seeks to bridge.

3. METHODOLOGICAL PROPOSAL

It is considered that financing decisions are taken by the company's executives, in each period, with information then available, which differ, at least in part, from that observed *ex post*. Also, the amounts to be funded (or refunded) by external sources of funds are not just a function of deficits (or surpluses) arising from current investments in the operation, but they may include future investment prospects, which are reflected in the company's *cash holding policies*.

Instead of seeking to explain indebtedness level variations through deficits (or surpluses) of internal financing, observed *ex post*, the aim is to identify which scenario of deficit (or surplus) expected by management, estimated from possible *financing and cash holding policies*, would be better explained by financial flows observed at external sources of funds. Thus, various 'versions' of the POT are tested and potential problems arising from the use of accounting semi-identities are mitigated.

The first investment regarded in the analysis is the one made in net operating assets (NOA), defined in (1), in line with Papanastasopoulos et al. (2011).

$$NOA_{i,t} = NWCA_{i,t} + NNOA_{i,t} = \left[\left(CA_{i,t} - C_{i,t}\right) - \left(CL_{i,t} - STD_{i,t}\right) \right] + \left[\left(TA_{i,t} - CA_{i,t}\right) - \left(TL_{i,t} - CL_{i,t} - LTD_{i,t}\right) \right] \quad (1)$$

In (1), the variable net working capital assets (NWCA) is calculated by deducting the nonfinancial portion of current liabilities from the nonfinancial portion of current assets. Here we have current assets (CA), cash and short-term investments (C), current liabilities (CL), and short-term debt (STD). In its turn, net noncurrent operating assets (NNOA) is calculated by deducting the nonfinancial portion of noncurrent liabilities of noncurrent assets. Thus, we have total assets (TA), total liabilities (TL), long-term debt (LTD) – noncurrent financial liabilities – and the definitions for CA and CL are maintained. NOA is the sum of NWCA and NNOA and represents the total investment in the company's operation, discounting the portion funded by operating liabilities. As the study adopts quarterly analysis periods and NOA typically consists in investments planned and approved in advance, this variable is taken *ex post*, i.e., as realized.

The POT states that administrators avoid equity issuances and, to do so, they seek to preserve a certain financial slack, consisting in an internal surplus of funds, added to the safe debt that the company can issue (Myers, 1984; Myers & Majluf, 1984). This financial slack is related to future investment opportunities and is connected to the company's *cash holding policy*, as Leary and Roberts (2010) point out. Therefore, the analysis of a company's investments should also consider the allocation of funds in the internal portion of this financial slack, characterized here by net liquid balance (NLB), which is determined, in (2), by deducting STD from C, just as in Dambolena and Shulman (1988).

$$NLB_{i,t} = C_{i,t} - STD_{i,t} \quad (2)$$

$NLB_{i,t-1}$ represents an internal source of funds that, in quarter 't,' depending on the *cash holding policy*, may have its value depleted, increased, decreased, or even maintained, to ensure the desired (or possible) value for $NLB_{i,t}$, in the end. The other source of funds to be considered is expected self-financing (ESF), estimated in (3).

$$ESF_{i,t} = EIBE_{i,t} + DISCOP_{i,t} + PPESLG_{i,t} - DIVPAID_{i,t} \quad (3)$$

ESF is estimated by deducting dividends paid over the quarter under analysis (DIVPAID) from the expected income before extraordinary items (EIBE), adjusted by net income from discontinued operations (DISCOP), and by property, plant and equipment sales loss/gain (PPESLG). *Ex post* values are adopted for DIVPAID, DISCOP, and PPESLG, because they are associated with movements with prior approval, thus known *a priori* by management. As for EIBE for the quarter, ¼ of the value observed for the consolidated income before extraordinary items for the twelve months ended within the previous quarter is adopted, for parsimony, as a reference potentially used in the projection of ESF by the management. More elaborate projections for EIBE did not lead to gains compatible with their greater complexity.

In a given period, expected internal funds are estimated by management using equation (4) and they are named, from now on, EIF.

$$EIF_{i,t} = NLB_{i,t-1} + ESF_{i,t} \quad (4)$$

When making a decision on a company's financing, the possibilities are analyzed according to the *expectation* of sufficiency or insufficiency of EIF, reflected, in (5), in expected deficit (EDEF).

$$EDEF_{i,t} = \Delta NOA_{i,t} + ENLB_{i,t} - EIF_{i,t} \quad (5)$$

The variable ΔNOA represents, in (5), the variation observed in NOA, during the quarter under analysis. In turn, the expected net liquid balance (ENLB), at the end of the quarter, is due to the company's *cash holding policy*, to be characterized later. It is seen that EDEF is defined from (i) the company's plans for investments and dividends, reflected in ΔNOA and EIF, respectively; (ii) internal financial slack, evaluated by $NLB_{i,t-1}$ and reflected in EIF; (iii) its *cash holding policy*, reflected in ENLB; and (iv) the expected self-financing for the period, based on the results of its operation, also reflected in EIF. Thus, the aim is to ensure that EDEF reflects the best possible estimate of a company management's expectations with regard to internal financing deficit (or surplus), at each moment of financing decision-making.

