FUNDAÇÃO INSTITUTO CAPIXABA DE PESQUISAS EM CONTABILIDADE, ECONOMIA E FINANÇAS – FUCAPE

FELIPE STORCH DAMASCENO

ESSAYS ON INFORMATION DISCLOSURE: impairment theory, trade credit and voluntary disclosure behavior.

VITÓRIA
2019

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Tese apresentada ao Programa de Doutorado em Ciências Contábeis e Administração da Fundação Instituto Capixaba de Pesquisas em Contabilidade, Economia e Finanças - Fucape, como requisito parcial para obtenção do título de Doutor em Ciências Contábeis e Administração de Empresas.

Orientador: Prof. Dr. Bruno Funchal.

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Para minha esposa Mays, minha força, meu apoio e meu amor

To my wife Mays, my strength, my support and my love

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RESUMO

Esse trabalho analisa a importância da informação na relação entre firmas e investidores externos e os impactos gerados na capacidade de investimento e na precificação da firma. Eu olho essa relação por três óticas: Primeiro, a possibilidade ou não de o gestor reverter perdas por impairment. Encontrei que a diferença na norma contábil impacta no esforço implementado pelo gestor para identificar a necessidade de impairment, que mais impairments equivocados são feitos quando a reversão é permitida e uma redução do conservadorismo contábil. Entretanto, permitir a reversão aumenta o valor da firma e reduz a ineficiência de subinvestimento gerada pela assimetria informacional. Segundo, testo quatro preposições da teoria de divulgação voluntária de previsões de lucro. Encontro evidências que existem diferentes incentivos para divulgação voluntária dependendo da performance da firma e de persistência na divulgação. Também encontro indícios que as realizações de fluxos de caixa podem não ter relevância na decisão de divulgar voluntariamente e sim a dotação de opções de compra de ações. Terceiro, apresento um projeto de estudo do impacto de crises econômicas na capacidade de financiamento. Espero encontrar evidências de que existe uma migração de crédito bancário para crédito comercial. Esse movimento se baseia na perda de confiança nas informações disponíveis durante crises econômicas[1].

Palavras-chave: Informação; Impairment; Reversão de impairment; Divulgação voluntária; credito comercial.

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[1] Parte dos resultados dessa pesquisa foram publicados em Damasceno, F. S., & Funchal, B., (2015). Valuing the impairment loss reversal effect on firms' debt financing. Damasceno (2018). Intertemporal decisions and cash realizations: Empirical evidences of corporate voluntary disclosure. In Encontro Nacional da Associação Nacional de Programas de Pós-Graduação em Ciências Contábeis

ABSTRACT

This paper analyzes the importance of information in the relationship between firms and external investors and the impacts on the investment capacity and firm valuation. I look at a relationship through three optics: First, allowing or not impairment losses reversals. Find a difference in the accounting standard impacts the effort implemented by the manager to identify a need for impairment, that more misguided impairments are made when reversion is allowed and a reduction of accounting conservatism. However, when reversals are allowed increases firm value and reduce the inefficiency of underinvestment from informational asymmetry. Second, I test four prepositions from voluntary disclosure theory using management guidance. I find evidence that there are different incentives for voluntary disclosure depending on the firm's performance and a persistence in disclosure due market awareness of information existence. Moreover, I find evidence that cash flow realizations may have no relevance in the decision to voluntarily disclose, but rather the endowment of stock options. Third, I present a project to study the impact of economic crises on study capacity. I hope to find evidence that there is a migration of bank credit to commercial credit. This movement is based on the loss of confidence in the information available during economic crises.[2]

Key-words: Information; Impairments; Impairments loss reversals; Voluntary disclosure; Trade credit.

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[2] Part of the results are published on Damasceno, F. S., & Funchal, B., (2015). Valuing the impairment loss reversal effect on firms' debt financing. Damasceno (2018). Intertemporal decisions and cash realizations: Empirical evidences of corporate voluntary disclosure. In Encontro Nacional da Associação Nacional de Programas de Pós-Graduação em Ciências Contábeis

SUMÁRIO

INTRODUCTION

Accounting information is a major factor of economic efficiency. However, managers could use their information advantage to mislead investors. With greater information in hands, managers can make better decision focusing on maximizing firm value or maximize their own utility. Thus, if used properly, resources allocation is improved, and firms present superior financial performance. Nevertheless, when managers use information endowment with an agenda focusing on maximizing their own utility instead stockholders' interests. I focus on study how information environment impact firms and outside investors relations and its consequences to investment, firm value and credit.

Bharadwaj (2000) presented evidence that firms with high IT capability (great capability to process information) outperform a control group of firms on various profit and cost-based performance measures. Bushman and Smith (2001) suggested a channel throughout corporate governance where financial accounting information impact economic performance. Lang and Lundholm (2000) present evidence that firms that increase disclosure before equity offerings might be hyping stocks prices to mislead investors. Brown and Hillegeist (2007) shows that quality of information and information asymmetry are negative related caused by the likelihood of investors discover private information.

Many papers discussed the importance of accounting information such as credit default swap pricing (Batta, 2011), tax avoidance (Gallemore and Labro, 2015) and portfolio optimization (Hand and Green, 2011). Hall (2010) discussed the use of accounting information for managerial work and developed three propositions. First, to develop knowledge to decision-making. Second as part of a wider information set to perform their work and third to interact among them. This work is focused on investigate how accounting informational environment impact firm-level efficiency.

First, we develop a theoretical model comparing two accounting standards that differ from each other by allowing or not to managers to reverse impairment losses. Given managers such reversal options impacts on informational flow from firm to outside stakeholders. We find that not allowing reversals increase managers' conservatism. On the other hand, managers that have this discretion are more aggressive and make less effort to identify impairment necessity. Hence, more bad impairments are made. However, Sophisticate investors prices the firm with a higher value and make a higher optimum investment. Hence, there is less economic inefficiency from under-investment in the case of aggressive manager that impair the asset. Although this is controversial, investors price the reversal option as an opportunity to increase collateral value.

Second, focus on the importance of information to firms' financing capability and the impact of higher banks screening due lower trust on informational environment during economic crisis and firms need to finance their activities using credit from suppliers. I base this argument on the proposition that information is a major part of firm financing and on the idea, that with asymmetry information adverse selection takes place and screams out firms from credit market.

Pagano and Jappelli (1993) presented a model showing that credible information is an important issue to avoid adverse selection on credit markets. Smith (1987) shows that suppliers can identify potential defaults quickly than if financial institutions are solo providers of credit. Cunat (2007) shows that suppliers have comparative advantage over banks in lending to firms because they can stop the deliveries, making them important liquidity providers which is a major issue during economic crisis.

Therefore, in this chapter investigate whether in economic crisis scenarios firms shifts their funding from banking credit to trade credit. Empirical results show that firms without access to BNDES money are more vulnerable to financial constraints and are more active on trade credit market. This vulnerability induces firms to use more trade credit, both offering and demanding more than firms that have the opportunity to finance their short-term operations using subsided operational credit.

Finally, on the third chapter I test theoretical predictions from Einhorn and Ziv (2009) voluntary disclosure model. They developed a setting where the flow of information is persistent and cash flow realizations lacks importance for managers with voluntary disclosing history. Moreover, managers prefer to remain quiet and create an uninformed reputation to avoid disclosing costs and disclosing commitment. Thus, high performance firms have a greater opportunity to not disclose since market understand that a non-disclosing of good information comes from lack of information instead of managers withholding information. Hence, that is different disclosing incentives depending of firms' performance.

I find evidence of persistency behavior of voluntary disclosing, indicating the implicit commitment predicted by the model. I also find that higher performance firms are less

likely to voluntary disclose and worse performance firms are greater incentives to disclose. However, the overall result shows that cash realizations have a positive and significant impact for both disclosing and non-disclosing firms, not consistent with the theory.

Furthermore, I extend the empirical model and add a different channel that impact managers' willingness to voluntary disclose stock options endowment. I found that results for disclosing persistency and difference of incentives are robust for this setting. I also find that cash realizations are not significant for managers that make a disclosure in the previous period. However, evidence suggest that quiet managers are not considering cash realizations when deciding whether to voluntarily disclose or not, different than expected.

Chapter 1

1 REAL EFFECTS OF ALLOWING IMPAIRMENT LOSSES REVERSALS

Abstract

We use a theoretical model to analyze how impairment loss reversal option affects economy efficiency and manager behavior. We found that it increases manager leniency and reduces manager rigorousness about possible assets' bad financial condition. A manager that is allowed to reverse impairment losses makes less effort to identify impairment necessity. Allowing such reversals increases short-term inefficiency but it is reversed to a long-term efficient allocation.

Key-words: impairment loss reversal; trade-off; information asymmetry; funding.

1.1 INTRODUCTION

This paper concerns on whether allowing impairment losses reversals have a significant impact on firm funding capability. The flow of information between firm and investors is a capital factor on resources allocation and economic efficiency. Moreover, timeliness as a factor of report quality makes impairment and impairment reversals an important aspect of corporate governance. Manager discretionary power over impairment decisions might be used for earnings management. We examine if allowing managers to reverse impairment losses has an impact on credit market.

There are two major accounting standards worldwide, IFRS and USGAPP and they have taken different stances with respect to reversals. In the US, reversals are prohibited

for most assets [1], while IFRS requires reversals if economic conditions no longer require the impairment. With the continuing convergence of US GAAP and IFRS the current trend greater use of current price in accounting standards, a more complete evaluation of the economic consequences of impairment reversals may help frame existing debates.

In this paper, we develop a model of impairment reversals around the real effect auditing setting of Lu and Sapra (2009). The model consists in an economy with two agents, managers and investors. This economy could be under one of two accounting standards that differs from each other by allowing or not to reverse impairment losses. We call them Reversal Accounting and Non-Reversal Accounting respectively. Nature draws an unobserved financial condition for firms' assets that impact directly on the necessity of impairment. Managers might make an effort and observe asset financial condition. If the effort made is not enough, she gets inconclusive evidence.

Afterwise, manager need to release a report that will signal assets financial condition to the market. We define managers' types as lenient or rigorous if she releases a good or bad report when have inconclusive evidence respectively. Investors observes the report and creates beliefs about real financial condition according to managers types, and prices the firm. At the end, the true financial condition is revealed to uninformed managers and a second round of reports retracting a bad impairment are released if firm is under Reversal Accounting.

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[1] Both standards allow assets to be fair-valued (there are differences between which assets on each standard). However, for the sake of comparability, we consider only book-value accounting, and this has no impact on our model.

Informational flow has a direct impact on the economic environment and can impact directly on how firms get funding or which projects are implemented and which ones are not. Information asymmetry is an important circumstance of adverse selection on credit markets, resulting on economic inefficiencies.

We found that allowing impairment losses reversals increases manager space of rigorousness and reduces space of leniency. Moreover, it also reduces how much effort the manager implements to identify impairment necessity and more bad impairments are made. We also found under-investment when a lenient manager releases a good report and when a rigorous manager releases a bad one. The economic inefficiency is similar with leniency on both accounting standards and is greater for Reversal Accounting with manager rigorousness. We contribute for the literature showing an aspect of information acquisition that has been neglected.

The paper goes as follows: Section 2 presents a literature review and Section 3 presents the model, section 4 and 5 presents the results for Non-Reversal Accounting and Reversal Accounting respectively. Section 6 concludes.

1.2 LITERATURE REVIEW

Biddle et al (2009) finds evidence of negative relation between information quality and investment efficiency. They found that the increase of report quality reduces economic frictions that constrain economic efficiency. Chen et al (2011) brings evidence that financial report quality increases investment throughout bank financing. Zhang (2013) use a CAPM setting to investigate the relation between accounting standards, investment level and welfare. The model presents that accounting standards matter not only because

quality affects but also because investment level. The results also suggest that an improvement on accounting standards causes a shift on resources allocation across firms and economic growth.

Lambert et al (2007) shows that quality of information has a direct and indirect impact on cost of capital and an increase in information quality reduces cost of capital. Therefore, information quality enables more good projects to be funded and impact economic growth. Easley et al (2004) investigates the relation between information and cost of capital and finds that the choice of accounting treatment influences cost of capital and investors demand higher stock return from firms with greater private information.

Ball et al (2000) shows that differences about accounting standards across countries affects firm value over time. Daske et al (2008) investigates the mandatory adoption of IFRS and found increase of liquidity, decrease of cost of capital and increase of equity valuations. Horton et al (2012) examines IFRS adoption improved quality on credit market and firms' information environment increasing comparability and information quality. Soderstrom et al (2007) discussed how the mandatory IFRS adoption by European companies. They argue that accounting quality is a function of each country institutional setting. Hence the impact of IFRS adoption should not be major on accounting quality.

Gigler et al (2009) investigate how accounting conservatism affect debt contracts They found that optimal covenants vary with the degree of conservatism and that accounting conservatism decreases debt contracts efficiency. Gox and Wagenhofer (2009) presents a theoretical model analyzing the optimal impairment rule and find that is

conditional conservative. Gox and Wagenhofer (2010) argued that investors prefer a conservative accounting system and fair value measurement increases accounting risk.

Kanodia (2007) analyzed real effects on accounting disclosure and finds that how firms' transactions are measured and reported has a real an important effect on resources allocation. This result highlights how important is the choice of how to disclose financial accounting measures. Rennenkamp et al (2014) conducted experiments about reversal of impairment losses. The result suggests that when responsible for the decision of write-off, manager invest more attempting to reverse cash flow outcome. The result is not similar when manager is not responsible for the write-off, indicating a behavior might not consistent with stockholders' interests.

1.3 THE MODEL

The model has one period and it is set as follows. Consider an economy with two types of agents: Managers, that own firms, and investors that price them. This economy may adopt two different accounting standards: one allows impairment losses reversals and the other does not. We will denote them Reversal Accounting and Non-Reversal Accounting respectively.

The timeline for the model consists of 3 steps, presented in Figure 1. At first Natures draws a good state with probability λ, or a bad state with probability $1 - \lambda$, where $\Delta\lambda = (1 - \lambda) - \lambda$. On the first step, a Manager from a representative firm might make an effort to be informed about nature state. (Figure 1). Finally, firm can make two reports about assets values, YG if that is no need for impairment or YB if the asset is impaired.

Figure 1: Timeline
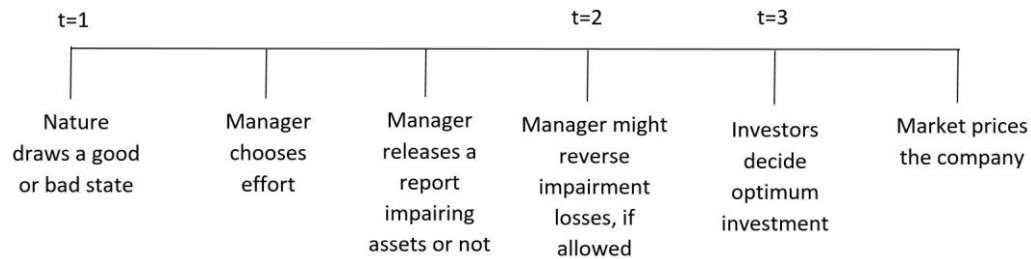
Manager chooses to make effort to accumulate evidence and identify assets financial condition as *G* or *B* with probability $q \in [0,1]$. If she chooses to make not enough effort, ends with inconclusive evidence *I* (Figure 2). We refer to the probability of identify assets financial condition as effort given the interdependency of the both. The cost of effort, $c(q)$ [1], is increasing and convex, with $c(0) = 0$, $c0(0) = 0$ and $c0(1) = \infty$ [2]. Manager can assume two types. We define managers' types as Rigorous if she chooses to impair the asset when she is not certain whether the asset should be impaired and Lenient if only impairs when is certain about state of nature. Investors can observe managers types. Whenever a manager releases a wrong report, she is given wrong information and misleading investors, i.e. reports Y_B if *G* or Y_G if *B*. Thus, we assume an expected liability *L* that may be imposed on managers when they make the wrong choice, where $E(L) > 0$ [3].

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[1] There is an implicit cost of making impairment reversals that is considered by the managers. In order to keep the model simple, we assume that the present value of this implicit cost is considered when deciding how much effort to implement to seek evidences to impair the asset or not.
[2] Following Lu and Sapra (2009)
[3] This liability could be seeming as the expected value of a lawsuit

On step 2, manager is fully informed about nature state and perfectly identify whether should had impair the asset in the first place. In case that impairment have been made when it shouldn't, she can reverse losses if allowed. The firm has an investment opportunity and needs external funding. In case of good state, the investment will generate a return $2\mu\sqrt{k}$ or 0 otherwise. If the firm is allowed to reverse impairment losses, investors wait for managers' report before making any investment decision.

