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The Effect of Banks' Commission Fees in Brazilian IPOs' Underpricing

Thiago Medeiros de Mattos Brito

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Supervisor: Jens Forssbaeck, Ph.D.

Abstract

It is known that underpricing is a widely researched topic worldwide by many different aspects, having instigated studies over the last decades to find reasons in order to explain this phenomenon. However, its relation with banks' commission fees is still a little explored field, possibly due to the lack of data available to test for this hypothesis. This context raises the following research question: Are underwriters' commission fees a determinant of IPO underpricing? In Brazil, when companies are willing to raise funds in the stock exchange, they are required to disclose in the IPO prospectus the amount of fees to be paid to underwriters, auditors and attorneys. Based on this available data for the Brazilian market, it will be possible to test the hypothesis of a relation between underpricing and bank's commission fees, as well as to explore its potential theoretical motivations. Data from 125 Brazilian companies that went public during the period 2007-2018 were collected in order to proceed with this analysis. Multiple linear regressions accounting for different control and explanatory variables were performed to arrive at the final result that an increase on underwriters' commission fees tends to minimize underpricing, especially considering the Incentive fee category.

Keywords: IPO, Underpricing, Underwriters, Commission Fees, Brazilian Capital Market

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1 Introduction

When a company takes the decision to go public, it contracts a group of financial institutions to assist through the Initial Public Offering (IPO) process. These banks are known as underwriters and perform a key role during the IPO route as they are responsible for evaluating the enterprise in order to set the initial price range that the issuer's share will be offered to the market. After this step, the bankers along with some company's executives start a series of presentations to investors (known as roadshows) in order to advertise the offer and generate interest in potential buyers. The bookbuilding process happens together or just after the roadshows and consists in collecting bids from fund managers stating the number of shares they want to buy and for which price considering the settled range, being these bidders usually clients of the banks that are playing the underwriter role. By calculating a weighted average of these proposals, a final issue price is found and the company can proceed with the offering.

At the time when contracting an underwriter, the issuer has to decide on the IPO type of sale to establish the service terms. The most common options are Firm Commitment (banks guarantee the sale of a certain amount of shares by purchasing them at the IPO price and reselling it to the public, bearing the market price risk), Best Efforts (underwriters commit on doing its better to sell the IPO, but does not ensure any demand) and Pure Auction (financial institutions organize an auction for investors to bid their offers and the shares are distributed on a top-down basis in accordance with the bid prices). The underwriters are paid through commission fees settled as a percentage of the proceeds raised in the offering, and these fees are usually distributed into four categories: Coordination (payment for the banks' work together with the issuer in the preparation of the IPO materials), Firm Commitment (compensation for the risk of guaranteeing the sale in the case of a firm commitment type of sale offer), Placement (commission for the banks' sales team that are advertising and selling the issuing to clients) and Incentive (bonus payment to stimulate the financial institutions to sell the offering).

It is on IPO processes that one of the most interesting and curious phenomena in finance takes place, being subject of study to many researchers due to its wide range of possible explanations and theories behind: The IPO Underpricing. It does happen when the final issuing price proves to be lower than the value that the market consensus is attributing to the company at the first

day of negotiation due to a broader valuation by the whole market and not only by the investors that participated in the bookbuilding process, meaning that the company did not raise all the possible proceeds from its initial public offering. The underpricing itself can be measured dividing the closing price on the first day of trading by the IPO price established in the offer definitive prospectus minus one. If the first-day stock return is positive there was underpricing in the issuing, while if it is negative an overpricing occurred.

In this master thesis, the potential relation between underpricing and banks' commission fees is explored considering the Brazilian capital market environment, where the amount of fees is available due to the stock exchange regulation. The reason for analyzing the association of underpricing and underwriters' fees is to build a better understanding of the role financial institutions play in this phenomenon, as well as to explore potential theoretical motivations like if an underwriter would contribute deliberately towards an IPO share price under market expectations to mitigate its own risk in the case of an offer with firm commitment clauses, for example. The implications of such a relationship are complex and may be linked to some well-known underpricing theories, such as Asymmetric Information. Considering the underwriters' point of view, it has mixed incentives: On the one hand banks will receive fewer commissions if the underpricing is too relevant as the fees are negotiated as a percentage of the raised proceeds, but on the other hand they could make a higher profit reselling underpriced stock being traded with a premium in the market. Consequently, the type of sale may play a role here as it determines who bears the risks involved. A possible agency cost story may also apply as the issuer firm (principal) wants to maximize proceeds while underwriters (agent) may have other motivations. Thus, commissions can be used as incentive pay to reduce agency problems, and if this works, then underpricing should decrease if the percentage of commissions are high.