For an objective definition of the limits for safe debt, it is worth analyzing both whether the company is perceived as capable of issuing debt securities with a good risk assessment, and the amount of debt it would be able to issue, maintaining this good assessment. Here, we follow the recommendation of Lemmon and Zender (2010) and this ability to issue securities is assessed with the support of a predictive model. We adopt the predictive solvency model of Prado et al. (2018), based on data from Brazilian listed companies, which reported a 90.9% accuracy rate in separating solvent and insolvent companies. As the only adaptation, NWCA is adopted, calculated from more consolidated balance sheet accounts, instead of working capital requirement (WCR), after confirmation of immaterial classification differences (less than 1%), due to this adaptation, for the sample of this study.

It is estimated that companies classified as insolvent in the immediately preceding quarter have zero capacity to issue safe debt in a given quarter. Solvent companies, on the other hand, have this capacity assessed through a comparative analysis with their solvent peers in the same sector, regarding the 90th percentile of two indicators commonly used in creditor protection: (i) indebtedness, in line with Leary and Roberts (2010); and (ii) the ratio between net debt and earnings before interest, taxes, depreciation and amortization (EBITDA), representative of payment capacity and identified by Albanez and Schiozer (2022) as the most used performance indicator in covenants of debt contracts of Brazilian listed companies, between 2007 and 2018.

Therefore, it is considered that solvent companies can increase their net debt, provided that the ratios between net debt and EBITDA (ND/EBITDA) and between net debt and total assets (ND/TA) do not exceed the 90th percentile of their distribution, among solvent companies in the same sector, in the quarter immediately preceding the analysis. The safe debt (SDEBT) that can be issued by each solvent company, in a given quarter t, is defined in (6).

$$SDEBT_{i,t} = max\{0\ ,\ min[(ND/TA_{P90,s,t-1} - ND/TA_{i,t-1}).TA_{i,t-1}\ ,\ (ND/EBITDA_{P90,s,t-1} - ND/EBITDA_{i,t-1}).EBITDA_{i,t-1}]\} \quad (6)$$

In (6), SDEBT is estimated through the 90th percentiles of ND/TA and ND/EBITDA for the sector and the values of these same variables for the company itself, at the end of the previous quarter. As SDEBT is a metric for the safe debt available to the company and not an indebtedness 'adjustment factor', the smallest value it assumes is zero.

Based on the concepts discussed here, financial slack (FSLACK) is calculated, for a quarter 't,' through (7), considering the NLB available in 't-1' and the safe debt subject to issuance (SDEBT), in 't.'

$$FSLACK_{i,t} = NLB_{i,t-1} + SDEBT_{i,t} \quad (7)$$

In this study, four *financing and cash holding policies* are tested, in order to analyze which one is better explained by the financial flows observed in external sources of funds. In common among the four policies there is a search for the preservation of financial slack compatible with the company's future investment opportunities, to avoid the need to issue equity and possible stock devaluation due to adverse selection (Myers, 1984; Myers & Majluf, 1984). To do so, each company adopts, in its *financing and cash holding policy*, a reference for ENLB compatible with its future opportunities and seeks to get closer to this reference, observing financing criteria that adhere to the POT.

The four policies differ depending on whether an external or internal reference is adopted for the preferred value of ENLB and the POT version they follow is more or less restrictive. Companies in the same quartile of price/book (P/B) value – a share's market value over book value – are regarded comparable here, considering P/B as a proxy for future opportunities to generate value for shareholders, from the market's perspective. Companies comparable to each other should be equally prepared to take advantage of these opportunities. To allow a comparison between companies of various sizes, the NLB/TA ratios are adopted as references.

As an external reference for ENLB/TA in a quarter 't', we adopt the median value of NLB/TA, in the previous quarter ('t-1'), from companies that were in the same P/B quartile of the company under analysis, also in 't-1.' As an internal reference for ENLB/TA, for a given company, in a quarter 't,' we adopt the NLB/TA ratio observed, in 't-1,' for the same company, assuming an oscillation around a value close to the desirable one, which would, in that case, be defined internally.

The actually estimated value for ENLB will not necessarily be the preferred one, being dependent on the company's allocation capabilities. We define, in Table 1, parameters that enable analyses that consistently integrate decisions on ENLB and decisions on company's financing.