Figure 2: Information acquisition
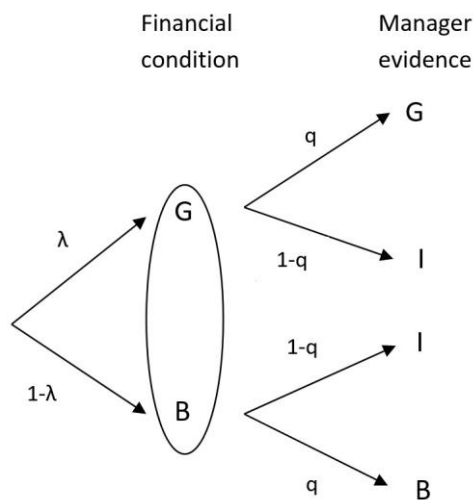
The value of the firm, *M*, depends on state of nature. Finally, the third step consists on investors deciding the investment and pricing the firm. Investors knows managers' types and creates beliefs about asset financial condition. We call *Z* investors' information set including managers' effort, type and report, i.e. $Z = [q, T, Y_i]$. Using this information, he identifies optimum investment and market prices the firm. We call Φ and φ, firm value in a good report and in a bad report respectively where $\Delta M = \Phi - \varphi$ is the difference between firms' possible expected values.

Definition 1 *The ratio of the difference between firms' possible values and the liability is called fee-liability ratio,* $\frac{\Delta M}{L} = \frac{\Phi - \varphi}{L}$.

Managers' payoffs are defined by firms' expected value less any expected liability by releasing of bad reports. Managers choose what report to give according to which expected payoffs they face when making the decision. Manager chooses the effort that will maximize payoff function, given which report were released and her type. If impairment losses reversals are allowed, manager faces two payoffs matrix. The first is at the point to decide whether to impair the asset or not. The second is whether to reverse impairment loss or not. She can observe that and solve using backward induction to her first decision point.

$$\text{Manager payoff } \{\sum_{i=1}^{3} \Pr(State)\, E(payoff_i | State, type\}$$

Following Lu and Sapra (2009), we assume that the real condition of the asset is not perfectly identified by the market. Thus, to create their beliefs about assets financial condition, investors infer Bayesian probabilities of good condition given available information. We will denote this probability by p, i.e., $p = Pr(G|Z)$. Investors choose to maximize their expected return, $p2\mu\sqrt[2]{k} - k$, and is easy to see that,

$$k^* = p^2\mu^2 \tag{1}$$

Moreover, let's suppose that the state of nature is fully informed. Thus, the manager will always make the right choice about impairment and the investor, being fully informed, makes his first-best choice of investment. We can find from equation 1 that the optimal investment would be $k_G^{FI} = \mu^2$ and $k_B^{FI} = 0$.

Definition 2 *We call investment inefficiency whenever investors overinvest or under-invest given information asymmetry around asset financial condition.*

Furthermore, we look how investors price firms. We assume that capital markets are competitive, thus it is going to price the firm as the expected return on the investment plus the penalty for damage caused by managers' wrong choices.

1.4 NON-REVERSAL ACCOUNTING

Under this accounting standard manager only are allowed to reevaluate asset downward. Manager decides which report to release according to her evidence about nature state and her type (Figure 3).

Figure 3: Report disclose conditions
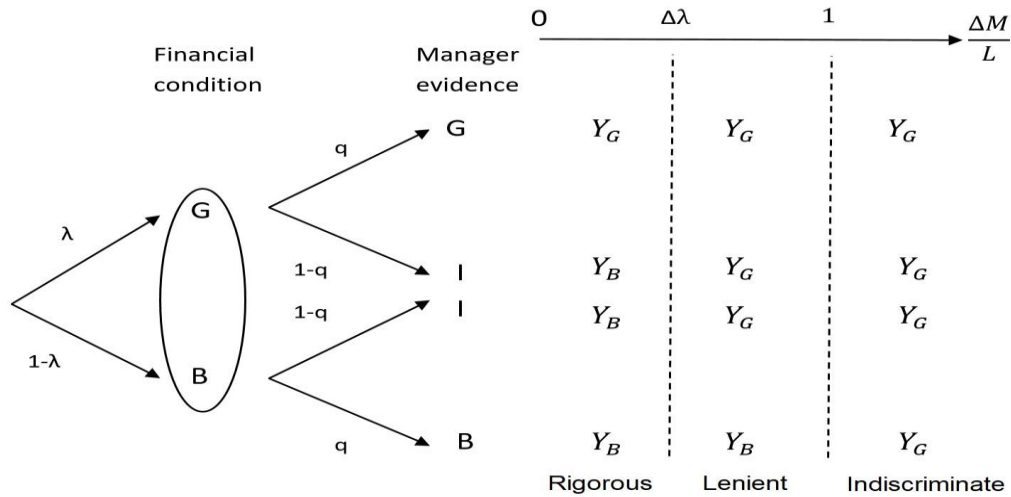
Table 1 presents the payoffs. We can see the expected payoff crossing evidence with each report that can be given. Last column presents the condition when manager decides to give a good report and not impair the asset. Rationally, she would prefer not to

make an impairment if and only if value of the asset less any expected liability is greater than value of impaired asset less any expected onus.

Table 1: Payoffs

Evidence	Y_G	Y_B	Y_G If and only if
G	Φ	$\varphi - L$	$\frac{\Delta M}{L} \geq 0$
I	$\Phi - (1 - \lambda)L$	$\varphi - \lambda L$	$\frac{\Delta M}{L} \geq \Delta \lambda$
B	$\Phi - L$	φ	$\frac{\Delta M}{L} \geq 1$

It is easy to see that managers' choice of report will depend directly on her expectation of payoff. Her choice will always take into consideration how much more her firm will be priced after a good report other than a bad report considering how much liability she might take by given a wrong report (Figure 3).

Claim 1 *i) When $\frac{\Delta M}{L} < \Delta \lambda$ manager will always impair the asset, unless the evidence is G in which case she won't.*

ii) When $\frac{\Delta M}{L} \epsilon [\Delta \lambda, 1]$ manager will never impair the asset, unless the evidence is B in which case she will.

iii) When $\frac{\Delta M}{L} \geq 1$ manager will never impair the asset

Choice of impairment effort

Manager decides what effort to do to identify impairment necessity focusing on maximizing her utility. From figure 3 and table 1 we can see her payoffs according to her type and which reports are release.

- Manager rigorousness ($\frac{\Delta M}{L} < \Delta \lambda$)

Manager always impair the asset except when she observes evidence G, in which case firm value would be Φ. Manager expected payoff is as follows:

$$\lambda \Phi q + (1 - q)(\varphi - \lambda L) + (1 - \lambda) q\varphi - c(q) \qquad (2)$$

- Manager leniency ($\frac{\Delta M}{L} \in [\Delta \lambda, 1]$)

A Lenient manager, $\frac{\Delta M}{L} \in [\Delta \lambda, 1]$, never impair the asset, unless the evidence is B. Thus, if the evidence is G, she collects the fee Φ; if her evidence is I she will receive Φ − (1 − λ)L with probability λ. Therefore,

$$\lambda \Phi q + (1 - q)(\Phi - (1 - \lambda) L) + (1 - \lambda) q\varphi - c(q) \qquad (3)$$

- Indiscriminate report ($\frac{\Delta M}{L} \geq 1$)

We can see from figure 1 that when $\Delta M > L$ the manager will never impair the asset. Thus, she always receives Φ and have a liability risk of (1 − λ).

$$\Phi - (1 - \lambda) L - c(q) \qquad (4)$$

Therefore, we can take the derivative of each utility function above to find first order conditions, indicating managers' optimum choice of effort.

Claim 2 *The manager supply of impairment quality, q, is characterized as follows:*

i) For Rigorous manager

$$c'(q) = \lambda M + \lambda L \tag{5}$$

ii) For Lenient manager

$$c'(q) = (1 - \lambda)(L - \Delta M) \tag{6}$$

iii) For Indiscriminate manager

$$c'(q) = 0 \tag{7}$$

Manager chooses effort to maximize payoff given her type, although it could mean to choose to make an effort lower than expected by investors. to find the optimum effort choice, we just need to invert the cost of effort function and isolate q^*. Thus, we can conjecture from claims 2 that:

Lemma 1 *Not allowing impairment losses reversals enhances the following effort to identify impairment necessity:*

i) Rigorous manager

$$q^* = c'^{-1}(\lambda (M + L))$$

ii) Lenient manager

$$q^* = c'^{-1}((1 - \lambda)(L - \Delta M))$$

iii) For Indiscriminate manager

$$q^* = c^{'-1}(0)$$

1.4.2 Price and investment

Now, we turn to see how the market prices the firm. Investors observe managers' types based on previous actions and create beliefs about asset financial condition, accordingly with managers' types, actions and accounting standard. Using these beliefs, investors identify optimum investment and prices firms.

From figure 3, we can see how managers constructs their Bayesian probabilities based on the relation between firm value and liability. Plugging each Bayesian probability into equation 1, we can find the investors' choice of investment, given their beliefs of asset financial condition.

Claim 3 *For a given impairment quality q, we have the following optimal investment from equation 1:*

$$k(y_G, R, q^*) = \mu^2$$

$$k(y_B, R, q^*) = [\frac{\lambda(1 - q^*)}{1 - \lambda q^*}]^2 \mu^2$$

$$k(y_G, Le, q^*) = [\frac{\lambda}{1 - (1 - \lambda)q^*}]^2 \mu^2$$

$$k(y_B, Le, q^*) = 0$$

Remark 1 *Investors under-invest when Lenient managers impair the asset and when Rigorous managers choose not to.*

We see that whenever uncertainty exists, investors are more cautious and choose to withhold investment. Hence, this behavior leads to underinvestment and creates economic inefficiency. Furthermore. we compute firms' value M. Investors price firms as investment expected return plus liabilities from bad managers decisions.

Claim 4 *When managers are not fully informed by asset financial condition, market prices the firm as follows,*

$$\varphi_{NR,G,R} = E[M(y_G, R, q^*)] = \mu^2$$

$$\varphi_{NR,B,R} = E[M(y_B, R, q^*)] = \left[\frac{\lambda(1-q^*)}{1-\lambda q^*}\right]^2 \mu^2 + \frac{\lambda(1-q^*)}{1-\lambda q^*} L$$

$$\Phi_{NR,G,Le} = E[M(y_G, Le, q^*)] = \left[\frac{\lambda}{1-(1-\lambda)q^*}\right]^2 \mu^2 + \frac{(1-\lambda)(1-q^*)}{1-(1-\lambda)q^*} L$$

$$\Phi_{NR,B,Le} = E[M(y_B, Le, q^*)] = 0$$

1.5 REVERSAL ACCOUNTING

Under Reversal Accounting, managers decide to report whether to impair assets but can reverse impairments on the future. Managers are less committed with their report since they might revise and amend.

Allowing for impairment reversals will affect managers' payoffs, as described in Table 02. Manager will reverse impairment in two situations: one, if and only if there is evidence that the assets are indeed good enough to keep the project and generate positive future cash flows; two, if the reversal is greater than any liability. This is common

knowledge. Furthermore, at first manager uses this information to make her first decision on which report to give in the first place.

Figure 4: Report conditions
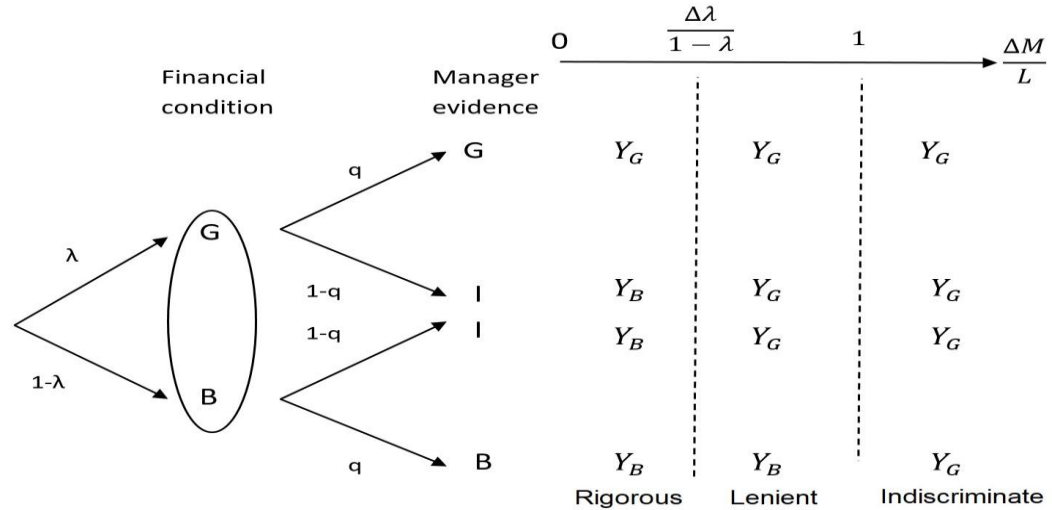
Table 2 shows managers' criteria to decide whether to ratify her previous report and reverse impairment losses. She reverses impairment if the firm value gained by a good report would exceed the liability she might take.

Table 2: Payoffs

Evidence	Re	NRe	Re if and only if
G	$\Phi - L$	$\varphi - L$	$\frac{\Delta}{L}\frac{M}{} \geq 0$
B	$\Phi - L$	φ	$\frac{\Delta}{L}\frac{M}{} \geq 1$

We can see from payoffs on table 2 that facing good evidence and knowing that she made a bad impairment, she is better off reversing impairment losses. On the other

hand, if the manager is sure that the impairment, she made was correct (she gets evidence B), she will only reverse losses if the gain on firm value exceeds her liability.

Claim 5 *i) Manager will always reverse impairment losses after an* undue impairment.

ii) Manager would make a wrong impairment loss reversal if and only if $\frac{\Delta M}{L} \geq 1$.

Table 3 shows the payoffs at the point where manager decides to impair the asset or not, solving for backward induction her future decision on whether to reverse impairment losses or not.[1]

Table 3: Payoffs

Evidence	Y_G	Y_B	$Y_B Re$	Y_G If and only if
G	Φ	$\varphi - L$	$\Phi - L$	$\Phi \geq 0$
I	$\Phi - (1 - \lambda)L$	φ	$(1 - \lambda)\varphi + \lambda(\Phi - L)$	$\frac{\Delta M}{L} \geq \frac{\Delta \lambda}{1 - \lambda}$
B	$\Phi - L$	φ	$\Phi - L$	$\frac{\Delta M}{L} \geq 1$

Interestingly, from Tables 1 and 3, we can see that managers' impairment criteria shifted. We can see that the space of rigorousness increases when we consider impairment reversal option (Figure 4). Manager is more predisposed to make impairments when has inconclusive evidence [2]. There is an increase of rigorousness and a decrease of leniency as a result of giving more discretionary power to managers.

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[1] We can see on Table 3 the payoffs manager would face by solving for backward induction. For the sake of simplicity, we consider liabilities as the same.

[2] We can see it from the firm-difference-liability ratio on Figures 3 and 4.

Proposition 1 *Allowing impairment losses reversals increases managers' rigorousness and reduces managers' leniency.*

An interesting consequence of allowing impairment reversals is that more assets with good financial condition are impaired but less over valued assets are found in the balance sheet (Figure 4).

Corollary 3 *Allowing impairment loss reversals reduces the likelihood of overvalued balance assets on balance sheets.*

1.5.1 Choice of impairment effort

When managers are allowed to reverse impairment losses, they keep choosing effort to maximize expect firm value according to her type. From table 3 and figure 4 we can identify expected firm value function according to managers' type.

- Manager Rigorousness ($\frac{\Delta M}{L} < \Delta\lambda$)

Again, manager always impair the asset unless she finds evidence G. However, because of reversals firms' expected value when she has evidence I and reports Y_B changes. The new expected payoff is

$$\lambda q\Phi + (1 - q) \{(1 - \lambda)\, \varphi + \lambda\, (\Phi - L)\} + (1 - \lambda)\, q\varphi - c(q) \qquad (8)$$

- Manager Leniency ($\frac{\Delta M}{L} \in [\Delta\lambda, 1]$)

A Lenient manager, when $\frac{\Delta M}{L} \in [\Delta\lambda, 1]$, never impair the asset, unless the evidence is B. Thus, if the evidence is G, she collects the fee Φ; if her evidence is I she will receive $\Phi - (1 - \lambda)L$ with probability λ. Therefore,

$$\lambda\Phi q + (1 - q)(\Phi - (1 - \lambda)L) + (1 - \lambda)q\varphi - c(q) \qquad (9)$$

- Indiscriminate report ($\frac{\Delta M}{L} \geq 1$)

We can see from figure 1 that when $\Delta M > L$ the manager will never impair the asset. Thus, she always receives Φ and have a liability risk of $(1 - \lambda)$.

$$\Phi - (1 - \lambda)L - c(q) \qquad (10)$$

Claim 6 *The manager supply of impairment quality, q, is characterized as follows:*

i) For Rigorous manager

$$c'(q) = \lambda L \qquad (11)$$

ii) For Lenient manager

$$c'(q) = (1 - \lambda)(L - \Delta M) \qquad (12)$$

iii) For Indiscriminate manager

$$c'(q) = 0 \qquad (13)$$

One more time we can identify managers' optimum effort. We can see from claim 7 that:

Lemma 2 *Managers maximize payoff choosing effort such as:*

i) Rigorous manager

$$q* = c'^{-1}(\lambda L)$$

ii) Lenient manager

$$q^* = c^{'-1}((1 - \lambda)(L - \Delta M))$$

iii) Indiscriminate manager

$$q_* = c^{'-1}(0)$$

We can easily find by comparing lemmas 1 and 2 a relation between the possibility of reverse losses and the effort choice to identify asset financial condition. Once a Rigorous manager is allowed to reverse losses, she chooses to make less effort.