This synopsis illustrates the complexity of the subject, in which some implications can even be paradoxical in certain aspects. An example of that was given by Loughran and Ritter (2002) who found that besides not raising all the potential amount of proceeds due to IPO underpricing (leaving money on the table, in the financial market jargon), generally the companies' decision makers are happier after the issuing because they discover that its shares are more valuable than expected, meaning that they became wealthier after the IPO.

Taking into consideration the described scenario, this master thesis main research question arises: Are underwriters' commission fees a determinant of IPO underpricing? The hypothesis

of a relation between underpricing and commission fees was tested using data from 125 Brazilian companies that went public during the 2007-2018 period. Multiple linear regressions were performed taking into account potential explanatory variables as well as control variables like the firm's age, size, capital structure, industry, listing segment as well as issuing year. The final objective of this research is to test the hypothesis that an increase in the commission fees paid to underwriters would contribute to decrease underpricing in the IPO. The most similar study was held by Ljungqvist (2003) considering exclusively IPOs in the UK during 1991-2002 and does only accounts for the banks' total commission rate and flat fees, without a breakdown per category. Considering the most recent and relevant years in the Brazilian capital market, the findings of this master thesis could complement other paper works covering the underpricing topic as well as motivate further empirical studies about this relationship in other countries if commission fees data are available. The thesis is structured in the following way:

- a. Theoretical Review:** Assess the existing literature about IPO underpricing and previous researches covering the topic in order to present relevant theories and how they would support the hypothesis of a relation between underpricing and banks' commission fees in the Brazilian capital market.
- b. Data and Methodology:** Description of the data considered in the analysis, including how it was collected and the adjustments made. Also reveals what had to be excluded in order to create reliable models as well as the limitations found during the development of this academic work. Methodology part consists of information about the research approach used and the initially raised hypotheses.
- c. Results and Analysis:** Interpretation of the results obtained from the performed regression models and its relation with the previously presented literature in order to discuss how the findings contribute to accept or reject the argument that underwriters' fees might play a role in IPO underpricing.
- d. Conclusion:** Summary answering if the master thesis fulfilled its research aims and objectives, also commenting on the practical implication of the results found and how it would contribute to future researches.

2 Theoretical Review

Underpricing is a widely researched topic in finance and has a significant impact on an issuer's initial public offering evidencing in the first day of trading the amount of money the company left on the table. Logue (1973) and Ibbotson (1975) had already exploited it in their early studies commenting that the share prices on IPOs are usually underpriced, resulting in expressive positive returns in the offering day. Ljungqvist (2007) says that every year firms leave several billions of dollars behind, being 19% the average IPO underpricing in the United States of America since the 1960s, as shown in Figure 1 below.