Table 1
Reference parameters for ENLB: ENLBPREF, ENLB2OP, and ENLB3OP

Main reference	1st option (ENLBPREF)	2nd option (ENLB2OP)	3rd option (ENLB3OP)
MED $NLB_{P/B,\ t-1}$	MED $NLB_{P/B,\ t-1}$ or $NLB_{i,\ t-1}$ (the higher of the two)	$NLB_{i,\ t-1}$ or 0 (zero) (the higher of the two)	$NLB_{i,\ t-1}$
$NLB_{i,\ t-1}$	$NLB_{i,\ t-1}$ or 0 (zero) (the higher of the two)	$NLB_{i,\ t-1}$ or 0 (zero) (the lower of the two)	Not applicable

Notes: *MED is an acronym for median; ENLBPREF, for the preferred ENLB; ENLB2OP, for the 2nd option of ENLB; and ENLB3OP, for the 3rd option of ENLB, considered in this sequence, according to Table 2. All variables are divided by the value of TA at the end of t-1.*
Source: *Prepared by the authors.*

Based on the concepts discussed so far, Table 2 presents the four integrated financing and cash holding policies analyzed.

Table 2
Financing and cash holding policies considered in the testing of the POT

ID	Main reference	Rationale for ENLB
SDPBQ	MED $NLB_{P/B,\ t-1}$	ENLB = ENLBPREF, if (EIF + SDEBT) ≥ (ENLBPREF + ΔNOA), or ENLB2OP, if (EIF + SDEBT) ≥ (ENLB2OP + ΔNOA), or ENLB3OP.
IFPBQ	MED $NLB_{P/B,\ t-1}$	ENLB = ENLBPREF, if EIF ≥ (ENLBPREF + ΔNOA), or ENLB2OP, if EIF ≥ (ENLB2OP + ΔNOA), or ENLB3OP.
SDFRM	$NLB_{i,\ t-1}$	ENLB = ENLBPREF, if (EIF + SDEBT) ≥ (ENLBPREF + ΔNOA), or ENLB2OP.
IFFRM	$NLB_{i,\ t-1}$	ENLB = ENLBPREF, if EIF ≥ (ENLBPREF + ΔNOA), or ENLB2OP.

Notes: *ENLB is an acronym for expected net liquid balance (ENLB); all variables are divided by the TA value at the end of t-1.*
Source: *Prepared by the authors.*

In Table 2, policies beginning with 'IF' (i.e., internal financing) represent a more restrictive version of the POT, in which companies will only constitute reserves in preferential amounts (1st or 2nd option), if internal funds are expected to be sufficient. On the other hand, in policies beginning with 'SD' (i.e., safe debt), a more flexible version of the POT, sufficiency is required in relation to the sum of internal funds with the safe debt that can be issued. The main reference connects tables 1 and 2, establishing that policies ending in 'PBQ' link the goals for ENLB to the opportunities perceived by the market for the company (measured by the P/B quartile to which the company belongs) and those ending in 'FRM' adopt an internal view of the firm, in order to define these goals.

Once estimated the deficits (or surpluses, if negative) expected for the companies, using (3), (4), (5) and the premises of tables 1 and 2, the adherence between EDEF and the variations observed in external financing sources is analyzed, using (8).

$$EDEF_{i,t} = \alpha_{i,t} + \beta_1 \,.\, DDE_{i,t} + \beta_2 \,.\, SUR_{i,t} + \beta_3 \,.\, \Delta LTD_{i,t} + \beta_4 \,.\, \Delta TSCC_{i,t} + \beta_5 \,.\, DDE_{i,t} \,.\, \Delta LTD_{i,t} + \beta_6 \,.\, DDE_{i,t} \,.\, \Delta TSCC_{i,t} + \beta_7 \,.\, SUR_{i,t} \,.\, \Delta LTD_{i,t} + \beta_8 \,.\, SUR_{i,t} \,.\, \Delta TSCC_{i,t} \quad (8)$$

In (8), Δ represents the change actually observed in the variable over the quarter 't,' LTD the long-term gross debt, TSCC the total stockholders capital contribution, SUR is a *dummy* that takes the value '1' if EDEF is *negative* (internal surplus expectation) and '0' otherwise, and DDE is a dummy that takes the value '1' if EDEF is positive (internal deficit expectation) and if, in addition, it is expected that this deficit cannot be fully financed by debt (internal deficit, debt issuance and equity issuance are expected at the same time). With SUR and DDE equal to '0,' we have the reference level for (8), in which an internal deficit fully financed by debt issuance is expected. All variables are calculated for each quarter 't' and continuous variables are divided by the TA value, at the end of 't-1,' in order to mitigate size effects.