Proposition 2 *If impairment loss reversals are allowed, Rigorous managers make less effort to identify if they should impair long-lived assets*

1.5.2 Price and Investment

We first see optimum investment and firm value after impairment decision takes place and second, we do the same after the reversal option are considered. Investors price firms using the available information according to their beliefs about firm financial condition. The mechanism is the same independently of which accounting standard the economy is under. What happens is an impact of how the flow of information is set and how this might change manager behavior (type space).

From Figure 4 we can identify each Bayesian probabilities and we can see optimum investment plugging these Bayesian probabilities in equation 1.

Claim 7 *For a given impairment quality q, we have the following optimal investment from equation 1:*

$$k(y_G, R, q^*) = \mu^2$$

$$k(y_B, R, q^*) = [\frac{(1 - q^*)}{1 - \lambda q^*}]^2 \mu^2$$

$$k(y_G, Le, q^*) = [\frac{\lambda}{1 - (1 - \lambda)q^*}]^2 \mu^2$$

$$k(y_B, Le, q^*) = 0$$

Comparing claim 7 with first-best investment presented on equation (1), we can identify economic inefficiency from lack of investment given uncertainty.

Remark 2 *Investors under-invest when Rigorous managers impair the asset and when Lenient managers choose not to.*

Comparing claims 3 and 7 we can see that there is a direct relation between allowing managers to reverse impairment losses and the information given to the market. This relation affects investors' investment decisions and its efficiency. Specifically: investors' choice of investment and the inefficiency resulted from it.

Lemma 3 *When a Rigorous manager impair the asset, inefficiency is greater if impairment loss reversals are not allowed*

Investors are aware that if a Rigorous manager are more likely to make a wrong impairment. Thus, if she is not allowed to reverse impairment losses, making a wrong impairment means to deal with irreparable losses. Hence, investors hold back more

investments for Rigorous managers if they are not allowed to reverse losses than if they
have the option to restate asset value.

Claim 8 *Before any chance of impairment losses reversal market prices the firm as
follows,*

$$\varphi_{R,G,R} = E[M(y_G, R, q^*)] = \mu^2$$

$$\varphi_{R,B,R} = E[M(y_B, R, q^*)] = \left[\frac{(1-q^*)}{1-\lambda q^*}\right]^2 \mu^2 + \frac{\lambda(1-q^*)}{1-\lambda q^*} L$$

$$\Phi_{R,G,Le} = E[M(y_G, Le, q^*)] = \left[\frac{\lambda}{1-(1-\lambda)q^*}\right]^2 \mu^2 + \frac{(1-\lambda)(1-q^*)}{1-(1-\lambda)q^*} L$$

$$\Phi_{R,B,Le} = E[M(y_B, Le, q^*)] = 0$$

From Claim 8 we can see the following: when the market knows that although the
manager impaired the asset, if she made a bad choice, she is allowed to take it back and
restate the asset full value. This option represents the opportunity that a given asset may
be reported with true value. From claim 5 we can see that market prices impairment
reversal options.

Lemma 4 *Market prices differently firms depending on the accounting standards*

Proposition 3 *Allowing impairment loss reversal has a positive impact on short-
term firm value, considering an impairment made by a Rigorous manager*

1.6 CONCLUSION

We saw in this paper a model that highlights consequences of allowing impairment
losses reversals. We looked to a simple model that points out pros and cons on given

such discretion to managers. We found that allowing reversals of impairment losses induces managers to make less effort to identify impairment necessity and increases the number of bad impairments. We saw that market prices firms differently depending on the accounting standard.

Allowing reversals reduces leniency, produces less inefficiency and firms' prices are higher with manager rigorousness. Nevertheless, managers can benefit from it on short-term. This paper can contribute to real effects literature. More information ex-post tends to change the type of information produced and investment allocation decision.

Accounting regulators can also benefit from the insights we found in the way to enhance the discussion and refine accounting standards. Thus, how does this theory apply outside of the highly disciplined conditions of a purely academic environment? Well, we have today a movement from the GAPPs standard to IFRS. What we discuss in this paper is a matter that can be seen as one of the differences between the two standards and may be used for regulators to evaluate matters of efficiency on the standard. It also may give some insights about firm disclosures behaves to regulators and policy makers.

Leaving aside the particularities of performing the impairment test, the IFRS gives the manager the possibility of reversing losses when a better scenario arises. The US-GAPP is more rigid and once the loss is recognized, the manager cannot go back, so it is best advised to only make an impairment when certain about it. As this is a discretionary decision, the external agent may be suspicious about the reported value and a scenario of distrust could be created, which can result in adverse selection in the debt market.

Chapter 2

2 Do financial crises drive firms toward trade credit?

Abstract

We examine how financial crisis influence firms financing decision. Financial crisis increases economic uncertainty and induces financial institutions to be more careful when providing credit to firms finance short-term operations. Hence, firms are led to use more trade credit and avoid credit constraints harms. We use a sample of firm's quarterly data from 2002 to 2017, which gives us three periods of financial crisis. Literature presents controversial evidence whether firms demand/supply more commercial credit when banking credit is cut back. We first look for the aggregate effect on our sample and find that trade credit use increases during and after financial crisis. Thus, we separate the sample on whether firms use a credit line from Brazilian national development bank (BNDES) or not and perform a propensity score match difference-in-difference. According to the literature, firms that use BNDES credit line are less expose to financial constraints and can be a valorous control group to understand the dynamics of trade credit during economic crises. We find that firms not using government money increases their demand/supply of trade credit comparing to firms entitle to credit lines provided by Brazilian Economic Development Bank. We look into crisis individually and found consistent results, although weaker when comparing to the main results.

Key-words: Trade credit; Financial crises; Short-term funding; Trade-off; Banking credit

2.1 INTRODUCTION

We investigate firm's behavior on funding short-term operations during financial crisis. It is well known that monetary policies affect real economic activity by increasing the cost of financial resources available to firms. In particular, during economic crises,

financial institutions act by restricting the banking credit supply, which drives firms to shift to trade credit focusing on financing short-term operations. Nevertheless, firms that have no banking credit constraints are less exposed and will use less trade credit than other firms, achieving comparative advantages on the account of cheaper credit.

Beck et al (2004) shows that on a highly concentrated banking market, such as Brazil, that is an increase in the obstacles to obtain bank credit and the impact of this monetary restriction can be softened by trade credit availability. Prior findings indicate that trade credit can play a major part serving as banking credit alternative, as first pointed out by Meltzer (1960). In turn, Nilsen (2002) presented evidence about increase dependence on trade credit for firms without bond ratings during financial shrinkage. Fisman and Love (2003) examine countries with undeveloped financial intermediaries and found that trade credit is a reliable back-up source of financial funds.

Trade credit comes directly from the long-term relationship between clients and suppliers, as a natural consequence of commercial interconnection of counterparts. Besides, suppliers have an instinctive interest on the good financial health of their costumers (Cunat, 2007). Moreover, an analysis about 1994 Mexican devaluation crisis and 1997 Asian crisis found an increase on credit provided and received after the event, but that was a collapse of credit provided in the following years (Love et al, 2005)

However, the literature also provides diffuse evidence. There are documentation that small and medium enterprises from East Asia constrained in bank credit after 1998 financial crisis also were less able to use trade credit, indicating a liquidity shock disseminated over the supply chain (Love and Zaidi, 2010). Moreover, an

investigationabout the shocks on credit supply of private UK firms during 2008-2009 financial crisis found that firms dealt with credit contraction holding cash and issuing equity. There was no evidence of shifting from bank loans to trade credit (Akbar et al, 2013).

Furthermore, Meriläinen (2016) shows that bank ownership type can influence how much credit is provided and that during 2008-2009 financial crisis the shock was weakened if credit did not reduce during the crisis. Besides, that is evidence that state-owned banks charge lower rates to loans (Gulde and Wolf, 2005), indicating that firms with access to such line credits might have a privileged position comparing to competitors, although they can have an important role providing financial instability (Andrianova, 2012). These results indicate that firms with access to government provided money might be in a privileged position during financial crisis.

Moreover, firms entitle to a continue line of credit that do not shrinks during economic crisis might be less exposed to banking credit constraints and do not have to turn to a more expensive financial strategy such trade credit. Brazilian National Economic and Social Development Bank (BNDES in Portuguese) is a major actor in Brazilian credit market, used by Brazilian government to perform countercyclical politics, not reducing or even increasing credit during economic distress periods (Torres and Zeidan, 2016; Ferraz et al, 2013).

Trade credit theory predicts that small firms with limited capability to access capital markets use more trade credit when financial institutions are inaccessible (Petersen and Rajan, 1997). Burkhart and Ellingsen (2004) model show that trade credit and bank credit

might be either complement or substitute. Brandt and Li (2003) present theoretical evidence that banks discriminate firms for non-profit reasons. Therefore, we can expect to see firms shifting from banking credit to trade credit during economic crisis. We also expect to find that firms entitle to receive credit from BNDES have lower financial risk exposure. Development banks normally are focused on countercyclical policies and do not restrict credit on economic crisis periods (Torres and Zeidan, 2016). Hence, theoretical results point that government-owned banks provide more credit than private banks during financial crisis, focusing on counter-cyclical policies (Brei and Schclarek, 2015).

Brazil presents an interesting context because the appealing particularities that can be found. First, we have high bank concentration. This characteristic indicates that firms might have difficulties when demanding banking credit to fund short-term operation. Ceterelli and Strahan (2006) found evidence that potential entrants have greater adversities demanding credit in markets with higher banking concentration. Zambaldi et al (2011) found evidence that Brazilian small and medium-sized firms face credit constraints and credit rationing. Second, Brazil presents a greater list of economic crises in the last 20 years. Such unstable environment presents a big informational background about how firms deal with financial crisis and banking credit shrinkage. Third, Brazil has a major development bank financing only part of the firms. The circumstances create conditions to compare the effect of Development Bank participation on a low-competitive market favoring a group of firms over the rest of the market.

In this paper we use quarterly balance sheet data of 252 publicly traded firms from 1995 to 2017 and analyze their trade credit behavior before, during and after crises. The

intuition for these is that in crisis periods, firms are more vulnerable financially, making it

harder and more expensive for them to obtain bank loans. We see post-crisis periods, as

a transitional stage and trade credit either could return to prior crisis levels or could keep on higher levels. Our main variables of interest are accounts payable (scaled by cost of goods sold) and receivable (scaled by net operating revenue), as a proxy of the amount of trade credit that firms obtain from suppliers and provide to costumers. According to Yang (2011), these ratios capture the importance of trade credit in the financing of economic activity. We also are interested on Net Receivables (Accounts receivable minus payable scaled by net operating revenue) to measure whether trade credit flows over firms.

To conduct the investigation, we perform Difference-in-Difference (Diff-in-Diff) tests on a propensity score matched sample, comparing firms that use BNDES credit with firms that do not. It has been documented on the literature that Brazilian government has adopt an aggressive anti-cyclical fiscal policy and BNDES credit lines did not shrink during financial crisis. Results indicates that firms not entitle with BNDES credit increase how much trade credit they use if banking credit is constrained. More specifically, we see an increase of credit provided and demanded, indicating the importance of this credit line to finance operation when bank credit is constraint. Moreover, we find that net trade credit is augmented during and after financial crisis, suggesting that firms are transferring the credit received to their costumers creating a better environment to face periods of financial turbulence.

The paper continue as follows: Section 2 presents a literature review and presents our testing hypothesis; Section 3 presents data used and how variables were created. Sections 4 discuss the empirical strategy; sections 5 and 6 brings the results and conclusion, respectively.

2.2 LITERATURE REVIEW

We are focused on testing if firms shift their funding source during crises periods from banking credit to trade credit. Financial development is an important issue when thinking about economic growth (Greenwood and Jovanovic, 1990; Levine, 2005; Laeven et al, 2015). and during economic uncertainty periods, most credit sources tend to dry out, waiting for high volatility to past and risk to diminish (Popov and Udell, 2012). This issue is very important given how credit disruption can aggravate economic crisis or induce crisis that affect real activities (Gertler and Kiyotari, 2010).

It is expected to see an intimate relationship between financial crisis and firms' funding capability. Whenever an economy turns downward, uncertainty becomes progressively a concern for firms, banks and investors. A financial crisis is characterized specially by enlargement of adverse selection and moral hazard issues. Financial markets become unable to efficiently provide funds to those firms with better financial health or best investment opportunities (Mishkin, 1992). Bank financial health and real economic activity are deeply connected and setbacks on banking course of business can spillover to firms harming investments and operations (Rosengren, 2000; Campello et al, 2010; Aghion et al, 2001).

The 2008-2009 financial crisis is the earliest example of these spillover effects in the world. We saw a great decrease of new loans, in lending for real investment and lending for restructuring, especially for banks with worse access to deposit financing and those more vulnerable to credit-line drawdowns (Ivashina and Scharfstein, 2010). During this crisis, it was also seen a collapse on international trade flows, exemplifying the

connection between banks and firm's financial health. Countries with higher interbank rates (Such Brazil) were more affect by the downturn of trade with U.S. because the tighter credit market. Such effect was more pronounced in cases of lower trade credit access (Chor and Manova, 2012).

Therefore, trade credit comes as an important safety net to firms in times of inflated instability caused by uncertainty from low economic activity. Bank lending channel theory have an important discussion about how during monetary contractions banks change their loans, restricting credit to finance firms' operations and investments. To bear the cut back on banking credit, firms tend to shift their funding to trade credit as a substitute credit (Nilsen, 2002; Mateut et al, 2006). Small- and medium-sized enterprises (SMEs) from Europe resort to alternative lending strategies to deal with lending constraint due 2008-2009 financial crisis. There is evidence that firm denied of working capital turn to trade credit as alternative for bank loans (Casey and O'Toole, 2014)

Previous investigations show that there is evidence of how high credit spreads becomes prohibitive to some borrowers (Brock and Suarez, 2000). Borrowers with weak relationships with lenders or related with less healthy lenders are more susceptible to financial crisis and pay higher interest rates if they are able to have access to banking credit after Lehman bankruptcy (Chodorow-Reich, 2013). Moreover, trade credit has a more flexible profile and is more prevalent in less developed credit markets (Burkart and Ellingsen, 2004). Countries with not well-developed financial institutions have a growth bottleneck and trade credit might become an alternative solution that gives some breathing space to firms having difficult to access banking credit (Fisman and Love, 2003).

Developing countries with their not well-developed credit markets are more sensitive to credit constraints due financial crisis (Mishkin, 1996) and previous research shows that credit quality has a procyclical behavior in Brazil and that this behavior varies across credit types (Vazquez et al, 2012). The bankruptcy law approved in 2005 improved the efficiency of Brazilian credit market and as a consequence decrease the necessity of trade credit, indicating its countercyclical profile (Araujo et al, 2012). These evidence are consistent with our hypothesis that Brazilian firms change their credit portfolio during economic crisis, probably because lack of banking credit.

Empirical evidence show that non-state-owned firms from China used trade credit as growth opportunities when financial support from banks are limited (Ge and Qiu, 2007). Contrarily, previous research investigating 2008-2009 financial crisis and the following sovereign debt crisis in western Europe found that crisis effect was substantially weakened when stakeholder bank had no decrease on lending growth or at least decreased much less than commercial banks, indicating the importance of credit availability to mitigate economic crisis financial issues (Meriläinen, 2016).

Hence, we believe that during financial crisis and banking credit constraints firms must shift their source of credit to finance their short-term operations, increasing trade credit usage. However, the existence of a large financial institution providing credit even during economic distress periods might affect firms' decisions about funding short-term operations. To avoid decrease of GDP growth rate resulting from economic crisis, governments might perform countercyclical policies increasing earmarked credit which might unbalance credit market (Arora, 2017; Bonomo et al, 2015) and influence how firms respond to economic crisis. Government act on credit market through their own banks

during financial crisis (Ogura, 2018; Lin et al, 2017). Government preferences might generate credit misallocation (Xu et al, 2016) which might lead to inefficiency.

Thus, we investigate if the intimate relationship between government credit and private companies creates an unbalanced environment. We believe that firms entitle with government credit are less exposed to credit contraction. Previous research in Brazil found that, after 2008-2009 financial crisis, more loans were received in areas with higher government banks operations, which resulted on lower unemployment rates. Such police resulted on inefficient outcomes and reduced productivity growth in Brazilian regions with high share of government banks (Coleman and Feler, 2015).

Moreover, firms more benefited with earmarked credit in the period from 2004 to 2015 were larger, older and less risky firms. These are the firms that would have more access to private credit market, which indicates distorted is the credit market in Brazil (Pazarbasioglu-Dutz et al, 2017). Ru (2017) found a value decrease firms in the same industry of those that were benefited from China Development Bank. It is also found a spillover effect on private firms of downstream industries unbalancing the competition.

Thus, we use firms with access to BNDES credit lines as a control group and expect to find that firms with access to government money have lower exposition to financial constraints during financial crisis. This strategy allows us to verify whether firms that are truly exposed to financial distress periods and face banking credit constraints are indeed using more trade credit to finance short-term operations.

2.3 DATA DESCRIPTION AND VARIABLES

To create the database, we consider 252 non-financial firms available on Economatica database from 1995 to 2017, which gives us 25,575 firm-quarters observations. We disregard quarters with any indication of miss reporting and firms with less than five years information. Table 1 indicates the sample selection process for each dependent variable. To control for firms, access to BNDES credit lines, we restrict our sample from 2002 to 2017 given information availability.