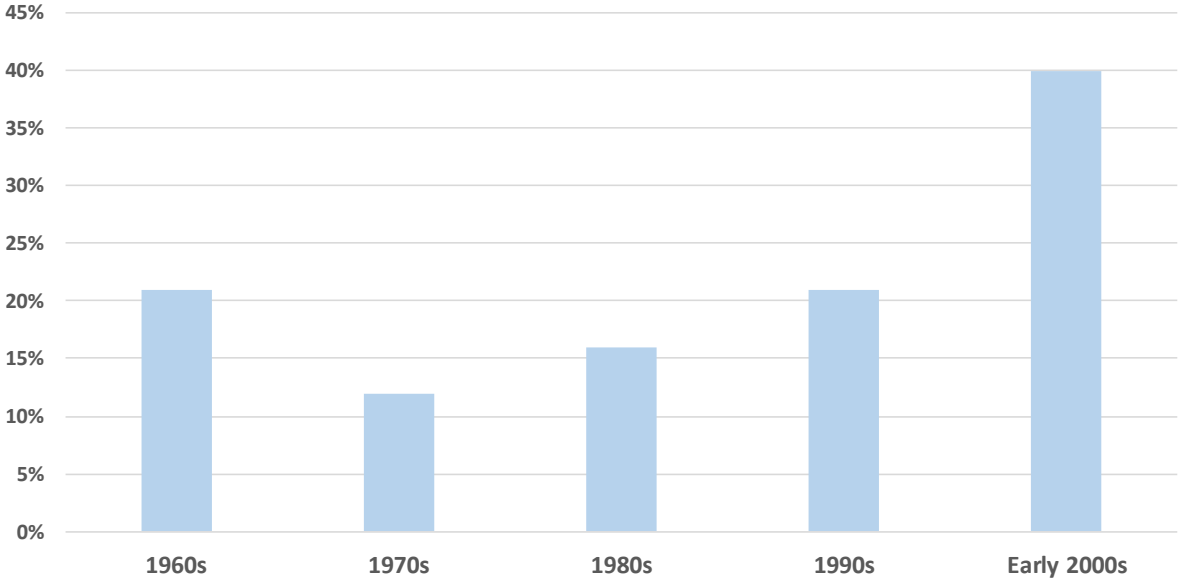


Figure 1 – Average Underpricing in the U.S. IPO Market (Ljungqvist, 2007)

The reasons for underpricing to happen on an initial public offering are diverse, ranging from excess demand due to strong interest of investors or favorable economic conditions (also known as hot market, in the financial market jargon), to hidden motivations as like willingness of the issuing participants to deliberately settle a final share price below the market expectations. In this section the main theories on underpricing are explored as well as the influence that financial institutions have on it, aiming to support the main idea of this master thesis that there is a relation between banks' commission fees and underpricing using the Brazilian IPOs over the last twelve years as a testing sample.

2.1 Main Theories of Underpricing

Ljungqvist (2007) analyzed the main theories on underpricing and grouped them into four different categories:

- a. Asymmetric Information:** Based on the belief that the information level is not necessarily the same among the IPO participants (issuer, underwriters, and investors), giving to the ones with extra knowledge the advantage when assessing the company's fair value. There is no consensus in the literature on which part would possess this information benefit: Baron (1982) defends that are the underwriters, Welch (1989) assumes that the issuer is privileged when talking about company's information, while Rock (1986) supports that some investors can be better informed than any other participant in the IPO. Three main theories may apply and will be further discussed later: Winner's Curse, Information Revelation and Agency Conflicts.
- b. Institutional:** Assumes that factors such as taxes, stock exchange regulations and legal issues might contribute towards IPO underpricing. The primary intuition comes from Logue (1973) and Ibbotson (1975) studies indicating that issuers would sell their shares on the initial public offering intentionally with a discount in order to minimize the risk of lawsuits from investors who might not be satisfied with the stock performance after the IPO.
- c. Control:** Brennan and Franks (1997) claim that underpricing can also be used as a strategy tool for old shareholders to intervene in the control power after the IPO. Reducing the offering price would stimulate higher demand for the IPO and consequently contribute to a more fragmented ownership structure. With this happening, the new shareholders would probably have an irrelevant influence on the company's decisions.
- d. Behavioral:** Accounts for the potential behavioral effects on underpricing, such as investors attributing unreal and overestimated valuations on the company as well as issuers that are unable to exert influence on underwriters to postulate a reduced underpricing in the offering.

In line with the most relevant literature covering the underpricing topic, this master thesis will focus on the theories of Asymmetric Information grouped by Ljungqvist (2007) as they are considered the main contributing factors for IPO underpricing.

2.1.1 Winner's Curse

Rock (1986) states that some investors are better informed about companies' fair values than the market in general, the underwriters and even the issuing firms, allowing them to only participate in attractive initial public offerings. While this informed group only bids for undervalued offerings, uninformed investors bid comprehensively. The result is that uninformed participants get all desired shares on the unattractive IPOs and on the attractive ones they compete in allocation with informed investors, causing positive stock returns on this last due to excess demand. As uninformed investors get rationed participation in the profitable IPOs and large allocations in unprofitable ones, they face the so-called Winner's Curse. It is important to notice that the stock market depends on the existence of uninformed investors since the informed ones do not represent enough demand to buy all shares from every IPO available, thus underpriced offerings are indispensable incentives to keep them participating and giving liquidity to the market.