The change in total stockholders capital contribution to the company, ΔTSCC, is calculated in (9), through the quarterly changes observed in specific balance sheet accounts.

$$\Delta TSCC_{i,t} = (SCC_t - SCC_{t-1}) + (PRIS_t - PRIS_{t-1}) + (SHT_t - SHT_{t-1}) + (MPR_t - MPR_{t-1}) + (ACIR_t - ACIR_{t-1}) + (ACINCL_t - ACINCL_{t-1}) \quad (9)$$

In equation (9), SCC represents the equity account that reports the stockholder contributed capital; PRIS, SHT, MPR, and ACIR represent the equity accounts that report the premium on the issuance of shares, the shares in treasury, the premium on merger, and the advance for future capital increase, respectively; and ACINCL represents the noncurrent liability account that reports the advance for future capital increase. The calculation of equity financing based on (9) offers: (i) a better assessment of this source of funds in merger and acquisition operations with share exchange, captured in (9), but not noticed in cash flows; (ii) capturing the effects of share repurchases and advances for capital increase; (iii) mitigation of the impacts of compensation programs, by disregarding the equity accounts associated with the options granted and the exercise of subscription bonus.

The new testing methodology proposed herein is similar to those adopted by Chay et al. (2015), Sánchez-Vidal and Martín-Ugedo (2005), and Watson and Wilson (2002), to the extent that it seeks to understand how the use of different sources of funds is related to the investments made by the company. However, it innovates by taking into account the incomplete (projective) nature of the information supporting the financing decision and by recognizing the existing integration between financing and cash holding policies. Thus, it enables the analysis of the relationship between the *expected* internal deficit or surplus due to the company's investments (in operating assets and in internal financial slack) and the financial flows that are *observed* in company's external sources of funds. Additionally, controlling for internal and safe debt financing capacities, it mitigates issues that are commonly reported in the reviewed literature, associated to the nonsegregation of the effects related to the company's financing preferences (pecking order) from those arising from the depletion of each of its sources of funds.

Using (8), we can formulate the testing hypotheses for the study:

> H_1: Companies that expect an internal deficit and are able to fully finance themselves through debt will do so. With SUR = 0 (a deficit is expected) and with DDE = 0 (there is no expectation of issuing equity, since there is enough debt financing capacity), positive β3 and β4 equal to or close to zero are expected.

H_2: Companies that expect an internal deficit and are unable to fully finance themselves through debt will issue equity. With SUR = 0 (a deficit is expected) and with DDE = 1 (there is an expectation of issuing equity, since debt financing capacity is not enough), the values of $\beta_3 + \beta_5$ and $\beta_4 + \beta_6$ are expected to be positive, i.e., debt and equity issues are expected. It is worth noting here that the values of $\beta_3 + \beta_5$ and $\beta_4 + \beta_6$ are more related to the amount of safe debt that the company will be able to add than to a preference for one or another source of funds.

H_3: Companies that expect an internal surplus will prefer paying down debt, rather than repurchasing shares. This is justified by management's interest in preserving the company's financial slack, consisted of its internal financial slack and the safe debt that it is able to issue. With SUR = 1 (a surplus is expected) and with DDE = 0 (there is no expectation of issuing equity, due to the surplus), the values of $\beta_3 + \beta_7$ and $\beta_4 + \beta_8$ are expected to be positive, with $\beta_3 + \beta_7$ greater than $\beta_4 + \beta_8$.

4. ECONOMETRIC DATA AND MODELS

The population of this study encompasses Brazilian nonfinancial companies listed on [B]3 (Brasil, Bolsa, Balcão). Financial statements and indicators were obtained from the platform *Economatica*. Quarterly and twelve-month moving windows data referring to the period between December 2010 and September 2020 are analyzed.

We excluded observations (i) referring to financial companies, holdings and companies that went public in the last quarter under analysis; (ii) with inconsistencies in financial statements accounts of interest; (iii) referring to periods in which: (a) total assets, equity (consolidated or from the parent company), or net sales revenue is less than or equal to zero; (b) the absolute value of net cash flow from operating activities is less than one currency unit; (c) the company has not had at least one class of its shares traded on at least 50% of the trading days in the quarter; (d) it is not possible to calculate any of the variables of interest. This results in a consolidated database with four panels of unbalanced data (one per each integrated financing and cash holding policy shown in Table 2), with 4,465 observations each, referring to information from 223 companies, over the course of 39 quarters. For the analysis of the ability to issue safe debt, companies are grouped into 5 sectors: (i) trade, leasing, logistics and airlines; (ii) construction, real estate and shopping malls; (iii) industry and agribusiness; (iv) utilities, telecommunications, mining, oil, gas and other concessions; and (v) other services. This grouping is based on the North American Industry Classification System (NAICS), levels I and II, and its details are available upon request to the authors.