TABLE 1

Sample description

Restrictions	Receivables	Payables	Net Receivables
All consolidate firm-quarters available on Economatica database	25,300	25,300	25,300
less prior years with missing total assets	7,660	7,660	7,660
less firms without at least 5 years observations	157	157	157
less firms missing cash flows	115	115	115
less firms missing sales growth	1,878	1,878	1,878
less firms missing cash balances	7	7	7
less years before BNDES sample	3,064	3,064	3,064
Sub-total sample	12,419	12,419	12,419
less missing dependent variables	336	688	426
Total sample	12,083	11,731	11,993

We are interested on investigate the behavior of trade credit used by firms during crisis periods. As characteristic, trade credit has short maturity (Burkart and Ellingsen, 2004). Thus, to measure how much credit firms offer to their costumers (Receivables), we

use short-term client's debt scaled by net revenue (as a proxy for sales). To measure credit from suppliers used by firms (Payables), we use short-term supplier's debt scaled by cost of goods sold.

Receivables captures how much of firms give as credit when selling their goods and Payables shows which part of firm's purchases was bought on trade credit. We expect with these ratios to measure the amount of trade credit used on day-to-day firm operations and its importance as informal credit lines during financial hazard periods. There is an alternative interpretation for these ratios. Normally trade credit has a short-term maturity (Burkart and Ellingsen, 2004), the results can be interpreted as how many days firms take to repay their creditors.

Moreover, we investigate whether firms sustain the same profile of trade credit or give more (less) credit during financial crisis periods. Thus, we consider a net receivable variable as the difference between Receivables and Payables scaled by total assets (NTCS). These ratios can be interpreted as the proportion of production/sales on credit, or since the trade credit usually has much shorter maturity than bank loans or bond issues, the alternative interpretation is the number of days costumers take to repay the credit (for quarterly data we multiply the ratio by 90) (Love et al, 2007).

We use the control variables indicated by trade credit literature (Petersen and Rajan, 1997; Colomiris, Himmelberg et al, 1995; Love et al, 2007). More specifically, we use ratio of operational cash flows to total asset (CFTA), cash balances to total assets (CBTA), growth of sales (Salesgr) and depreciation of currency exchange rate (ExcRateVar). CFTA and CBTA are both measured on beginning of the period indicating

firm's capability to face any financial constraint that might occur during a financial crisis.

Table 2 presents variables descriptions.

TABLE 2: VARIABLES DESCRIPTION

Names	Description
Crisis	Dummy variable equals one if quarter within crisis period and zero otherwise.
Post Crisis	Dummy variable equals one for the first year after a crisis period and zero otherwise.
BNDES	Dummy variable equals one if a firm used any BNDES credit line for a given year and zero otherwise.
CFTA	Ratio of cash flow from operations to total assets. Measured at the beginning of the period.
CBTA	Ratio of cash balances to total assets. Measured at the beginning of the period.
Salesgr	Growth rate of sales. Measured at the current period.
ExcRateVar	Depreciation of currency exchange rate. Measured at the current period.

Table 3 presents descriptive statistics. We can see that CFTA presents a wide distribution, although the standard deviation is quite small. Salesgr has an extremely high maximum value, in comparison to its mean and standard deviation. Both distributions indicate possible presence of outliers on our sample. Moreover, the distribution of the independent variables calls for more attention. They all are widely distributed over the sample and have extremes minimum or maximum values, which generates a very high standard deviation. All these together indicates the necessity of dealing with outliers. We winsorized all non-categorical variables at 1%.

TABLE 3: DESCRIPTIVE STATISTICS

VARIABLES	N	mean	sd	min	max
BNDES	12,424	0.292	0.455	0	1
Crisis	12,424	0.451	0.498	0	1
Post Crisis	12,424	0.152	0.359	0	1
CFTA	12,424	0.002	0.234	-5.628	12.127
CBTA	12,424	0.090	0.108	-0.018	0.969
Salesgr	12,424	0.434	5.516	-0.997	591.0
ExcRateVar	12,424	0.008	0.083	-0.145	0.366
Receivables	12,083	0.974	7.418	8.6E-06	322.0
Payables	11,731	1.123	30.811	-1.324	2015.7
Net Receivables	11,998	-0.077	55.457	-6042.0	268.4
Number of id	252	252	252	252	252

2.4 EMPIRICAL STRATEGY

We focused on testing whether firms use more trade credit during financial crisis periods. However, that is a group of firms that are not exposed to credit constraints given their access to BNDES credit lines. Thus, we use such firms as a control group as a comparison over economic crisis events. We expect that firms exposed to credit constraints are compelling to increase trade credit usage to finance short-term operations given banking credit constraints.To perform this investigation, we use a quarterly data from January of 2002 until December 2017 of non-financial public Brazilian firms. More specifically, we investigate if that is an increase of trade credit demand and supply during

or after an economic crisis, in comparison to the period before crisis starts and baking credit shrinks.

To identify crisis periods, we first identify possible dates candidates the time series of Interbank Deposit Rate[1] (hereafter CDI) as a proxy of market response to financial instability. Then, we perform structural break tests on possible dates of beginning and ending of financial crisis. We find three crisis periods: The first election won by the labor party, a political scandal of congressman being bribed to vote according to the president willingness and Dilma's credibility and governability crisis. We also define as post-crisis periods the four following quarters after crisis ending date and as pre-crisis periods every quarter that is not define as a crisis or post crisis cycle[2].

Thus, to conduct our analysis, we first create a sub-sample to each trade credit variable. We adopt this strategy to confirm that each sub-sample has no missing independent variable and to make sure that all variables are winsorized when data is ready to be tested. Having the date being well defined, we first perform a panel analysis to check the overall effect of credit constraints due economic crisis over trade credit market. We hope to find an increase on trade credit usage during distress periods. These results indicates that firms are indeed shifting their short-term operation funding from banking credit to trade credit.

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[1] available on brazilian Institute of Applied Economy (IPEA)

[2] The period between the end of the first financial crisis and beginning of the second comprises a three quarters period. Having two financial crisis so close to each other, results that we have only three quarters as first post-crisis period and no pre-crisis period before the second financial crisis.

Having the increase of trade credit on crisis (post-crisis) periods being established, we turn to investigate whether firms that have no access to BNDES credit lines are more exposed to banking credit constraints during financial crisis. Hence, we perform difference-in-difference analysis on a propensity scored matched sample. This strategy allows to compare firms that are similar on pre-crisis periods and would have the same necessity of trade credit, if neither firm were entitle to BNDES credit. Next, we disaggregate our sample to conduct our analysis on each crisis individually [1]. This procedure allows us to control for the heterogeneity of the market given the maturity discrepancy of a decade and a half of difference.

We start our analysis by determining crisis periods. We consider a potential crisis period if CDI have a strong growth sustained by at least 4 quarters. Therefore, we conduct Chows' tests for structural breaks on the suggested dates to verify which quarters we define as begin and end of crises periods. We tested three possible crisis periods: 2002-2003 presidential election, 2005 Mensalão scandal and 2013-2016 confidence crisis. We use CDI tendency changes to test for ending of crisis date. Figure 1 illustrates the possible dates.

Table 4 presents the results. We can see statistical significance for each one, indicating when crisis started and ended. To identify post-crisis periods, we impose two restrictions. First, post-crisis periods cannot be over one year after a crisis. We impose this restriction to avoid capture regular economic growth periods as crisis ending period.

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[1] Because lack of pre-crisis period associated with the second financial crisis, we conduct these tests only on first and third economic crisis.

Second, it cannot coincide with another crisis period, to mitigate the risk of bias by double effect.

Thereby, having the structural breaks being identified, we define dummies variables for crisis (CRISIS) equals 1 for quarters between beginning and ending crisis dates identified on Table 4. We call post-crisis period variable (POST) the four quarters after a crisis period.
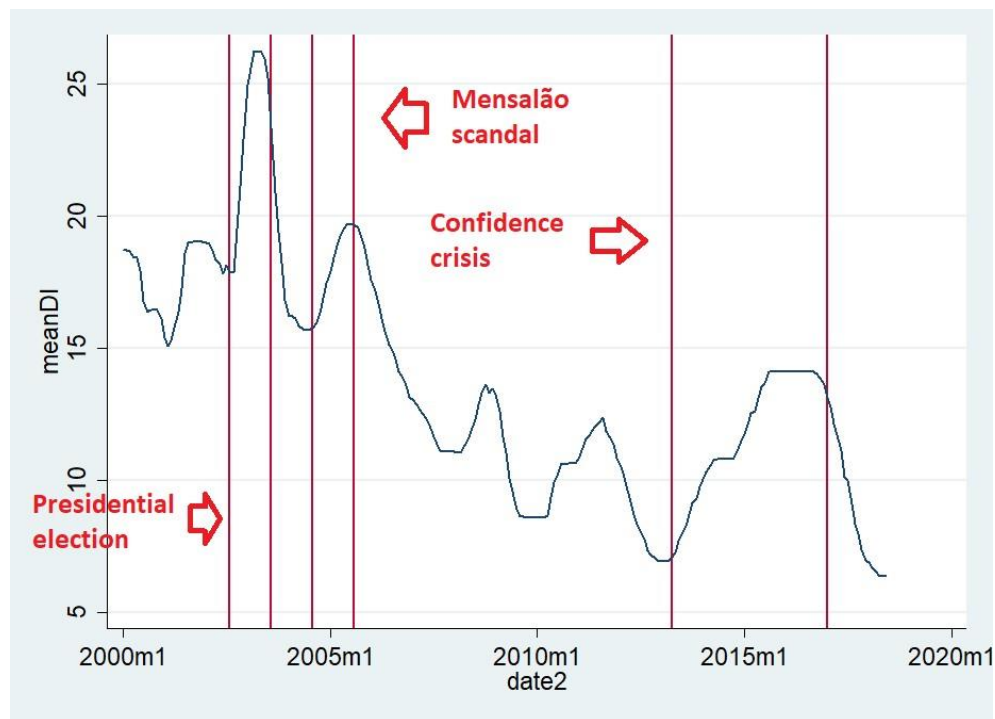
Figure 1

TABLE 4: STRUCTURAL BREAK

	Begin	End	Begin	End	Begin	End
Date	2002q3	2003q3	2004q3	2005q4	2013q2	2017q1
Chi2	4.8400	68.1705	39.1376	63.4669	74.297	8.1967
p-value	0.088	0.000	0.000	0.000	0.000	0.017

We are interested to investigate whether firms depending on bank credit to finance short-term operation have more difficult to bare financial crisis credit constraints than firms with BNDES credit access. We call treatment group those firms that are more exposed to credit constraints due uncertainty characteristic of economic crisis cycles. Control group are those firms that have used a BNDES credit line on a given year.

First, we use propensity score matching to find a counterfactual control sample of BNDES firms that were more likely to be in the treatment sample. We conduct DID estimations to compare the heterogeneity of financial crisis effects between the two groups for each sub-sample, comparing pre-crisis periods with crisis and post-crisis endurance. Moreover, we also perform DID tests on the whole sample to check for robustness of our results.

To match firms, we choose to use variables indicated in the literature to measure firms' necessity of funding to finance their short-term operations, as described earlier. Furthermore, to conduct DID tests, we add exchange rate depreciation and dummies of quarters, to capture fixed effects and trade credit seasonality. The difference-in-difference model is presented below.

$$TC_{i,t} = \beta_0 + \beta_1 Crisis_t + \beta_2 BNDES_{i,t} + \beta_3 BNDES_{i,t} * Crisis_t + \gamma Controls + FE + \varepsilon_{i.t} \quad (1)$$

$$TC_{i,t} = \beta_0 + \beta_1 Post_t + \beta_2 BNDES_{i,t} + \beta_3 BNDES_{i,t} * Post_t + \gamma Controls + FE + \varepsilon_{i.t} \qquad (2$$

Where, TC represents one of our three trade credit proxies; Crisis is a dummy variable equals 1 if the quarter is within a crisis period and 0 otherwise; Post is a dummy variable equal 1 if the quarter is within the following four quarter after crisis periods; BNDES is a dummy variable equal 1 if a firm did not use a BNDES credit line on a given year; Controls are variables commonly used on trade credit literature, as previously discussed.

2.5 RESULTS

First, we check for evidence that on the account of banking credit constraints from economic distress during and after financial crisis. We first perform a panel analysis on overall firms[1]. Table 5 presents this first set of results. The first important result is how firms with access to BNDES money behave. We can see no significant change on trade credit offer and demand during and after crisis periods. Nevertheless, that is a statistically significant reduction of Net Receivables indicating that such firms offering less trade credit in relation of how much they are demanding. These evidence suggest that is not a credit overflow effect from BNDES cash flow toward firms during economic distress periods.

Moreover, we find differences regard those firms that do not use BNDES money (hereafter, regular firms). First of all, that is a statistically significant difference on how financial crisis effect trade credit decisions among the two group of firms.

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[1] To perform this test, we use a bigger sample with all information available since 1995. When we proceed to investigate whether that is a difference on the behavior of firms according with access to BNDES credit, we had to narrow our sample to 2002 - 2017 period because of BNDES credit information availability.

Furthermore, Panel B presents the net effect of crisis and post-crisis among regular firms. that is a significant different participation of these firms on trade credit market after financial crisis. We see that they increase trade credit offer and demand during and after economic crisis periods.

TABLE 5
Panel A

VARIABLES	(1) TCrecta	(2) TCpayco	(3) NTCS	(4) TCrecta	(5) TCpayco	(6) NTCS
Crisis	-0,0099	0,00454	-0,0216	-0,0317	0,000934	-0,0363*
	-0,0182	-0,0105	-0,0195	-0,0202	-0,0125	-0,0199
Post Crisis	-0,0264	-0,0005	-0,0447*	-0,0357	-0,00122	-0,0510**
	-0,0406	-0,0321	-0,0245	-0,0404	-0,0324	-0,0246
BNDES	-0,108***	-0,0407*	-0,0859***	-0,113***	-0,0413*	-0,088***
	-0,0404	-0,0245	-0,0289	-0,0404	-0,0245	-0,029
BNDES*Crisis	0,144***	0,0646*	0,0923**	0,140***	0,0646*	0,0906**
	-0,0506	-0,0332	-0,0369	-0,0499	-0,0333	-0,0368
BNDES*Post Crisis	0,150**	0,0774*	0,0979**	0,142**	0,0759*	0,0930**
	-0,0585	-0,0411	-0,0384	-0,0573	-0,0403	-0,0377
CFTA				-0,175	-0,100***	0,0224
				-0,116	-0,0381	-0,0531
CBTA				-0,499**	0,0098	-0,392***
				-0,234	-0,118	-0,102
Salesgr				-0,222***	-0,0765	-0,0942***
				-0,0636	-0,0503	-0,031
Varcamb				0,012	0,052	0,029
				-0,059	-0,0385	-0,0458
Constant	1,080***	0,671***	0,599***	0,985***	0,619***	0,577***
	-0,0306	-0,0187	-0,0287	-0,052	-0,0392	-0,0346

Observations	12,088	11,736	11,998	12,088	11,736	11,998
R-squared	0,173	0,165	0,108	0,183	0,167	0,114
Number of id	252	252	252	252	252	252
SECTOR FE	YES	YES	YES	YES	YES	YES
QUARTER FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0,01, ** p<0,05, * p<0,1

Panel B

f-tests						
Crisis effect on regular firms						
Coeff	0,1341	0,0692	0,0707	0,1088	0,0656	0,0542
p-value	0,007	0,017	0,029	0,018	0,018	0,076
Post crisis effect on regular firms						
Coeff	0,1239	0,0769	0,0531	0,1062	0,0747	0,0419
p-value	0,01	0,005	0,065	0,019	0,005	0,128

Columns (3) and (6) on Panel B shows firms' profile on trade credit market. The results suggest that regular firms are increasing more trade credit offer than demand during economic crisis. However, that is evidence that this behavior is mitigated on post-crisis periods. If we look into the big picture, evidence are suggesting that regular firms are actually funding the decrease of BNDES firms decrease of trade credit offer.

We are investigating whether firms that have BNDES credit line access are less exposed to financial crisis credit constraints. Table 6 presents the first set of results for the combined sample. In panel A we can see the results for Receivables, our metric to measure how much trade credit is offered by firms. Firstly, it is interesting to note that in periods of economic calmness, that is no difference on how much trade credit is offered

by the two groups of firms. Such result indicates the lack of an overflow effect of credit provided by BNDES to other companies.

Next, we can see in the first column the change in the supply of commercial credit during periods of economic crisis. We found evidence that regular firms with no access to government money offer mode trade credit when bank credit is restricted when comparing with firms that use BNDES credit. This behavior shows that the resources provided by the government are not having much multiplier effects in the economy, having benefited precisely those firms that received the money directly. However, when we look at the second column, we can see that after the economic crisis this trend is sustained. The gap between how much trade credit is offered by the two group of firms remains one year after the credit crunch.

Panel B brings the results for Payables, our proxy for trade credit demand. We can see again a significant difference in the participation of the two groups in the trade credit market. Firms that receive BNDES funds are more financially comfortable and demand less trade credit than regular firms. Moreover, we can see that during financial crises periods that is an increase in the trade credit gap demanded by the two groups of firms.