2.1.2 Information Revelation

The Information Revelation theory arises from the wish of identifying informed investors and trying to make them reveal their estimations of stocks' fair prices. Benveniste and Spindt (1989), Benveniste and Wilhelm (1990), as well as Spatt and Srivastava (1991) argue that this is one of the main roles the underwriters play in an offer, using bookbuilding as an instrument of the price-discovery process. As better informed investors tend to deliberately devalue their proposals in order to maximize capital gains, the underwriters act by recompensing aggressive offers with higher allocation stakes to avoid it and encourage investors to bid fairly.

For the sake of that, it is indispensable the IPO to be underpriced to give investors the incentive to raise their bids, otherwise, they will not mind being diluted or rejected from an overpriced and unprofitable offering. Alexander Ljungqvist states that "Even though their IPOs are underpriced, issuers benefit from these arrangements. Bookbuilding allows them to extract

positive information and raise the offer price in response—even though the price will rise further in the after-market because some money has to be left on the table.” (Ljungqvist, 2007, p.390). It gives light to another important phenomenon called Partial Adjustment found by Hanley (1993), which evidences price revisions during the bookbuilding process, the participation of institutional investors (often better informed than retail ones) on the issuing and positive first-day stock price returns (underpricing, in other words) are positively correlated.

2.1.3 Agency Conflicts

Considering the key role investment banks play during an IPO process and the mixed incentives while dealing with different stakeholders, it opens space to agency problems. Underwriters tend to give larger stakes of the offering to regular investors even if occasional ones present better bids. It can be interpreted as a favor exchange system, where investors agree to participate in less attractive IPOs to continue being invited by the financial institutions to take part in promising ones. The fundament behind it is that “the value of the bank’s underwriting activities depends more on the future cooperation of regular investors than on being able to price any given IPO more fully” (Ljungqvist, 2007, p.391).

In this scenario, issuers can suffer from too much intentional underpricing as well as arbitrary allocation strategies from the underwriters’ side, letting this latter to benefit from indirect pecuniary gains in addition to the initially negotiated commission fees for the service. These fees for playing the underwriter role in the IPO are settled as a percentage of the total amount raised in the offering, but depending on the potential private benefits for the bank, it might be inclined to stimulate underpricing and lose some proceeds from commissions in exchange of a higher profit elsewhere (like inflated trading commissions, for example). An aggravating factor for it is that issuers are often a one-time client during its IPO process, while investors keep an ongoing relationship with the investment banks on many other businesses.

The level of uncertainty about a firm’s fair value in the market is directly linked to the intensity of information asymmetry among issuer, underwriters and investors, contributing to more significant underpricing if the asymmetry is high. Biais, Bossaerts, and Rochet (2002) defend that to maximize the IPO proceeds, the issuing company should set a higher price the fewer the quantity of the shares distributed to retail investors (assuming them as the uninformed participants of the market). Stimulating issuers’ monitoring by adding a portion of secondary

offering in the issuing is also efficient as argued Ljungqvist and Wilhelm (2003) since the current shareholders tend to increase surveillance as they would be also leaving money on the table as individuals in the case of underpricing. Other ways to seek minimizing underpricing according to Ljungqvist (2003) is to increase the percentage of commission fees related to the raised proceeds, while Welch (1992) says to grant underwriters with an over-allotment option (also known as greenshoe) that allows the bank to sell more shares than initially forecasted and, by doing that, increase its gains if there is a high demand for the IPO.

2.2 Other Potential Motivations

Company and offer characteristics are also factors that might potentially contribute to underpricing. Firm age was a component studied by Ritter (1984), Beatty and Ritter (1986) as well as Ljungqvist and Wilhelm (2002), who found that younger companies tend to be riskier and face a higher degree of Information Asymmetry problem. The industry that the company operates also play a role in underpricing according to Ritter (1991), who found expressive average initial returns of 30.9% for the Oil & Gas sector and passive 3.7% for Financial Institutions for example, as shown in Figure 2 below. The effect of the offer size was studied by Beatty and Ritter (1986), stating its negative relation with underpricing considering that small offers are seen by the market as a sign of uncertainty and increased risk.