Due to the heterogeneity that Lemmon and Zender (2010) and De Jong et al. (2010) observed in the coefficients relating internal financing deficit to debt issues, when segmenting subsamples by deficit size, we adopt quantile regressions (Koenker & Hallock, 2001) to analyze (8) at three EDEF quantiles ($\tau = 0.25$, $\tau = 0.50$, and $\tau = 0.75$). The general form of these regressions is presented in (10) and (11).

$$q(X, S, \tau) = X^T\beta(\tau) + S^T\pi(\tau) \quad (10)$$

$$Y = q(X, S, U) \quad (11)$$

By excluding S (which represents the average correlated effects) from (10) and (11), we have the traditional (cross-section) representation of quantile regression, which allows us to evaluate the marginal effects of X on Y, from the β coefficients, for each τ quantile (U level). Thus, we enable the analysis of the relationships between EDEF and its covariates (ΔLTD, ΔTSCC, SUR, and DDE), at different quantiles of the conditional distribution of EDEF. In the correlated random effects model proposed by Bache et al. (2013) for panel data analyses, the π coefficients represent, in each τ quantile, the random effects correlated to the variables ΔLTD and ΔTSCC. Then, the β coefficients can be interpreted, in the estimates, as marginal effects that configure the relationship between the regressors and EDEF, excluding the correlated effects associated with the π coefficients.

The use of quantile regressions enables analyses that are robust to the influence of extreme EDEF values, but not to extreme values on explanatory variables that are bad leverage points (Rousseeuw & Hubert, 2018). Then, we proceeded to the analysis of influential observations, in line with what was proposed by Adams et al. (2019), in 3 steps: (i) identification of potential bad leverage points (extreme values in explanatory variables); (ii) application of multivariate analysis of outliers; and (iii) exclusion of observations identified in (i) that were classified as outliers in (ii).

In (i), we regarded as extreme those observations with variations (positive or negative) in LTD or TSCC that were greater than 90% of total assets at the end of the previous quarter; in (ii), the multivariate analysis of outliers was performed by estimating the model through robust regression (Rousseeuw & Hubert, 2018), in 4 steps, using the function *lmrob* of the *robustbase* package on the *R* software (Maechler et al., 2021), with

setting = 'KS2014' (Koller & Stahel, 2017), *compute.rd = TRUE*, *compute.outlier.stats = 'SMDM'*, *maxit.scale = 500*, *seed = .Random.seed*, and *set.seed(1234)* and identifying as outliers the observations that are given zero weight in this regression (Adams et al., 2019; Rousseeuw & Hubert, 2018); in (iii), a single observation was excluded, for being regarded as extreme both in (i) and (ii). This resulted in an unbalanced panel with 4,464 observations for each policy under analysis.

5. RESULTS AND DISCUSSION

Considering the nonnormality of the distribution of the variables, the analyses presented herein adopt measures and methods that do not have data normality as a requirement for satisfactory and unbiased results. Table 3 shows the medians of the variables of interest, segmented by the P/B quartile in which the company was positioned, at the end of the previous quarter.

Table 3
P/B quartiles and companies' characteristics

P/B	SALES	EBITDA%	GrTA	NOA	NLB	EIF	SDEBT	FSLACK
Q1	14.446	13.568	0.011	0.687	-0.002	0.000	0.038	0.054
Q2	14.862	17.520	0.014	0.639	0.032	0.042	0.124	0.157
Q3	14.749	19.083	0.018	0.642	0.053	0.057	0.096	0.153
Q4	14.968	19.356	0.025	0.560	0.081	0.087	0.124	0.214

Notes: *SALES is the natural log of net sales revenue and EBITDA% is the EBITDA margin, both accumulated in the last 12 months. GrTA is the growth of total assets in the quarter. NOA, NLB, EIF, SDEBT and FSLACK are defined by equations (1), (2), (4), (6) and (7), respectively. EIF, SDEBT, FSLACK and GrTA are divided by total assets at the end of the previous quarter; NLB and NOA by total assets at the end of the quarter to which they refer. The statistical significance of differences between medians was verified with Kruskal-Wallis (Hollander et al., 2013) and Dunn (1964) tests, with significant differences at 5% in 85% of the cases, excluding only differences between the medians for Q2 and Q3 of the variables SALES, GrTA, NOA, SDEBT and FSLACK; and between the medians of Q3 and Q4 for EBITDA% and Q2 and Q4 for SDEBT.*
Source: *Prepared by the authors.*

In Table 3, the adequacy of P/B quartiles as *proxies* for the financial slack is highlighted: the FSLACK medians are significantly different between all pairs of P/B quartiles (except for Q2-Q3) and higher for higher P/B; NLB follows the same pattern; and SDEBT is much higher for companies in Q4 of P/B, compared to those in Q1. These aspects corroborate the theoretical perspective adopted by this study that, in line with the POT (Myers, 1984; Myers & Majluf, 1984), companies seek to maintain a financial slack adequate to expectations, in order to avoid losing good investment opportunities. Chay et al. (2015) identified a feature compatible with these: companies with high investment levels kept more cash and cash equivalents, including those arising from equity issues. Also in Table 3, companies from Q4 have higher medians for GrTA, EBITDA%, and EIF, when compared with those from Q1, and this support the rationale of the opportunities to create value being reflected in P/B ratios.