Furthermore, Panel C exposes firms trade credit profile. We can see that the difference on Net Receivable among the two groups of firms increases during and one year after economic crisis periods. These results indicate that firms not using BNDES money are relatively offering more trade credit, which goes against the argument that increasing government cash flow towards firms during economic crisis has a spillover effect over the economy. Our evidence show that these firms are offering relatively less trade credit comparing with how much trade credit they are demanding.

TABLE 6: MATCHING MODEL: BNDES CREDIT LINE ACCESS FOR INDIVIDUAL CRISIS

| | Panel A: Dependent Variable: Receivables | | | |
| | Crisis | | Post crisis | |
	Coefficient	P-Value	Coefficient	P-Value
Before				
Control	0,601		0,601	
Treated	0,630		0,630	
Diff (T-C)	0,029	0,441	0,029	0,441
After				
Control	0,476		0,418	
Treated	0,674		0,584	
Diff (T-C)	0,198	0,000***	0,166	0,000***
Diff-in-Diff	0,169	0,001***	0,136	0,013**
Number of observations:	10243		6581	

| | Painel B: Dependent Variable: Payables | | | |
| | Crisis | | Post crisis | |
	Coefficient	P-Value	Coefficient	P-Value
Before				
Control	0,310		0,310	
Treated	0,384		0,384	
Diff (T-C)	0,074	0,000***	0,074	0,000***
After				
Control	0,286		0,268	
Treated	0,450		0,383	
Diff (T-C)	0,164	0,000***	0,116	0,000***
Diff-in-Diff	0,090	0,000***	0,042	0,158
Number of observations:	9882		6528	

| | Painel C: Dependent Variable: Net Receivables | | | |
| | Crisis | | Post crisis | |
	Coefficient	P-Value	Coefficient	P-Value

Before				
Control	0,415		0,415	
Treated	0,335		0,335	
Diff (T-C)	-0,080	0,028**	-0,080	0,028**
After				
Control	0,295		0,223	
Treated	0,337		0,284	
Diff (T-C)	0,042	0,174	0,061	0,013**
Diff-in-Diff	0,122	0,011**	0,140	0,001***
Number of observations:	10162		6530	
SECTOR FE	Yes			Yes
Quarter FE	Yes			Yes

These tables have an important result. Although firms that are no entitle with BNDES credit increases trade credit usage during financial crisis and banking credit constraints, they are relatively offering more trade credit than demanding. Such result is interesting and important because shows a spillover effect across firms, indicating that firms receiving more trade credit and funding more clients. This movement across trade credit market is important to guarantee firms short-term operations funding.

In accordance with the behavior illustrated above, firms entitle to BNDES credit lines usage also do not change their trade credit market profile. The problem is, that they receive subsidized credit from the government and do not increase trade credit offering to their clients. This behavior harms the economic capability of credit offering during financial distress given that credit is being canalized to firms that offer less trade credit and do not increase their offering when other firms are increasing their demand.

Furthermore, we look for economic crisis individually[1]. Table 7 presents the results for Receivables. We can see on Panel A the results for crisis periods. First column shows that, although there is a statistically difference among firms that use BNDES money and those who do not, the difference did not change because the first labor party presidential election.

The second column presents the results for the major credibility and governability crisis. We do not see a significant difference of trade credit offering on pre-crisis period. Nevertheless, we see that regular firms offer a greater amount of trade credit during the crisis period. Such result corroborates with our previous findings that is not an overflow of credit from BNDES firms to the rest of the economy.

Panel B presents the results for post-crisis analysis. We see that both post-crisis periods present the same behavior on trade credit offer found during economic crisis, corroborating with our previous findings[2].These results highlights the fact that firms using BNDES subsidized are not playing a major role on trade credit offer, although they are receiving cheap money from the government.

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[1] We use only first and third financial crisis because the second one starts right after the first post-crisis period. Thus, there it is no possible the make the comparisons we are doing because lack of information

[2] We see no significant difference on trade credit offer after the third post-crisis. Because we have a big precrisis periods and just three post-crisis quarters, that is much less information on after-event side on Diff-in-Diff. The unbalanced amount of information might be harming the results.

TABLE 7: MATCHING MODEL: BNDES CREDIT LINE ACCESS FOR INDIVIDUAL CRISIS

Panel A: Dependent Variable: Receivables

	1st crisis		3rd crisis	
	Coefficient	P-Value	Coefficient	P-Value
Before				
Control	0,550		0,587	
Treated	0,937		0,613	
Diff (T-C)	0,387	0,002***	0,026	0,508
After				
Control	0,440		0,498	
Treated	0,754		0,716	
Diff (T-C)	0,314	0,000***	0,218	0.000***
Diff-in-Diff	-0,073	0,623	0,193	0.001***
Number of observations:	662		8402	

Painel B: Dependent Variable: Receivables

	1st post-crisis		3rd post-crisis	
	Coefficient	P-Value	Coefficient	P-Value
Before				
Control	0,550		0,550	
Treated	0,937		0,568	
Diff (T-C)	0,387	0,002***	0,018	0,636
After				
Control	0,408		0,398	
Treated	0,710		0,565	
Diff (T-C)	0,303	0.000**	0,167	0,031**
Diff-in-Diff	-0,085	0,568	0,149	0,083*
Number of observations:	669		5015	
Sector FE	Yes		Yes	
Quarter FE	Yes		Yes	

What the evidence points out is that those firms that have BNDES money offer a similar amount of trade credit to their clients but, the difference on the average offer

becomes statistically significant during and after economic crisis when regular firms increase their Receivables. This behavior could be explained because banking credit might take a while to increase again due economic instability and informational credibility.

Table 8 presents the results for Payables. The first interesting result present on this table is the analysis of first crisis. Evidence shows no significant difference on how much trade credit is demanded between firms that receive BNDES money and those that do not. These evidence shift when looking for third crisis results. We see that firms entitle to BNDES money demand less trade credit than other firms and the difference is greater during banking credit constraints. We can make a connection to Receivables results. Firms that do not use BNDES money participates more in trade credit market than firms that are less financially exposed because are receiving money from BNDES.

TABLE 8: MATCHING MODEL: BNDES CREDIT LINE ACCESS FOR INDIVIDUAL CRISIS

Panel A: Dependent Variable: Payables

		1st crisis		3rd crisis	
		Coefficient	P-Value	Coefficient	P-Value
Before					
	Control	0,440		0,292	
	Treated	0,489		0,378	
	Diff (T-C)	0,048	0,464	0,086	0.000***
After					
	Control	0,388		0,311	
	Treated	0,376		0,501	
	Diff (T-C)	-0,013	0,844	0,190	0.000***
Diff-in-Diff		-0,061	0,510	0,104	0.000***
Number of observations:		662		8022	

Painel B: Dependent Variable: Payables

		1st post-crisis		3rd post-crisis	
		Coefficient	P-Value	Coefficient	P-Value
Before					
	Control	0,440		0,270	
	Treated	0,489		0,350	
	Diff (T-C)	0,048	0,464	0,081	0.000***
After					
	Control	0,290		0,272	
	Treated	0,399		0,400	
	Diff (T-C)	0,109	0.015**	0,128	0,020**
Diff-in-Diff		0,060	0,448	0,048	0,403
Number of observations:		676		4936	
Sector FE		Yes		Yes	
Quarter FE		Yes		Yes	

Table 8 Panel B presents post-crisis results, however, are not consistent with prior results found for all crisis and post-crisis periods together. We see an increase on trade credit demand on first post-crisis period, but the result does not hold for third post-crisis analysis. When checking within time periods, before and after the event, we also see an inconsistency of significance. One explanation could be that only part of firms increases trade credit demand (and offer) and standard errors increases a lot for third post-crisis (and crisis) tests after the event.

Table 9 have the results for Net Receivables. Although this variable is directly related to the Receivables and Payables, it enables to a different analysis. This variable capture trade credit market participation profile, i.e., it captures whether firms offer more trade credit than demand and if it changes due banking credit constraints.

First, let's introduce the results by doing an overall analysis. We can see an inconsistency. Firms that have BNDES money offer a higher (lower) amount of trade credit relatively to how much they are demanding before the first (third) economic crisis. However, during both crisis we see regular firms with greater Net Receivables[1]. Moreover, we see that the results persist throughout 1 year after economic crisis ends. These results indicate that firms using subsidized government money offer relatively less credit than they demand comparing to their peer firms deprived of BNDES credit.

TABLE 9: MATCHING MODEL: BNDES CREDIT LINE ACCESS FOR INDIVIDUAL CRISIS

Panel A: Dependent Variable: Net Receivables	1st crisis		3rd crisis	
	Coefficient	P-Value	Coefficient	P-Value
Before				
Control	0,291		0,413	
Treated	0,492		0,326	
Diff (T-C)	0,201	0,027**	-0,087	0,020**
After				
Control	0,220		0,318	
Treated	0,412		0,351	
Diff (T-C)	0,192	0,003***	0,033	0,374
Diff-in-Diff	-0,009	0,935	0,120	0,023**
Number of observations:	657		8330	

Painel B: Dependent Variable: Net Receivables	1st post-crisis		3rd post-crisis	
	Coefficient	P-Value	Coefficient	P-Value
Before				
Control	0,291		0,388	

[1] Although it is not significant during the third event, the difference between pre-crisis and during crisis is positive and statistically significant

	Treated	0,492		0,304	
	Diff (T-C)	0,201	0,027**	-0,084	0,017**
After	Control	0,218		0,163	
	Treated	0,389		0,260	
	Diff (T-C)	0,172	0,003***	0,097	0.011**
Diff-in-Diff		-0,029	0,787	0,181	0,000***
Number of observations:		665		4970	
SECTOR FE		Yes		Yes	
QUARTER FE		Yes		Yes	

Although the results have some difference from Table 9 overall results, we find many consistency corroborating with our prior results. Moreover, it is important to highlight that looking crisis individually might have lower informational power because a very heterogeneous sample specially on post-crisis analysis. This is a limitation of our paper at this point. The prosecution is to use seasonally adjusted data to check the behavior around events dates. We also performed diff-in-diff tests on unmatched sample and use several liquidity indicators to match firms. Untabulated results are qualitatively the same to those presented.

2.7 CONCLUSION

We are investigating firms' behavior when choosing how to finance operations in times of financial crisis. It is expected that moments of economic turbulence create an environment of high uncertainty and, as a consequence, lead to a contraction of bank credit available to firms. This decrease of banking credit induces firms to finance each other to continue their operations in order to cope with this turbulent period. That being

true, companies with better financial health are better prepared to deal with credit restrictions and continue their operations. We expect these companies to seek less trade credit in times of crisis.

However, Brazil has one of the largest economic development banks in the world, BNDES. It is to be expected that the government does not retract credit in times of crisis. Its Table 8 might be perhaps to even strengthens money orders seeking to leverage economic growth by an overflowing effect between companies. Thus, companies that have access to BNDES credit are less vulnerable to economic crises and do not need to turn to commercial credit.

In this article we used quarterly data of Brazilian companies listed on the Bovespa between 2002 and 2017. Structural break tests were performed to identify dates of entry and exit of economic crisis. The moments following crisis exit are transitory moments between reduction of uncertainty and normalization of economic activity. Thus, we consider the next four quarters as a moment of transition and that can also affect business behavior in relation to commercial credit. As controls, we use firm characteristics in cash generation capacity and macroeconomic variables that may affect credit relationships among firms.

The results show that firms use more trade credit in times of economic crisis and that this effect persists during the period of transition to economic normalization. The result is consistent Table 9 for supply and demand of trade credit. There is also evidence that firms are transferring the credit received to their customers, inducing a flow of credit that may enable a more favorable environment to deal with bank credit cutbacks. On the other

hand, the evidence indicates that firms with BNDES credit do not change their behavior in relation to the supply and demand of commercial credit, evidencing that they are less vulnerable to credit market turbulence and have comparative advantages over competitors to face crises. It is important to note that we do not find evidence that these firms are increasing their trade credit supply and are not transferring their greater capability to face crises for other firms.

Moreover, we investigate crisis individually and found consistencies with our main result. The results are stronger for the third crisis, which could be explained by Brazilian market maturity over the years. Finally, we found evidence that the difference between how much trade credit firms are offering and demanding do no change during financial crisis, indicating a continuous flow of credit among firms. Such behavior generates an enabling environment to finance short-term operations during economic crisis.

The results we find are important to better understand how firms make financing decisions in turbulent and uncertain periods. It also helps complement commercial credit literature by two important angles: first, showing the Brazilian context, which had not yet been studied; second, bringing the development bank into the discussion. Our results show that Brazilian firms compete unfairly and face crises and uncertainties with different fundamentals. Those that are protected by government credit are more able to deal with difficulties and do not help create a favorable context for the economy as a whole, a fact emphasized by advocates of government transfers to firms in times of crisis.

Chapter 3

3 Intertemporal Decision and Cash Realizations: Empirical Evidence of Corporate Voluntary Disclosure

Abstract

In this paper we investigate managers voluntary disclosure behavior using as base four predictions from Einhorn and Ziv (2008) intertemporal model. We found strong evidence of management implicit commitment to disclose on the existence of past disclosure. We also found managers have different incentives to disclose around zero earnings surprises. The fact of whether a previous disclosure was made or not also impacts the incentives to disclose a new guidance. Next, we extent the channels which forecast are determined including stock options compensation variables and found evidence that cash realizations have no influence on managers decision to disclose. The evidence is the same for managers with and without disclosures history.

Key-words: Voluntary disclosure; Strategical behavior; Accounting theory; Compensation; Management incentives.

3.1 INTRODUCTION

Accounting literature has presented in the past decades an important discussion about why managers voluntarily disclose private information. The theory is getting more sophisticated and several explanations have major role on the literature. We are looking for evidence about three predictions from Einhorn and Ziv (2008) (Hereafter *EZ*) on which a multi-period model enlightens that the choice of making a forecast is influenced by past disclosure decisions.

The model is based on Dye (1985) and Verrechia (1983) one period models, which add uncertainty informational endowment and costly disclosures. First, manager receive a signal with some probability and decides whether to disclose this signal to the market or not. Moreover, managers have the opportunity to withhold information, which is desirable to avoid disclosure costs. Thus, a rational manager chooses to disclose evaluating price impact and disclosure costs. When bad public news is available, firms choose to disclose to discriminate themselves among other firms. After a disclosure is made, investors assume that manager as endowed with information. A following non-disclosing period is treated as withholding information and priced as bad news.

Withhold information for increasing periods enhances managers' uninformed reputation, which avoid disclosure costs and makes it easier to withhold information in the future. To choose to disclose means to give up having an uninformed reputation and to be able to withhold information and not being penalized by the market. Kothari et al (2009) shows evidence that managers withhold bad news disclosure to a certain threshold, but do not adopt the same behavior on good news statements. Beyer and Dye (2012) present a theoretical model that indicates the importance reputation in a trust/investment game and found that rational managers.

One of the main results from *EZ* model is that when voluntarily disclosing private information, managers are implicitly committing themselves with future disclosures. As consequence of such commitment, the influence of past disclosures is so strong that cash flow realizations after disclosures have no real effect on the choice disclosing on the following period. Hence, *EZ* conjectures a persistence behavior of management

forecasts, cash realizations have no effect on forecast if a previous forecast was made and cash realization should negatively affect forecasts if no forecast was made.

First, we check if managers with different levels of earnings surprises would have different incentives to disclose. This test gives us an idea of how managers behave when choosing to disclose or not. We break apart earnings surprises on four subsets: first, we separated positives and negatives, then, for we break below and above the respective mean. We call it less positive (negative) and most positive (negative) respectively. We can see that firms below zero have more incentives to disclose, indicating that they want to signal to investors that they are not so bad. The sign shifts as consider positive earnings surprises, indicating change of incentives, changing managers' willingness to voluntarily disclose. This result is consistent with *EZ* prediction that is easier to withhold information when presenting better performance. The results are stronger for firms presenting less negative and most positive earnings surprises.

On our second set of tests we find evidence that indeed the history of forecasts is a very important factor of making a new forecast about next year *EPS*. It is a consistent and strong result. Moreover, we found evidence that cash realizations do play a role on forecast choice. For a firm that did prior forecasts, increase of earnings surprises makes it more likely to choose to forecast again. This result does not sustain *EZ* predictions. For a firm that did not make a forecast, we found a non-significant negative relation between earnings surprises and the likeliness to disclose, in comparison with a disclosing firm. This result goes together with *EZ* predictions, but the overall effect is positive and mainly significant unlike the model predicts.

Further, we extend the empirical model and include another channel on which forecasts can be affected. Stock compensation can both be influenced by earnings and it is important for the manager when deciding whether or when to make a forecast. Bartov and Mohanran (2004) shows evidence of opportunistically stock options exercises, correlated with earnings and stock performance. They found evidence that earnings management induces untypical large options exercises which increases payment from exercises. Aboody and Kasznik (2000) documented that managers guide investors' expectations around stock options awards by delaying good news and rushing bad news. The opposite behavior is seeing around stock options exercises. Brockman et al (2010) found evidence that managers voluntarily disclose to increase stock prices if they have the intent to exercise stock options in the pre-exercise period. However, if they have the intent to withhold underlying shares, they guide investors to decrease stock prices and avoid taxes. Cicero (2009) evidenced that managers use private information to boost profitability of options exercise strategies. Cheng and Lo (2006) found that managers tends to time stock options exercises buying more after bad news disclosures.