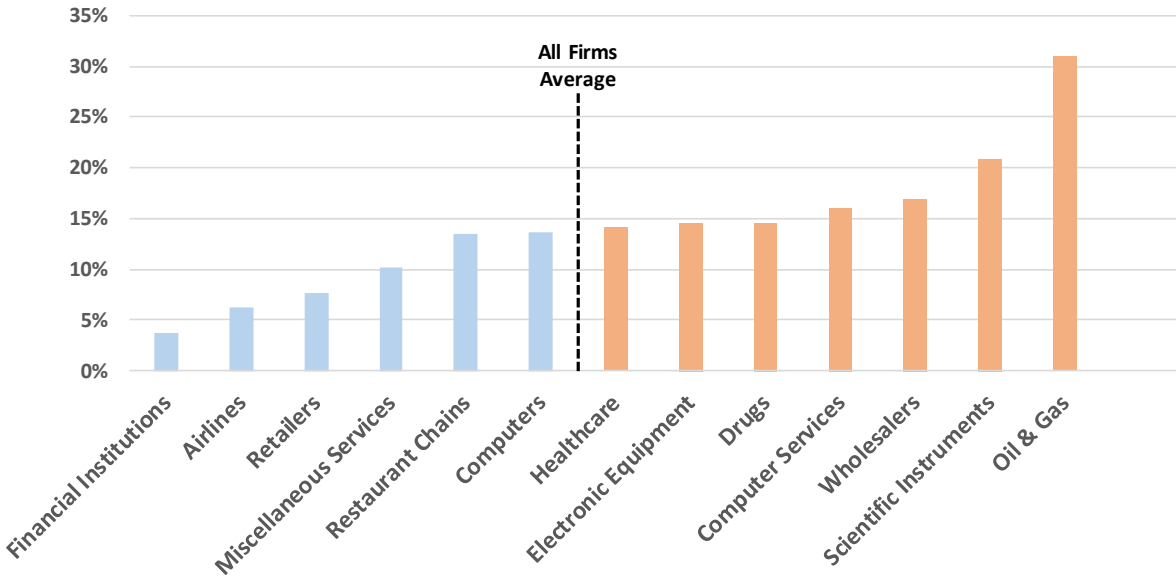


Figure 2 – Average Initial Return per Industry (Ritter, 1991)

2.3 Underwriters' Influence on Underpricing

Bradley, Cooney Jr and Singh (2004) analyzed the effect of the IPO final price being fixed as an integer (whole number, non-fractional and possibly resulting from a rounding) or non-integer (fractional and non-rounded number) value in underpricing. The intuition behind the study is that as underwriters are determinant on the price discovery process by accessing the company's information, having an exact figure for the share price at the end might give a sign on how meticulous was the valuation performed and how diligent the banks were during this process. The authors found that the underpricing from integer price offers were on average 25.5%, while for IPOs with non-integer prices it was 8.1%. Offer price deviation from the initial range was explored by Giudici and Roosenboom (2004), who discovered that there is a strong relation among underpricing and price reviews in the North American and European markets.

Concerning underwriters' reputation, although Carter and Manaster (1990) see it as a way that good companies can prove the quality of its offering by contracting top financial institutions, there is no consensus in the literature about its effect on underpricing. Megginson and Weiss (1991), Michaely and Shaw (1994), as well as Carter, Dark, and Singh (1998) found a negative correlation between underwriters' reputation and underpricing, while Loughran and Ritter (2002) and Ljungqvist and Wilhelm (2002) discovered the opposite by finding a positive relationship among them. The authors Loughran and Ritter (2002) argue that this pattern change in recent years is possibly due to the growing market power of financial institutions, allowing them to exercise more influence on a company's IPO and stimulate underpricing.

Complementing the theories involving underwriters and underpricing, Cals, Kayo, and Martelanc (2012) found analyzing Brazilian IPOs during the 2004-2011 period a positive relationship among the underpricing intensity and the exercise of a greenshoe option. The authors also discovered that underpricing were less significant when the bank was a shareholder of the issuing company during hot market periods. The commission fees volume in respect to the contracted type of sale was analyzed by Aggarwal and Rivoli (1991), who concluded that best efforts offers can be up to three times more expensive for the issuer in terms of underwriter fees than firm commitment ones.