Table 4 presents the estimation results of (8) by cross-sectional quantile regression around the median of EDEF, for the 4 policies under analysis.

Table 4
Cross-sectional (CS) quantile regressions, around the median (0.50 quantile) of EDEF

	SDPBQ	IFPBQ	SDFRM	IFFRM
ΔLTD	0.11 ***	0.06 **	0.10 ***	0.13 **
ΔTSCC	0.02	0.01	0.01	0.02
ΔLTD:DDE	0.23 **	0.28 ***	0.26 **	0.23 *
DDE: ΔTSCC	0.46 *	0.47 *	0.48 *	0.47 *
ΔLTD:SUR	-0.07	-0.03	-0.08 *	-0.08
SUR: ΔTSCC	0.03	0.02	-0.01	-0.03
(Intercept)	0.03 ***	0.02 ***	0.02 ***	0.01 ***
DDE	-0.01 ***	0.00 **	-0.00	0.01 ***

Table 4
Cont.

	SDPBQ	IFPBQ	SDFRM	IFFRM
SUR	-0.05 ***	-0.03 ***	-0.04 ***	-0.04 ***
N	4,464	4,464	4,464	4,464
R1	0.28	0.29	0.29	0.17
AIC	-17,050,32	-18,473,99	-17,373,60	-13,392,48
BIC	-16,992,68	-18,416,36	-17,315,97	-13,334,85

Notes: *All continuous variables are divided by total assets at the end of the previous quarter. Regressions estimated with the R quantreg package (Koenker, 2021). Settings: seed = 1234; bootstrap method = 'wxy;' repetitions = 1,000. AIC, BIC and R1 analyze the models based on the information criteria proposed by Akaike (1974), Bayesian (Schwarz, 1978), and the fit measure R1 (Koenker & Machado, 1999).*
**** p < 0.001; ** p < 0.01; * p < 0.05. Analyses consider a minimum significance of 5% (*).*
Source: *Prepared by the authors.*

The AIC, BIC, and R1 criteria suggest that the policies better explained by the financial flows observed in external sources of funds are IFPBQ, SDFRM, and SDPBQ, with similar explanatory power. These results, associated with greater financial slack observed for higher P/B (Table 3), corroborate the perspective of the financial slack being based on external references, in a way that is compatible with the perceived opportunities for value creation.

Returning to the research hypotheses, it is expected that, for the baseline scenario (expectation of a deficit financeable by safe debt, with SUR=DDE=0), the coefficient associated with ΔLTD is positive and the coefficient associated with ΔTSCC is equal to or close to zero. In this scenario, for any of the policies in Table 4, the coefficient associated with ΔLTD is significant and positive and the coefficient associated with ΔTSCC is not significant (we cannot say that it is different from zero), and this corroborates what was predicted by the hypothesis H_1. De Jong et al. (2010) identified that 79.8% of the companies with no debt restrictions have issued debt in the presence of large deficits and only 15.1% of those with restrictions did so. Although they relate only deficit and debt variation and do not control for the amount of safe debt that is available, the result obtained by them is compatible with those identified herein.

In the expectation of deficit (SUR=0) in an amount that exceeds safe debt (DDE=1), the coefficients of interaction terms between DDE and ΔLTD and between DDE and ΔTSCC are statistically significant, positive, and indicate a relevant increase in the use of both financing sources, for all the policies under analysis, corroborating what was predicted by the hypothesis H_2. Although they neither evaluate ΔTSCC, nor the deficit portion financeable by safe debt, Lemmon and Zender (2010) identified results compatible with these: the lower the probability of rating for the company's debts, the more negative was the coefficient that reduces, in their model, the participation of debts in financing the company's deficit. These results and those obtained in the present study, showing relevant equity issues (ΔTSCC) when safe debt is not enough to finance internal deficit, are both consistent with what is predicted by the POT.

Finally, in the case where there is an expectation of surplus (SUR=1 and DDE=0), with the exception of the interaction term between SUR and ΔLTD, in SDFRM, which indicates a reduced coefficient for this variable, the coefficients of the interaction terms between SUR and continuous variables are not significantly different from zero. There is virtually no change in relation to the baseline scenario, indicating, in the expectation of a surplus (negative EDEF), a significant relationship with debt payment, and not with the repurchase of shares, and this corroborates the hypothesis H_3. De Jong et al. (2010) have identified a compatible behavior, with the estimation of the coefficient that relates the internal deficit (or surplus) with debt variation, in their model, reaching its highest value in the presence of surpluses. These results are consistent with the POT (Myers, 1984; Myers & Majluf, 1984), because (i) they predict a greater restitution of external funds obtained through debt, whenever possible and (ii) they indicate a preference for the preservation of financial slack, in order to avoid missing out on good investment opportunities (debt payment, all else held constant, contribute to increasing available safe debt).