We first validate the use of stock compensation variables by running regressions of forecast on prior forecast and each variable we propose, considering wealth and number of options. We choose to keep prior forecast variable because we already found that choosing to forecast or not in the past have a major role on forecasting on the future. We show that options compensation variables we proposed have a significant effect on forecasts. Hence, we add each one in our prior model and one more time test for *EZ* predictions.

On this extension we found evidence that persistence on forecast still significant and strong, corroborating with the strength of the evidence found on the first set of tests. This result is consistent with all three options compensation variables tested and controlling for prior forecast. The most important result that comes from adding options compensation in *EZ* is that earnings surprises pretty much loses all significance on explaining the choice of forecast. Options variables shows to be important when explaining forecasts choices and earnings surprises plays at most a minor role. These evidence corroborate with *EZ* predictions that cash realizations after a forecast have no importance on making more likely to make a new forecast.

When running regressions on positive and negative earnings surprises, we see a consistent shift of signal when surprises increases, indicating change of incentives. We can also see that cash realizations do not play an important role, having only some significance on the edges. Moreover, we see that the effect of earnings surprises for a firm with no history of forecast still lower than a firm with disclosing history, which goes in the direction of *EZ* predictions. Nevertheless, the joint effect shows no significance what so ever, but with eventual negative signs. This shows one more time the importance of using stock options compensation variables on explaining forecasts. In this manner, we search for empirical evidence for three predictions made on Einhorn and Ziv (2008) multiperiod model for voluntary disclosure. We found evidence that strongly support two predictions and a weak clue for the prediction that earnings surprises have a negative effect on forecast.

Our results contribute to voluntary disclosure literature, enlightening factors of managers' decision to provide guidance voluntarily. Information disclosure is a major

factor of market quality, which could indicate that voluntary disclosure holds a great deal of importance to investors and regulators. On the other hand, that is not a consensus on scientific literature about the long-term effect or the desirability (Goldstein and Yang, 2017). Another issue on voluntary disclosure literature is to understand why firms change their voluntary disclosure policy. Depoers and Jeanjean (2010) investigated how French firms managers decide to withhold information across time and they found that a widespread practice of withhold some information across years, although the amount of information is relatively stable over time. Hence, we contribute using a different angle, as we found an association of guidance and firm performance impacting on the likelihood of a future disclosure.

Furthermore, understand managers' decision to voluntarily disclose is also important to institutional investors in a matter of impacting asset pricing decisions. Haggard et al (2008) presented theoretical and empirical evidence that voluntary disclosure reduces information acquisition costs and stock price co-movement. Eng and Mak (2003) found evidence that voluntary disclosure is associated with ownership structure and corporate governance. Balakrishnan et al (2014) shows that managers can impact firm liquidity through non-mandatory guidance, influencing their cost of capital. Moreover, financial information disclosures are constantly in the sights of regulators, seeking to improve corporate disclosures accuracy, veracity and reliability to protect investors (Greenstone et al, 2006). Shroff et al (2013) investigated the 2005 SEC Securities Offering Reform impact on voluntary disclosure decisions. They found an increase of preoffering disclosures, correlated with lower information asymmetry and cost of capital.

The paper continues as the following: section 2 presents the research design, data and main variables; section 3 presents the empirical results and section 4 concludes.

3.2 RESEARCH DESIGN

Einhorn and Ziv (2008) use a multi-period model to explain the intertemporal dynamics of voluntary disclosure. The model is an infinity repeated game where two agents (managers and investors) are interacting in the market. At the beginning of each period managers might receive or not a signal to be used to estimate forthcoming cash flows. Investors do not observe managers' information endowment and update their beliefs about it at the beginning of each period according with the available information.

An informed manager receives the signal and estimate future cash flows and decide whether to truthfully disclose this information or not. Disclosure is assumed to be costly and this cost is increasing over time as the number of disclosing periods increases. The informational environment is assumed to be a Markov chain and therefore history-dependent. Assuming that the information environment is relatively stable over time, if a firm choose to make a disclosure, investors will see the manager as informed in the future. Any non-disclosing period in the future might be seeing as withholding of information and firm is priced as having bad news. This implicates that an implicit commitment to disclose is assumed whenever a disclosure is made, and this commitment strengthens as more disclosures are made. Bischof and Daske (2013) found evidence that a mandatory one-time disclosure about risk exposure during Eurozone debt crisis lead to subsequent discretional disclosures, shifting voluntary disclosure equilibrium. Baginski and Rakow (2012) showed empirical evidence that

disclosure and cost of capital are negative related. Cheynel (2013) present a model in which non-disclose firms have a greater cost of capital than disclosure firms. These results lead to our first set of hypotheses.

H1a: A firm is more likely to make a forecast about future cash flow realizations if a forecast was made in the previous period.

H1b: The likelihood of a forecast about future cash flows is not related to cash flow realizations if a disclosure was made in the previous period

In their model, managers want to withhold information for two reasons. First, to avoid current and future disclosing costs. Second, not to be seeing as informed and must make a commitment to future disclosures. Avoiding disclosing enhances managers' reputation of being uninformed making it easy to withhold future information and the effect is stronger if the firm presented high cash flow realizations on non-disclosing history. Having a good performance and not disclosing makes it easy to managers to be seeing as uninformed instead of withholding information because it is too good information to be withheld. Rogers and Stocken (2005) also argued how managers willingness to mislead investor is a function of market ability to detect it. Acharya et at (2011) investigates the flow of information endogeneity and identify a possible channel to how market information can trigger managers disclosures. Besides, Verrechia (1983) evidence that because market has no perfect knowledge about the manager being informed or not, managers withhold information and discloses opportunely.

Sletten (2012) use a different way to study how bad news announcements may triggers management forecasts. She used other companies' restatements as a proxy for market news. Suppose a given company makes a restatement, if the abnormal return of a 3-day window centered in the announcement is positive (negative), she considers a good (bad) news. An industry peer firm will see and might make forecasts on their own or not. She finds that if the abnormal return resulted by the restatement is negative, peer industry firms are more willing to make forecasts. Nevertheless, there is no evidence that the magnitude of the abnormal return is related with forecasts. This is consistent with previous evidence that managers withhold information.

On the other hand, a manager that made a disclosure is seeing by investors as informed and because the Markovian information environment is assumed to be informed in the future. Hence, managers' natural behavior is to keep disclosing, regardless the signal. Stocken (2000) asserted that investors evaluated managers disclosure performance over time. Tse and Tucker (2010) use a duration analysis to show evidence that managers time disclosures in a within-industry context. They looked into the third month on each fiscal quarter and identified the leader firm as the first one that released a negative earnings warning. Hence, they tested if following firms made warnings in a five days window after and found evidence of clustering previously market news announcements. Afterwards, they did the same enquiry for good managers' disclosures and they found no evidence. Thereby, these findings indicate that not only managers are timing disclosures, but they are doing it asymmetrically. Hence, we test the following hypothesis.

H2a: The likelihood of a forecast about future cash flows is negatively related to cash flow realizations since last disclosure if there is not a history of disclosure

H2b: The likelihood of a forecast is decreasing on cash flows realizations

3.3 MAIN VARIABLES AND ESTIMATION

We run Probit models on annual data. Our dependent variable, *Forecast*, is equal one if a forecast about next year Earnings Per Share (EPS) is made. We restrict forecasts from prior earnings announcement to fiscal year end date. We ignore forecasts from end of fiscal year and earnings announcement to avoid sample selection bias from preannouncements. We use lagged forecast, *LAG_F*, as independent variable to investigate whether a persistent effect exists on managers' guidance strategy. This is our first main interested variable.

To control for information from cash realizations we use Earnings surprises, *EarnSup*. We measure earnings surprises as Earnings Per Share (Hereafter EPS) adjusted for splits minus consensus. EPS, consensus and managers' forecasts are obtained from I/B/E/S to mitigate measurement error and inconsistencies on definitions. At last, to investigate whether non-disclosing firms have still had impact of cash realizations on manager forecast, we interact *EarnSup* with the inverse of *LAG_F*. This setting makes it easier to analyze the effect of surprises on willingness to make a forecast when manager did not reveal information on previous periods. We control for firm characteristics commonly used on voluntary disclosure literature. To test for *H2b* we

run the regressions on earnings surprises quartiles to check if there are different incentives for different performances.

$$Forecast_i = \alpha + \beta_1 LAG\_F_i + \beta_2 EarnSup_i + \beta_3 EarnSup_i * \left(1 - LAG_{F\,i}\right) + \gamma Controls$$
$$+ IndFE + YearFE + \varepsilon_i \tag{1}$$

Next, we focused on investigate where *EZ* predictions are not being sustained by empirical evidence. We consider that an agency problem might raise from the intuit of manager to maximize utility from stock options endowment. Managers focusing on stock options exercise engage on earnings management behavior. It is also known that managers have timing voluntary disclosure around options awards and options exercises. Thus, exists a channel where earnings surprises might impact on managers forecast throughout stock options endowment.

We obtain CEO annual compensation from Computast ExecuComp and prepared following Core and Guay (2002). OptsVst is the ratio of vested wealth from options and total wealth from options. Opts is the ratio of number of unexercised exercisable options and total number of options. These two variables measure the proportion of option compensation that could be executable but were not and did not expire and the proportion of stock options in relation of managers' total portfolio. Furthermore, we check if just having options explain managers' voluntary willingness to forecast. For such, se consider two dummy variables: DoptsV equals one if manager have on earnings announcement date any wealth from vested options and equal to zero otherwise. Dopts equals one if manager have on earnings announcement date any wealth from options and equal to zero otherwise. To validate using compensation variables to explain managers forecast, we

first run Probit regressions of each options variables on *Forecast*, where *Compensation* represents each option variable discussed above.

$$Forecast_i = \alpha + \beta_1 LAG\_F_i + \beta_2 Comp_i + \gamma Controls + IndFE + YearFE + \varepsilon_i \quad (2)$$

Finally, we add compensation variables on our *EZ* test setting and investigate whether the three predictions are sustained with empirical evidence.

$$Forecast_i = \alpha + \beta_1 LAG\_F_i + \beta_2 EarnSup_i + \beta_3 EarnSup_i * (1 - LAG_{F_i}) + \beta4 Comp_i$$
$$+ \gamma Controls + IndFE + YearFE + \varepsilon_i \quad (3)$$

3.4 DATA

Our full sample is consisted of over 2,000 firms and around 18,000 firm-years observations from 2000 to 2016. To create these samples, we use data from I/B/E/S Guidance, I/B/E/S History, Compusatat Annual Industry, Compustat ExecuComp and return files from CRSP. As a proxy to managers' voluntary disclosure, we use guidance from IBES. We consider only quantitative guidance about annual EPS made until end of fiscal year. We disconsider pre-announcements. In cases where firms made more than one forecast announcement, we use only the first one made for the following annual EPS. To calculate earnings surprises we use earnings per share (EPS) adjusted for splits minus analysts' consensus [1].

[1] For firms missing consensus, we use EPS adjusted for split as a proxy for earnings surprises. We adopt this strategy to increase sample size and to avoid selection bias.

The control variables are consisted on firm characteristics. Analysts are the number of analysts following the firm. We consider as zero if that is no information about analysts following a firm on a given year. Liquidity is calculated as volume divided by number of shares outstanding. We measured return on assets (ROA) as total earnings scaled by total assets. Market-to-Book is market value scaled by book value and as measurement for investment we use CAPX. EPS volatility and Ret volatility are standard deviation of adjusted EPS and stock return respectively. Compensation variables are CEO stock options wealth and number calculated according to Core and Guay (2002).

Table 1 Panel A present descriptive statistics for guidance, surprises and compensation variables. Table 2 Panel B shows descriptive statistics for control variables following voluntary disclosure literature. Panel C presents descriptive statistics relative to size and performance divided by 1000 for expositional purposes. We winsorized at 1% to mitigate variance inflation due outliers.

We can see from Panel A that a little more than half of the firms choose not to release management forecasts in the sample period. Nevertheless, forecast have a huge standard deviation, indicating that some firms never disclose, and others always disclose, which brings evidence for *EZ* predictions. We can also see that stock options are around 22% on average, mostly of options wealth are vested, options are the bigger part of equity being hold by managers and a little more than half are exercisable but not exercised yet, which indicates possible existence of incentives for managers to influence stock price at some point. We can see from Panel C that our sample contains mostly big firms with more than 8.5 billion dollars average total assets and more than 3 billion

dollars book-value. We can also see from Panel B a great volatility on EPS and number of analysts following firms, with some firms having not being followed at all.

TABLE 1: DESCRIPTIVE STATISTICS

Panel A

Variable	Mean	Std. Dev.	Min.	Max.	N
Forecast	0.39	0.488	0	1	19361
EarnSup	0.594	9.262	-42.5	1138.88	19361
Opts	0.446	0.338	0	1	17915
OptsVst	0.514	0.307	0	1	15084
#UnOpts	0.564	0.235	0	1	18262
#Opts	0.798	0.271	0	1	19085

Panel B

Variable	Mean	Std. Dev.	Min.	Max.
Liquidity	0.016	0.038	0	1.092
#Analysts	13.685	10.06	0	75
ROA	0.053	0.112	-5.99	0.924
Investment	0.048	0.055	-0.033	0.797
Ret volat	0.027	0.014	0.003	0.198
EPS volat	1.204	1.834	0	77.951
Leverage	0.537	0.265	0.023	6.812
Market-to-book	0.008	0.178	-13.5	15.96
N			19361	

Panel C

Variable	Mean	Std. Dev.	Min.	Max.	N
mkvalt	8.697	27.684	0.006	626.550	18960
Total Assets	14.258	88.002	0.008	2573.126	19361
BV	3.375	11.887	-16.1	256.205	19340
NI	0.435	1.999	-38.5	53.394	19361
EPS(raw)	1.773	2.395	-42.3	58.33	19361

3.5 EMPIRICAL RESULTS

We are focused on testing *EZ* results about the intertemporal dynamics of voluntary disclosure. Three predictions follow the results. First, managers want to create a

uninformed reputation to be easier to withhold information on current and future periods. This result implicates that managers with uninformed reputation are less likely to disclose when presenting high performance. Second, because the history dependence of informational environment, once a manager reveal herself as informed, there is a persistence behavior on forecasts. When making a forecast, manager implicitly commits himself on making forecasts on following periods. Third, if a manager is seeing as informed, the propensity of a new disclosure is unaffected by any cash realizations since the last disclosure. Being revealed as informed induces a disclosing behavior and information is unraveled.

To test the prediction of negative relation between forecasts and past cash realizations, we run equation 1 on earnings surprises positives and negatives. We expect that firms on higher surprises are less likely to forecast and firms on lower quartiles are more likely to forecast. Table 2 presents the results. We can see that firms performing below zero have a strong incentive to disclose and discriminate each other a part. This behavior is especially true for less negative surprises firms, which have more incentives to sign the market that they are better than other firms. We can see on columns 3 and 4 that firms with higher performance are less likely to make future forecasts. These results are consistent with *EZ* argument that higher performances give managers the opportunity to create an uninformed reputation.

We next investigate if there is evidence of the implicit commitment of disclosure and how cash realizations affect disclosure for managers that have a forecast history and those who have not, and Table 3 presents the results.

TABLE 2

VARIABLES	(1) Most Neg	(2) Less Neg	(3) Less Posit	(4) Most Posit
EarnSup	0.126***	0.568***	-0.369***	-0.00711
	(0.0442)	(0.128)	(0.0617)	(0.0143)
#Analysts	0.000414	8.97e-06	-0.000112	0.000403
	(0.000471)	(0.000346)	(0.000355)	(0.000613)
ROA	193.7**	304.6***	-48.70	-334.7
	(98.01)	(71.35)	(76.41)	(240.0)
Investment	-0.782	-0.316	-0.470	0.125
	(0.936)	(0.692)	(0.628)	(1.122)
Market-to-book	-9.207*	-2.595	1.089	-0.664
	(5.319)	(2.021)	(1.307)	(4.091)
Liquidity	-2.335	-0.0986	-0.336	0.405
	(2.655)	(1.381)	(1.198)	(2.533)
EPS volat	-0.192***	-0.0600*	-0.0338	-0.190***
	(0.0404)	(0.0361)	(0.0259)	(0.0370)
Ret volat	-24.63***	-28.04***	-27.91***	-14.33***
	(3.849)	(3.295)	(2.898)	(5.291)
Leverage	0.933***	0.623***	0.491***	0.430
	(0.193)	(0.155)	(0.141)	(0.266)
Constant	0.118	1.209***	1.682***	-0.145
	(0.432)	(0.456)	(0.301)	(0.567)
Observations	2,673	6,377	7,845	2,699
Industry FE	YES	YES	YES	YES
year FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

First, we can see on column 1 that a disclosing manager are more likely to keep disclosing on following periods, as predicted by *EZ*. Column 2 presents the result for

equation 1 and we can see a consistent result for disclosing commitment after manager being identified as informed. We can also see the effect of cash realizations for managers that did make a prior forecast and for those that stayed quiet. Even so the coefficient of the interaction of surprises and the inverse of disclosing dummy is not significant, the liquid effect is positive and significant indicating that overall firms that did not make a prior forecast are taking surprises into consideration when deciding to voluntarily disclose. This result contradicts *EZ* predictions about the intertemporal dynamic effect of forecast.