Table 5 shows the results obtained using cross-sectional (CS) and correlated random effects (CREM) estimations of (8), at each quartile of EDEF, for the policies that adopt an external reference for the preferred internal financial slack (ENLBPREF). Results for the other policies are suppressed for brevity and they are available upon request to the authors.

Table 5
Cross-sectional (CS) and correlated random effects (average, CREM) quantile regressions, at the quantiles 0.25, 0.50 (median), and 0.75 of EDEF

		SDPBQ			IFPBQ		
		0.25	0.50	0.75	0.25	0.50	0.75
CS	ΔLTD	0.07 **	0.11 ***	0.13 *	0.04 *	0.06 **	0.11 *
CREM	ΔLTD	0.07 **	0.11 ***	0.13 *	0.04 **	0.06 **	0.10 *
CREM	m. ΔLTD	0.07	0.04	0.01	0.11 **	0.09 *	0.05
CS	ΔTSCC	0.02	0.02	0.03	-0.00	0.01	0.02
CREM	ΔTSCC	0.02	0.01	0.03	0.00	0.01	0.01
CREM	m.ΔTSCC	0.08	0.04	0.07	0.06	0.03	0.03
CS	ΔLTD:DDE	0.08 *	0.23 **	0.50 ***	0.11 **	0.28 ***	0.52 ***
CREM	ΔLTD:DDE	0.08	0.23 **	0.50 ***	0.10 *	0.29 ***	0.52 ***
CS	DDE:ΔTSCC	0.08	0.46 *	0.84 ***	0.10	0.47 *	0.86 ***
CREM	DDE:ΔTSCC	0.08	0.47 **	0.83 ***	0.10	0.47 **	0.85 ***
CS	ΔLTD:SUR	0.03	-0.07	-0.12 *	0.05 *	-0.03	-0.10 *
CREM	ΔLTD:SUR	0.02	-0.08 *	-0.12 *	0.05 *	-0.03	-0.09
CS	SUR:ΔTSCC	0.08	0.03	-0.01	0.09	0.02	0.00
CREM	SUR:ΔTSCC	0.08	0.03	-0.01	0.05	0.03	0.00
CS	(Intercept)	0.01 ***	0.03 ***	0.06 ***	0.01 ***	0.02 ***	0.04 ***
CREM	(Intercept)	0.01 ***	0.03 ***	0.06 ***	0.01 ***	0.02 ***	0.04 ***
CS	DDE	-0.00 **	-0.01 ***	-0.01 ***	0.00 **	0.00 **	0.01 **
CREM	DDE	-0.00 *	-0.01 ***	-0.01 **	0.00 *	0.00 *	0.01 *
CS	SUR	-0.05 ***	-0.05 ***	-0.07 ***	-0.04 ***	-0.03 ***	-0.04 ***
CREM	SUR	-0.05 ***	-0.05 ***	-0.07 ***	-0.04 ***	-0.03 ***	-0.04 ***

Notes: *Regressions estimated with R packages quantreg (Koenker, 2021) and rqpd (Koenker & Bache, 2011). Settings: seed = 1234; bootstrap method = 'wxy;' repetitions = 1,000.*
**** p < 0.001; ** p < 0.01; * p < 0.05. Analyses consider a minimum significance of 5% (*).*
Source: *Prepared by the authors.*

The results of the panel regressions (CREM) shown in Table 5 confirm the conclusions about the research hypotheses presented in the cross-sectional regression analysis around the median (Table 4). The research hypotheses are also ratified at the other quartiles, with a single caveat: hypothesis H_2 cannot be confirmed at the quartile 0.25, in which the DDE:ΔTSCC interaction is not significant, making it impossible to relate equity issuance to safe debt insufficiency to meet the expected deficit.

The statistical significance of the differences between the coefficients of various quantiles was verified using the Wald test, applying the function *anova.rq* of the package *R quantreg* (Koenker, 2021) to the results of the *CS* regression. The differences were statistically significant between the coefficients of the interactions ΔLTD:DDE and DDE:ΔTSCC, higher for higher quantiles, and between the coefficients of the interaction ΔLTD:SUR. These differences, once identified, enable important analyses, described below.

For the case of expected surpluses, it can be noted, from the combination of the coefficients ΔLTD and ΔLTD:SUR, shown in Table 5, that the resulting coefficients are smaller for the quantile 0.75 when compared to those in the quantile 0.25. As surpluses are negative deficits, this represents the association of higher coefficients with larger surpluses (more negative deficits). On the other hand, in the scenario where equity issuance is expected, the greater the deficits, the greater the coefficients associated with ΔLTD and ΔTSCC. These findings are consistent with the POT, as they relate a greater use (or restitution) of external funds to greater deficits (or surpluses) of internal financing and differ from the results obtained by De Jong et al. (2010), who identified a coefficient relating internal deficit to long-term debt issuance that is lower for large deficits than for normal deficits.