Columns 3 to 6 brings the results of re-estimating equation 1, but now considering firms performance. We see on columns 3 and 4 that earnings surprises have a positive effect for firms that made a prior disclosure when firms present negative performance. These results are an inconsistent with *EZ* predictions. Cash realizations should have no effect for a disclosing firm.

On the other hand, columns 5 and 6 present the results for firms that present positive earnings surprises. We can see a negative coefficient, significant for higher surprises firms. This result could indicate that disclosing firms and choosing to stop disclosing and the really good performance gives the opportunity to do so. These firms could be seeing as uninformed instead of being withholding information given the high performance. However, although it is not a result from *EZ*, stay quiet and try to create an uninformed reputation for high performance firms is expected even for firms with disclosing history.

TABLE 3

VARIABLES	(1) Forecast	(2) Most Neg	(3) Less Neg	(4) Less Posit	(5) Most Posit
LAG F	1.928***	1.923***	1.909***	2.064***	2.104***
	(0.0347)	(0.137)	(0.0757)	(0.0659)	(0.140)
EarnSup	0.0280**	0.204***	0.782***	-0.0307	-0.0432**
	(0.0133)	(0.0692)	(0.210)	(0.114)	(0.0190)
(EarnSup)*(1-LAG F)	-0.00907	-0.122	-0.413	-0.142	0.0480*
	(0.0181)	(0.0832)	(0.276)	(0.141)	(0.0271)
#Analysts	-0.0003	8.70e-05	-0.0003	-0.0004	-0.0003
	(0.0002)	(0.0005)	(0.0003)	(0.0003)	(0.0005)
ROA	173.2***	186.2	178.3***	-39.31	-116.7
	(43.79)	(125.4)	(69.12)	(65.66)	(162.5)
Investment	-0.792**	-1.936*	-0.295	-0.660	-1.064
	(0.352)	(1.129)	(0.575)	(0.499)	(0.975)
Market-to-book	2.544**	-3.486	-1.415	3.685**	-2.447
	(1.075)	(4.758)	(2.076)	(1.444)	(3.553)
Liquidity	-1.571**	-1.330	-0.131	-1.046	-0.896
	(0.767)	(2.955)	(1.348)	(1.150)	(2.296)
EPS volat	-0.090***	-0.15***	-0.0490	-0.048**	-0.141***
	(0.0153)	(0.0374)	(0.0301)	(0.0209)	(0.0297)
Ret volat	-18.35***	-20.31***	-18.94***	-15.72***	-1.327
	(1.624)	(4.224)	(2.854)	(2.697)	(4.528)
Leverage	0.356***	0.619***	0.410***	0.369***	0.436**
	(0.0801)	(0.200)	(0.123)	(0.112)	(0.218)
Constant	0.223	-0.250	-0.0666	0.853***	-0.707
	(0.257)	(0.448)	(0.407)	(0.263)	(0.446)
Observations	18,736	4,798	4,650	4,702	4,503
Industry FE	YES	YES	YES	YES	YES
year FE	YES	YES	YES	YES	YES

	F-test				
Coeff	0.0190	0.0822	0.3681	-0.1723	0.0047
p-value	0.041	0.152	0.044	0.028	0.780

Furthermore, we see a different pattern for non-disclosing firms. First of all, that is no effect of surprises on the choice of disclosing for firms that are performing really bad and really good. This result contradicts *EZ* prediction that non-disclosing firms with really good performance have the opportunity to strengthen the uninformed reputation. Nevertheless, when looking to columns 4 and 5, we see a shifted sign when firms change from negative surprises to positive surprises. This change of effect indicates that firms with different performance have different incentives to disclose, as predicted on *EZ*. Moreover, the negative and significant coefficient on column 5 shows that non-disclosing firms with positive performance are less likely to start disclosing, consistent with *EZ* prediction of strengthen uninformed reputation.

Hence, empirical evidence show that indeed that is a persistent behavior on voluntary management forecast. Such behavior induces managers that once started disclosing to keep doing so, evidence of the implicit commitment discussed by *EZ*. We also found evidence that there are different incentives to disclose, depending on firm performance. *EZ* predicted that is easier to quiet firms to stay quiet and strengthen uninformed reputation when present better performance. We found evidence of such behavior for firms presenting performance around zero. However, we see that cash realizations still have a part on forecast decision, being the manager committed to disclose

or not. This result contradicts what was predicted by the model. Our hypothesis is that managers might decide to disclose not because of performance but focusing on boosting or sinking stock price to maximize their own utility.

Next, we investigate whether there is a channel through compensation where surprises affect willingness to disclosure. First, we validate the use of compensation to explain disclosure by estimating equation 2 on our four compensation variables. Firms use stock options as part of manager compensation package to align manager interests with shareholders' interests. Unfortunately, other agency problems may be arising and, focusing on maximize their utility, managers might have incentives to influence stock price when interested on exercising options or around options awards.

Table 4 presents results for these tests. We can see that compensation variables are significantly explaining forecasts. Although signs are not consistent, they are as expected. Managers have incentives to boost stock prices having stock options or not. A non-disclosing manager with only stocks will trigger a negative investors reaction due skepticism, which decreases managers' wealth. On the other hand, if the manager has only stock options, the decision of non-disclosing will leave the stock price to be affect only by normal market reactions. Thus, managers' wealth remains unchanged. Because managers' payoff is smaller with stocks than with options, having options decrease the probability of disclose relatively to stocks. Hence, the reason for the sign to shift is that correlation between *Forecast* and equity or options are opposites.

TABLE 4

VARIABLES	(1) Forecast	(2) Forecast	(3) Forecast	(4) Forecast
LAG F	1.925***	1.872***	1.929***	1.928***
	(0.0345)	(0.0356)	(0.0345)	(0.0345)
Opts	0.193***			
	(0.0463)			
OptsVst		-0.0791*		
		(0.0454)		
DoptsV			0.0998**	
			(0.0388)	
Dopts				0.0926**
				(0.0438)
#Analysts	-0.000302	-0.000273	-0.000282	-0.000285
	(0.000189)	(0.000190)	(0.000189)	(0.000189)
ROA	185.8***	184.2***	183.6***	182.8***
	(43.86)	(47.52)	(44.07)	(44.22)
Investment	-0.711**	-0.530	-0.769**	-0.779**
	(0.352)	(0.374)	(0.353)	(0.353)
Market-to-book	2.637**	3.222***	2.636**	2.639**
	(1.081)	(1.178)	(1.078)	(1.081)
Liquidity	-1.643**	-1.987**	-1.533**	-1.517**
	(0.763)	(0.854)	(0.766)	(0.768)
EPS volat	-0.088***	-0.0851***	-0.0867***	-0.0867***
	(0.0152)	(0.0160)	(0.0152)	(0.0152)
Ret volat	-19.22***	-19.63***	-19.17***	-19.18***
	(1.605)	(1.677)	(1.609)	(1.608)
Leverage	0.341***	0.368***	0.350***	0.349***
	(0.0797)	(0.0834)	(0.0797)	(0.0799)
Constant	0.200	0.377	0.196	0.204
	(0.253)	(0.232)	(0.252)	(0.253)
Observations	18,729	16,541	18,736	18,736
Industry FE	YES	YES	YES	YES

year FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Nevertheless, the results show that hold stock options have an impact on willingness to make management forecasts. These results corroborate with our argument that compensation might be an important channel throughout cash realizations influence disclosures that was not considered do far. Having this relationship being distinguished, we can look whether *EZ* predictions hold when considering the effect on compensation on *Forecast*.

Table 5 presents results for equation 3, on proportion of vested options. Column 1 shows overall results for option wealth variables, column 2 to 5 for regressions considering different earnings surprises performances. We can see on column 1 that on average cash realizations have no impact on willingness to forecast. This is already an improvement from our first set of results. We can see that managers with a history of forecast are not considering performance when deciding to disclose again. This result corroborates *EZ* prediction and is an improvement from our first set of results.

Now, columns 2 - 5 shows that firms with different performances have different incentives to disclose. We can see a clear shift of effect around zero for disclosing firms, indicating change of incentives. Managers that made a prior forecast take performance into consideration on forecast decision whenever earnings surprises are low. Perhaps this effect reflects a necessity to sign a better result on the future.

TABLE 5

VARIABLES	(1) Forecast	(2) Most Neg	(3) Less Neg	(4) Less Posit	(5) Most Posit
LAG F	1.872***	1.906***	1.833***	1.986***	2.013***
	(0.0359)	(0.144)	(0.0771)	(0.0674)	(0.145)
EarnSup	0.0202	0.241**	1.163***	-0.0524	-0.0142
	(0.0211)	(0.106)	(0.369)	(0.179)	(0.0322)
(EarnSup)*(1-LAG F)	-0.00472	-0.166*	-0.409	-0.129	0.0583**
	(0.0188)	(0.0882)	(0.287)	(0.148)	(0.0283)
OptsVst	-0.0830*	-0.100	-0.399***	-0.119	0.231
	(0.0466)	(0.226)	(0.129)	(0.0973)	(0.183)
(EarnSup)*OptsVst	0.0129	-0.00336	-0.667	0.0134	-0.0408
	(0.0221)	(0.140)	(0.474)	(0.220)	(0.0379)
#Analysts	-0.0003	-7.66e-05	-0.001***	-0.001***	-0.001**
	(0.0002)	(0.0004)	(0.0003)	(0.0002)	(0.0004)
ROA	174.1***	216.9	219.5***	-47.15	-365.0
	(47.08)	(140.9)	(71.48)	(66.59)	(223.4)
Investment	-0.548	-1.692	-0.0297	0.256	-0.420
	(0.373)	(1.170)	(0.610)	(0.520)	(1.049)
Market-to-book	3.136***	-8.501	-3.134	5.762***	2.658
	(1.172)	(6.664)	(2.238)	(1.504)	(3.775)
Liquidity	-2.027**	-2.312	-1.309	-3.791***	-0.115
	(0.851)	(3.278)	(1.476)	(1.198)	(2.494)
EPS volat	-0.088***	-0.149***	-0.0373	-0.044**	-0.147***
	(0.0161)	(0.0421)	(0.0329)	(0.0225)	(0.0305)
Ret volat	-18.71***	-20.41***	-12.12***	-9.57***	-4.042
	(1.705)	(3.282)	(2.142)	(2.099)	(3.944)
Leverage	0.365***	0.696***	0.372***	0.348***	0.514**
	(0.0834)	(0.208)	(0.130)	(0.115)	(0.227)
Constant	0.335	-0.305	-0.236	0.218	-1.074***
	(0.234)	(0.477)	(0.366)	(0.226)	(0.397)
Observations	16,541	2,305	5,468	6,644	2,218

Industry FE	YES	YES	YES	YES	YES
year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

F-test					
Coeff	0.016	0.142	-0.249	-1.001	0.038
p-value	0.295	0.102	0.739	0.096	0.067

However, when looking for a quiet manager F-tests shows that firms right above zero have big incentives to stay quiet and keep building an uninformed reputation. For firms right below zero, we see a negative coefficient, which also corroborates with the uninformed reputation prediction, but is not significant. Results on most positive surprises are controversial. Evidence shows that a quiet manager are more likely to start talking if performing well unlike predicted by the model. We still see a consistent and significant effect of past forecasts on manager willingness of making more forecasts, corroborating on *EZ* predictions of implicit commitment for managers that forecasted on previous period.

Furthermore, we look for total options instead of wealth. Table 6 presents the results. The overall results are similar to what we found with options vested ratio. Earnings surprises are not significant for disclosing managers, Table 3 also consistent with *EZ* predictions. For those managers that did not have a history of disclosure, although we see a negative sign as predicted by *EZ*, it is mostly not significant. F-test also corroborate with evidence that earnings surprises do not have effect on disclosure for stayed quiet managers.

TABLE 6

VARIABLES	(1) Forecast	(2) Most Neg	(3) Less Neg	(4) Less Posit	(5) Most Posit
LAG F	1.924***	1.922***	1.903***	2.062***	2.103***
	(0.0346)	(0.139)	(0.0758)	(0.0658)	(0.141)
EarnSup	0.00961	0.211**	0.752***	0.0993	-0.0520**
	(0.0155)	(0.0894)	(0.262)	(0.138)	(0.0238)
(EarnSup)*(1-LAG F)	-0.00806	-0.121	-0.407	-0.145	0.0492*
	(0.0182)	(0.0854)	(0.275)	(0.141)	(0.0271)
Opts	0.173***	-0.0432	0.191*	0.276***	0.338*
	(0.0471)	(0.230)	(0.116)	(0.0948)	(0.176)
(EarnSup)*Opts	0.0398**	-0.0205	0.0431	-0.283	0.0163
	(0.0195)	(0.136)	(0.437)	(0.196)	(0.0341)
#Analysts	-0.0003	9.18e-05	-0.0003	-0.0004	-0.0004
	(0.0002)	(0.0005)	(0.0003)	(0.0003)	(0.0005)
ROA	176.4***	187.1	183.3***	-31.19	-128.6
	(43.63)	(125.0)	(69.34)	(65.76)	(164.4)
Investment	-0.713**	-1.947*	-0.256	-0.598	-0.716
	(0.352)	(1.129)	(0.576)	(0.498)	(0.977)
Market-to-book	2.554**	-3.693	-1.210	3.669**	-2.043
	(1.075)	(4.784)	(2.113)	(1.438)	(3.551)
Liquidity	-1.670**	-1.233	-0.365	-1.267	-0.782
	(0.762)	(2.942)	(1.352)	(1.145)	(2.278)
EPS volat	-0.09***	-0.16***	-0.0514*	-0.05**	-0.137***
	(0.0154)	(0.0374)	(0.0299)	(0.0209)	(0.0302)
Ret volat	-18.31***	-20.28***	-18.96***	-15.81***	-0.760
	(1.626)	(4.224)	(2.860)	(2.700)	(4.493)
Leverage	0.339***	0.621***	0.391***	0.357***	0.411*
	(0.0797)	(0.200)	(0.122)	(0.112)	(0.215)
Constant	0.165	-0.234	-0.162	0.742***	-0.824*
	(0.252)	(0.458)	(0.424)	(0.284)	(0.447)
Observations	18,729	2,612	6,173	7,516	2,535
Industry FE	YES	YES	YES	YES	YES

year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

F-test					
Coeff	0.002	0.089	0.345	-0.046	-0.003
p-value	0.899	0.170	0.161	0.687	0.898

When looking to performance regressions we can see a difference of incentives for managers that disclosed or stayed quiet. If a manager made a forecast before earnings surprises have impact if performing bad or when performing well, when being quiet penalization for an informed manager could be at least enlivened by the very good performance. The negative coefficient for higher performance firms is very interesting. This result is not predicted by *EZ* but is consistent with the argument that firms performing better have greater opportunity to stay quiet and be seeing as uninformed. For non-disclosing manager the liquid effects of surprises are not significant, but we can see evidence for *EZ* predictions as the sign shifts according to performance.

Table 7 and 8 presents the results for having stock options instead of looking to wealth. The overall result is similar for both and consistent with what we have found before. Now, when looking to performance they both present shift of signal after zero, indicating change of incentives, but significance is stronger when considering only vested options. Interestingly, we also see negative and significant coefficient for disclosing managers that are performing well. An unexpected result that corroborates with *EZ* arguments. For non-disclosing managers we also see a shift of sign when

looking for the liquid effects. However, the significance shifts from low positives to high positives when changing DoptsV to Dopts.

Afterwards, when including compensation variables, we see evidence of the importance of stock options endowment on managers disclosure decision. Regardless we do not find much significance on the interaction of earnings surprises and options variables, we see an important liquid effect, indicating that managers are indeed taking into consideration their gains when choosing to voluntarily speak to investors. This is an important result, indicating that, although the compensation package is given to managers focusing on decrease agency problems, there is still room for managers to exercise their power of discretion to boost their utilities and maximize their gains.

Our results are important contributing to several fields of accounting literature. First, we contribute to voluntary disclosure literature pointing out empirical evidence for an important theory. Our findings enlighten managers' voluntary disclosure behavior as dependent of occurrence of disclosures on prior periods. We also find that cash flow realizations have dubious effect, depending to firm performance and the existence of prior disclosures. These result reveals a strategic decision to disclose guidance, both for managers with disclosing history and for managers that did not disclose before. Furthermore, we found an interesting result that illustrate managers' incentives to stop disclosing. Firms with high performance present an opportunity to managers break voluntary disclosing persistence. Top quartiles performance firms difficultly are managing earnings this high. Hence, when deciding to stop disclosing, managers are more likely to seem uninformed than hidden bad news.

TABLE 7

VARIABLES	(1) Forecast	(2) Most Neg	(3) Less Neg	(4) Less Posit	(5) Most Posit
LAG F	1.927***	1.917***	1.868***	2.018***	2.105***
	(0.0347)	(0.136)	(0.0731)	(0.0641)	(0.140)
EarnSup	0.0232	0.276**	0.999**	-0.322*	-0.0515*
	(0.0181)	(0.125)	(0.393)	(0.181)	(0.0288)
(EarnSup)*(1-LAG F)	-0.00877	-0.134	-0.352	-0.156	0.0483*
	(0.0181)	(0.0826)	(0.271)	(0.141)	(0.0271)
DoptsV	0.0978**	0.0160	-0.00517	0.0708	0.0616
	(0.0392)	(0.191)	(0.100)	(0.0732)	(0.146)
(EarnSup)*DoptsV	0.00552	-0.0694	-0.360	0.340*	0.00922
	(0.0177)	(0.115)	(0.391)	(0.175)	(0.0304)
#Analysts	-0.0003	-1.80e-05	-0.001***	-0.009***	-0.001
	(0.0002)	(0.0004)	(0.0003)	(0.0002)	(0.0005)
ROA	175.1***	219.0*	226.5***	-8.822	-123.4
	(43.76)	(127.1)	(71.16)	(63.84)	(162.1)
Investment	-0.785**	-1.913*	-0.129	-0.178	-1.057
	(0.352)	(1.110)	(0.572)	(0.497)	(0.972)
Market-to-book	2.565**	-3.610	-1.498	4.167***	-2.386
	(1.073)	(4.966)	(2.104)	(1.431)	(3.535)
Liquidity	-1.581**	-1.337	-2.136	-2.924**	-0.802
	(0.765)	(2.829)	(1.369)	(1.135)	(2.293)
EPS volat	-0.089***	-0.15***	-0.042	-0.035*	-0.139***
	(0.0154)	(0.0375)	(0.0308)	(0.0206)	(0.0299)
Ret volat	-18.32***	-18.64***	-11.85***	-7.848***	-1.158
	(1.627)	(3.167)	(2.045)	(1.997)	(4.532)
Leverage	0.35***	0.61***	0.40***	0.320***	0.419*
	(0.0798)	(0.195)	(0.124)	(0.111)	(0.218)
Constant	0.141	-0.560	-0.488	0.103	-0.758*
	(0.258)	(0.398)	(0.375)	(0.228)	(0.460)

Observations	18,736	2,617	6,175	7,516	2,535
Industry FE	YES	YES	YES	YES	YES
year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

F-test					
Coeff	0.0145	0.142	0.647	-0.478	-0.003
p-value	0.447	0.170	0.100	0.007	0.923

Moreover, we also contribute to compensation literature. We use several CEOs options compensation variables as a control variable and find that as an overall result it helps to explain managers decisions to guide investors' expectations. However, the result is weak on disaggregated level, when looking to vested options. An anecdotal explanation is that high performance firms are already presenting good conditions to exercise vested options and really low performance firms' managers already gave up on those options. Firms with negative but close to zero EPS give incentives to managers stay quiet and try to exercise their options but without mislead investors.

Finally, we contribute to regulators indicating that the decision to disclose non-mandatory information could be taken with an agenda, looking to maximize managers utility instead the willingness to increase investors information set. It is important to measure and evaluate closer the true gains of such behavior and how it really contributes to market equilibrium.

TABLE 8

VARIABLES	(1) Forecast	(2) Most Neg	(3) Less Neg	(4) Less Posit	(5) Most Posit
LAG F	1.926***	1.923***	1.869***	2.022***	2.105***
	(0.0347)	(0.137)	(0.0733)	(0.0641)	(0.140)
EarnSup	0.00739	0.262**	0.463	-0.0271	-0.102***
	(0.0218)	(0.113)	(0.394)	(0.203)	(0.0345)
(EarnSup)*(1-LAG F)	-0.00866	-0.136	-0.367	-0.128	0.0480*
	(0.0180)	(0.0835)	(0.272)	(0.141)	(0.0268)
Dopts	0.0819*	-0.132	0.212**	0.149*	-0.233
	(0.0441)	(0.175)	(0.103)	(0.0871)	(0.158)
(EarnSup)*Dopts	0.0230	-0.0451	0.259	-0.0113	0.0654**
	(0.0193)	(0.101)	(0.398)	(0.187)	(0.0320)
#Analysts	-0.0003	-2.06e-05	-0.001***	-0.001***	-0.0003
	(0.0002)	(0.0003)	(0.0003)	(0.0002)	(0.0005)
ROA	174.3***	213.3*	226.6***	-6.726	-140.4
	(43.90)	(127.4)	(71.45)	(64.18)	(167.0)
Investment	-0.795**	-1.856*	-0.119	-0.196	-1.059
	(0.352)	(1.109)	(0.572)	(0.498)	(0.972)
Market-to-book	2.567**	-3.883	-1.273	4.238***	-2.557
	(1.076)	(5.033)	(2.149)	(1.436)	(3.618)
Liquidity	-1.566**	-1.412	-2.152	-2.905**	-0.593
	(0.767)	(2.836)	(1.384)	(1.143)	(2.304)
EPS volat	-0.09***	-0.15***	-0.043	-0.037*	-0.14***
	(0.016)	(0.037)	(0.031)	(0.021)	(0.030)
Ret volat	-18.31***	-18.45***	-11.94***	-7.980***	-1.418
	(1.628)	(3.177)	(2.043)	(1.995)	(4.556)
Leverage	0.346***	0.628***	0.399***	0.325***	0.416*
	(0.0800)	(0.194)	(0.124)	(0.111)	(0.219)
Constant	0.174	-0.474	-0.704*	-0.0450	-0.473
	(0.255)	(0.403)	(0.377)	(0.233)	(0.454)

Observations	18,736	2,617	6,175	7,516	2,535
Industry FE	YES	YES	YES	YES	YES
year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

F-test					
Coeff	-0.001	0.127	0.097	-0.156	-0.054
p-value	0.949	0.166	0.810	0.397	0.098

3.6 CONCLUSION

This paper searches for evidence for four predictions made by Einhorn and Ziv (2008) multi-period voluntary disclosure model. We first investigate evidence of an implicit disclosure commitment for managers seeing by the market as informed. Thus, we check how cash realizations affect the propensity of disclosure. Them we check for whether likeliness to disclose are decreasing on cash realizations, indicating that good performance brings opportunity to create a reputation of not being informed.

Running regressions on positive and negative earnings surprises we show that indeed managers have different incentives to disclose regard firms' performance. We found good evidence that firms with history of disclosure are more likely to keep informing the market, as predicted by the model. We also found evidence of earnings surprises having a positive and significant effect on forecast for both disclosing and non-disclosing firms. This finding does not give support for *EZ* predictions.

Next, we include stock options compensation variables to the model setting. We found that forecast persistence still positive and significant. More important, this extension

shows that earnings surprises have no influence on forecasts for firms with history of management forecasts, which is exactly the prediction from *EZ*. We also found that earnings surprises reduce the willingness to disclose for a firm with no history of forecasts, like the model predicts, but this effect is not significant.

When running regressions on positives and negatives earnings surprises, we see different incentives to disclose for managers that made a forecast or not. An informed manager considers cash realizations when making a disclosure choice if are performing bad or performing well. This result is really interested because it shows that a disclosing manager could stop disclosing when performing well, as argued by *EZ*. On the other hand, a quiet manager tends to stay quiet, especially if performing right above zero earnings surprises. We can also see a weak negative relation between cash realizations and forecast, as *EZ* predicted.

In conclusion, we found that managers around zero earnings surprises have different incentives when deciding to disclose or not. We found that those below zero have great incentives to disclose and discriminate themselves a part and those above the median have more incentives to stay quiet if they did not make a prior forecast. This result sustains *EZ* predictions that managers have a threshold when deciding whether to voluntarily disclose or not their private information.

We also found strong evidence of an inter-temporal effect on the choice of making a forecast. This finding indicates that after choosing to make a forecast, managers are seeing as informed and market expects to continue revealing information. The creation of a reputation of not being informed is important to be able to withhold information and not

being penalized by the market as a holder of bad information, such would be a manager that chooses to stop disclosing. We also found that earnings surprises have not much of a role when managers choose to disclose or not and a prior disclosure was made. Not being seeing as holder of really bad news becomes much more important than withhold information and managers have a persistent behavior after choosing to disclose. Both these findings corroborate with *EZ* predictions and give support to their theory.

Unfortunately, we did not find evidence that earnings surprises have a negative effect on the likeliness to disclose. We found that a firm with no history of discloses are less likely to make a forecast, but the joint effect is not significant although we found some negative signs. This finding is not what *EZ* predicted but in no way opposed the theory. It gives room for further investigation of what more effects could be missing.

CONCLUSION

We investigated information real effects on firms' behavior over three different settings. First, we use a theoretical model to explore real effects of reverse impairment losses option. We find that allowing such discretion incentives managers to make less effort to identify impairment necessity which induces more undue impairments to be made, increasing managers' rigorousness. On the other hand, managers restriction to reverse impairment losses induces managers' leniency, resulting on less impairments made when managers are uncertainty. As a result, market prices higher firms with rigorous managers after impairing an asset.

We contribute with real effects literature by presenting theoretical evidence to an important discussion about accounting standards and accounting conservatism. There is not much theoretical evidence about impairment and impairment reversals. We enlighten a few important facts and aggregate on accounting literature towards a consensus on impairment losses reversal impacts.

Furthermore, we focus on investigating whether economic crisis periods induce firms toward trade credit usage to finance short-term operations as a result of banking credit shrinkage. Brazilian setting gives a major opportunity in the sense of having one of the biggest economic developing banks in the world, BNDES. We use three different trade credit measures to capture trade credit demand, offer and profile. Using as control group those firms that use BNDES credit on a given year, we find strong evidence that regular firms are induced to use more trade credit during economic crisis.

We contribute to trade credit literature that have not yet a consensus about firms' short-term funding behavior during financial crises. Finance literature have found dubious evidence whether firms shift funding toward trade credit or not. We bring a new perspective to the discussion, separating firms that continue to receive banking credit during credit shrinkage and those that do not.

Finally, we examine managers' voluntary disclosure behavior. Voluntary disclosure literature has not yet determined managers' willingness to voluntary disclose. We use a theoretical framework provided by Einhorn and Ziv (2008) to predict managers decision to disclose guidance. Furthermore, we include managers' option wealth as utility proxy to test for opportunistic disclosure. We find evidence that managers are not disclosing just to inform stakeholders but also when their own interest are in stake, in the shape of compensation package.

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APPENDIX

- Claim 1

  The conditions to manager release a good report If evidence is G, she
  will always release Y_G

  $$\Phi > \phi > \phi \quad L => \Phi \quad \phi > \quad L => \frac{\Phi - \phi}{L} > \quad 1 => \frac{\Delta M}{L} > 0$$

  Because Φ is strictly greater than φ and L is greater than zero by assumption, it is
  always true.
  If evidence is I, she will release Y_G if
  $$\Phi - (1 - \lambda)L > \phi - \lambda L => \Phi - \phi > [(1 - \lambda) - \lambda)]L => \frac{\Delta M}{L} > \Delta\lambda$$
  If evidence is B she will release Y_G if
  $$\Phi - L > \phi => \Phi - \phi > L => \frac{\Delta M}{L} > 1$$

- Claim 2

  comes straightforward from taking the first derivative of q on each payoff function

- Lemma 1

  from each expression on Claim 2, invert function c and get $q*$

- Claim 3

  The Bayesian probabilities are summarized as follows
  Pr(G|y_G,Le,q) = 1

  $$\Pr(G|y_B, Le, q) = [\frac{\lambda(1 - q)}{1 - \lambda q}]^2$$

  $$\Pr(G|y_G, R, q) = \frac{\lambda}{1 - (1 - \lambda)q}$$

  Pr(G|y_B,R,q) = 0

  Pr(G|y_G,IND,q) = λ

  Plugging the respective Bayesian probability on first best investment from equation 1,
  we get optimum investment for each case.

- Remark 1

  We saw that first best investment is $K^F_G I = \mu^2$ and $K^F_B I = 0$, thus comparing with
  optimum investment on claim 3:

$k(y_B, Le, q*)$:

Assume $[\frac{\lambda(1-q^*)}{1-\lambda q^*}]^2 \mu^2 < \mu^2$

Thus, $[\frac{\lambda(1-q^*)}{1-\lambda q^*}]^2 < 1 \Rightarrow \frac{\lambda(1-q^*)}{1-\lambda q^*} < 1 \Rightarrow \lambda(1-q^*) < 1 - \lambda q^* \Rightarrow \lambda - \lambda q^* < 1 - \lambda q^* \Rightarrow$
$\lambda < 1$

This is true by definition

$k(y_G, R, q*)$:

Assume $[\frac{\lambda}{1-(1-\lambda)q^*}]^2 \mu^2 < \mu^2$

Thus, $[\frac{\lambda}{1-(1-\lambda)q^*}]^2 < 1 \Rightarrow \frac{\lambda}{1-(1-\lambda)q^*} < 1 \Rightarrow \lambda < 1 - (1-\lambda)q^* \Rightarrow (1-\lambda)q^* < (1 - \lambda) \Rightarrow q < 1$

This is true by definition

- Claim 4

  By the assumption of competitive market, the price of the firm equals investors'
  expected return $p^2\mu^2$ plus the expected damage award from overstatement

  Thus, plugging the respective Bayesian probability summarized on proof of Claim 3
  we have:

  $M(y_G, Le, q*)$:

  $Pr(G|y_G, Le, q) = 1$ and expected liability $= 0$

  $E[M(y_G, Le, q*)] = \mu^2$

  $M(y_B, Le, q*)$:

  $Pr(G|y_B, Le, q) = [\frac{\lambda(1-q)}{1-\lambda q}]^2$

  The Bayesian probability to receive a liability when a conservative manager releases
  Y_B is $\frac{(1-q^*)\lambda}{1-\lambda q^*}$

  Thus, $E[M(y_B, Le, q^*)] = [\frac{\lambda(1-q^*)}{1-\lambda q^*}]^2 \mu^2 + \frac{(1-q^*)\lambda}{1-\lambda q^*} L$

M(y$_G$,R,$q*$) :

$$\Pr(G|y_G, R, q) = \frac{\lambda}{1 - (1 - \lambda)q}$$

The Bayesian probability to receive a liability when a conservative manager release

Y$_G$ is $\frac{(1-\lambda)(1-q^*)}{1-(1-\lambda)q^*}$

Thus, $E[M(y_G, R, q^*)] = \frac{\lambda}{1-(1-\lambda)q^*}^2 \mu^2 + \frac{(1-\lambda)(1-q^*)}{1-(1-\lambda)q^*}L$

M(y$_B$,R,$q*$) :

Pr(G|y$_B$,R,q) = 0

Thus,

E[M(y$_B$,R,$q*$)] = 0 • Claim 5

Proof follows proof of Claim 1

- Proposition 1

From figure 3 we can see that manager turns from Rigorous to Lenient when $\frac{\Delta M}{L} = \Delta\lambda$

From figure 4 we can see that manager turns from Rigorous to Lenient when $\frac{\Delta M}{L} = \frac{\Delta\lambda}{1-\lambda}$

Because by definition λ is greater than zero, ΔM_{-L} increases managers' rigorousness and reduces leniency when impairment loss reversals are allowed • Corollary 3

Straightforward from Proposition 1

- Claim 6

Follows proof of Claim 2

- Lemma 2

Follows proof of Lemma 1 • Proposition 2

Straightforward from Lemma 1 and Lemma 2

- Claim 7

When allowed to reverse impairment losses, Bayesian probabilities summarize as follows: Pr(G|y$_G$,Le,q) = 1

$Pr(G|y_B, Le, q, Re) = \dfrac{1-q}{1-q\lambda}$

$Pr(G|y_G, R, q) = \dfrac{\lambda}{1-(1-\lambda)q}$

$Pr(G|y_B, R, q, Re) = 0 \quad Pr(G|y_G, IND, q = \lambda$

The rest of this proof follows the proof of Claim 3

- Remark 2

Follows proof of Remark 1

- Lemma 3

Assume $q*_{NR}$ as optimum effort for Non-Reversal accounting and $q*_R$ for Reversal accounting.

We know from proposition 2 that $q*_{NR,Ri} > q_{R,Ri}*$

$(1 - q*_{R,Ri}) > (1-q_{NR,Ri}*) > \lambda(1-q_{NR,Ri}*) => (1-q_{R,Ri}*) > \lambda(1-q_{NR,Ri}*)$

Thus, $\dfrac{1-q^*}{1-q^*\lambda} > \dfrac{\lambda(1-q^*)}{1-q^*\lambda}$

Hence, $\mu^2 - \left[\dfrac{1-q^*}{1-q^*\lambda}\right]^2 \mu^2 < \mu^2 - \left[\dfrac{\lambda(1-q^*)}{1-q^*\lambda}\right]^2 \mu^2$

- Claim 8

Follows proof of Claim 4

- Lemma 4

Straightforward from Claims 4 and 8

- Proposition 3

Straightforward from Claims 4 and 8 and Lemma 3

- Claim 9

After manager reverse impairment losses, Bayesian probabilities summarize as follows:

$Pr(G|y_G, Le, q) = 1$

$Pr(G|y_B,Le,q,Re) = 0$

$Pr(G|y_G,R,q) = \frac{\lambda}{1-(1-\lambda)q}$

$Pr(G|y_B,R,q,Re) = 0$

$Pr(G|y_G,IND,q) = \lambda$

The rest of the proof follows the proof of Claims 3 and 4