The elements incorporated into the testing methodology that we propose and apply here provide a plausible explanation for this divergence of conclusions. In De Jong et al. (2010), the authors analyze the relationship between *ex post* values of a company's debt variation and its internal financing deficit, omitting equity issues from their estimations. Even though they control for

surpluses or deficits, for the level of internal deficit and, using proxies, for the possibility of issuing debt, they do not estimate the available safe debt. The association of an accounting semi-identity with this lack of control of the available safe debt leads to the same problem pointed out by Chirinko and Singha (2000) on the model from Shyam-Sunder and Myers (1999): the analysis turns out to be not an exclusive POT test, but a joint test of preferences (pecking order) and proportions, in the usage of different sources of funds.

In this study, we analyze the relationship between EDEF (the estimate of the internal financing deficit expected by company's management, at the time the decisions are made) and the observed (*ex post*) net financial flows from/to long-term debt and equity holders, for the same period, mitigating problems that could arise if relevant variables are omitted, like those related to equity issues (commonly omitted) and to operational liabilities, omitted by Watson and Wilson (2002). Additionally, by estimating SDEBT based on objective criteria, we enable the testing of integrated financing and cash holding policies and explicit controls regarding the financing capacities, with dummies that characterize the three possible scenarios: surplus, deficit funded by safe debt, and deficit funded by safe debt and equity. The POT hierarchy of preferences can then be verified, apart from the proportions of the observed use (or restitution) of funds from (or to) each one of the sources. In this framework, the size of the coefficients of the variables associated with debt and equity issues, both included in the model, only reflect the intensity of use (or restitution) of each source, as a function of the expected amount of internal deficit (or surplus). Therefore, it is expected that a greater need for external funds corresponds to an increase in the coefficients associated with them, just as observed in Table 5.

The results in Table 5 also suggest possible alternative interpretations for apparent contradictions in relation to the POT identified in the national literature. The fact that Iquiapaza et al. (2008) have identified that companies with higher profitability and higher growth were more prone to issuing equity, for instance, may have been related to depletion of internal and safe debt financing capabilities, not identified due to the absence of controls for this, in the adopted model.

On the other hand, the results obtained by F. N. De Oliveira and P. G. M. De Oliveira (2009), who did not identify a relationship between the probability of issuing equity by a company and its indebtedness level, relative to the peers from its sector, may have resulted from not incorporating information on the solvency and payment capability of the companies under analysis. It should be noted that, with the adoption of the definition we propose for safe debt, which controls for the company's relative indebtedness level and payment capacity, in addition to its solvency, similar contradictions are not identified, with equity issuance occurring when safe debt is not sufficient.

In general terms, the results of this study corroborate the POT, with a preference for debt settlement over share repurchases, in the expectation of surpluses, and a greater use of safe debt, for larger deficits. Equity issuance is only significant when insufficient safe debt is expected, and it is also greater for larger deficits.

6. FINAL REMARKS

In this study, a new methodology has been proposed to test the adherence of corporate financing decisions to the POT. In this methodology, financing choices are analyzed considering information regarded as available to the company's management when these choices are made. Under this new perspective, the expected deficits (or surpluses) are estimated, and these estimates are analyzed in the light of the financial flows that are observed (*ex post*) in the various funding sources, which reflect the decisions made. This approach gets the analyses closer to the companies' decision-making context and avoids the use of accounting semi-identities, enabling more comprehensive analyses.

The proposed methodology operationalizes the concepts of safe debt and financial slack referred to by Myers (1984) and Myers and Majluf (1984), based on analyses of solvency, indebtedness level (relative to the sector), and relative payment capacity (with respect to the sector). Starting from the decision-making perspective and the concepts proposed herein, the analysis of various *integrated financing and cash holding policies* becomes feasible, controlling for the company's financing capabilities. With this, the main issues pointed out by Chirinko and Singha (2000) and Leary and Roberts (2010) on the POT tests are mitigated. Also, we contribute to bringing the research closer to the market, by analyzing deficit expectations from a managerial perspective and the payment capacity through the ND/EBITDA ratio, commonly used in practice, but not in the reviewed literature.

Applying the proposed methodology to a sample of Brazilian companies has produced results that corroborate the hypothesis that they make their financing decisions following what is predicted by the POT. It has also been

observed that the proposed methods offer a more controlled environment for this type of test, being able to support further advances in understanding the raising and use of financial resources by listed companies. As a limitation, the fact that the sample only covers Brazilian companies may be highlighted, because it does not enable us to compare the behavior of companies in different countries.

We understand that the application of the methodology built herein to other samples of companies, especially with a greater number of observations and in other markets, can contribute to its refinement. Additionally, its adaptation to address other issues, based on the concepts that it operationalizes, can open new paths for its use and lead to new contributions, in other finance topics.

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