3 Data and Methodology

3.1 Sample Selection

According to Desjardins’ blog post (2017), the Brazilian Stock Exchange (known as B3 - Brasil, Bolsa, Balcão) is the 20th largest stock market in the world and the 1st in Latin America. B3 was created in 2017 after the merger of the BM&FBOVESPA (stock exchange) and Cetip (over-the-counter market), but its predecessor companies have been acting in the Brazilian capital market since 1890. As reported by B3 (2019), the Brazilian Stock Exchange has reached in April 2019 a total of 336 companies listed in the equity segment as well as a market capitalization of BRL 3.7 trillion, representing a compound annual growth rate of 11.7% since the year of 2004. The last twelve years were exciting for the equity market in Brazil, considering that 125 companies did its IPO while 106 performed a Seasoned Equity Offering (SEO, also known as Follow-On), resulting in a total amount adjusted by inflation of BRL 711 billion raised by the firms during the 2007-2018 period, as shown in Figure 3 below.

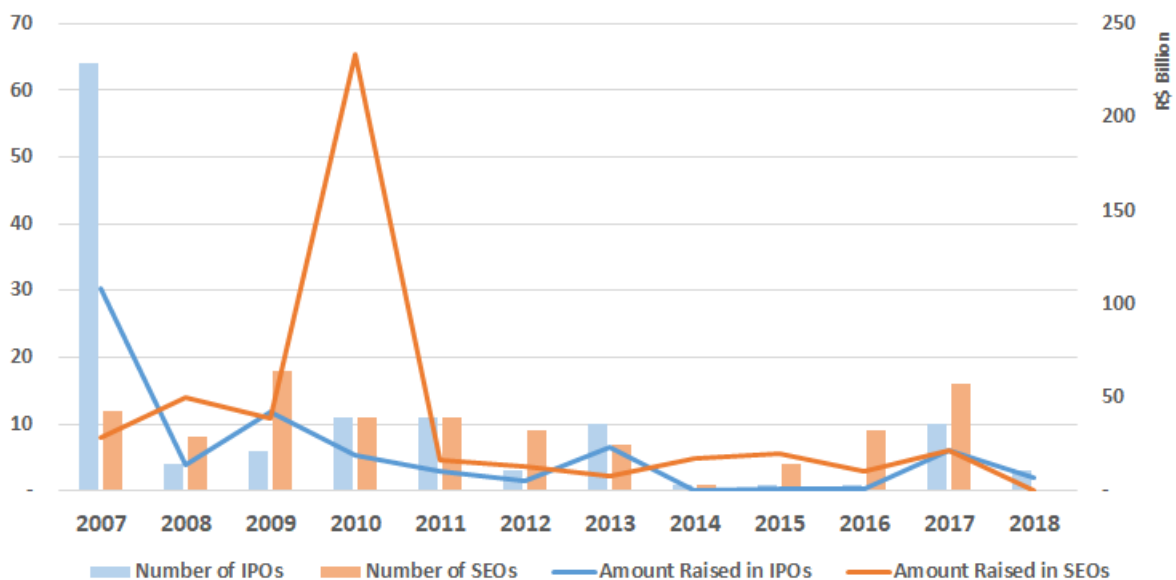


Figure 3 – Brazilian IPOs and SEOs per Year (BM&FBOVESPA, 2018)

In the Brazilian stock market, 66 of the 125 total IPOs that occurred from 2007 to 2018 presented a positive return on the first day of negotiation, meaning that underpricing happened in most of the cases. During this period the underpriced stocks went up 9.4% on average considering the closing price of the first day of trading. An upside of 52.1% was the highest

increase in a stock's Day 1 not only in this time-frame but also in the history of the B3 stock exchange, as shown in Table 1 below.

Year	Number of IPOs ¹			Statistics		
	Total	Underpriced	Overpriced	Median	Maximum	Minimum
2007	64	37	21	1.0%	52.1%	-14.2%
2008	4	2	2	1.6%	8.3%	-6.7%
2009	6	3	3	-0.7%	14.1%	-9.7%
2010	11	4	5	0.0%	24.4%	-4.3%
2011	11	4	6	-0.1%	15.8%	-7.5%
2012	3	2	1	0.6%	9.7%	-5.6%
2013	10	3	7	-2.7%	18.5%	-14.3%
2014	1	1	-	2.4%	-	-
2015	1	1	-	12.7%	-	-
2016	1	-	1	-4.0%	-	-
2017	10	6	4	4.3%	8.9%	-2.7%
2018	3	3	-	22.7%	22.8%	0.3%

Table 1 - IPOs in Brazil during 2007-2018 (BM&FBOVESPA, 2018)

This underpricing track record would be already enough to justify research about it in the B3 but there is another factor that instigates even more this analysis that is the opportunity to investigate its relation with banks' commission fees. According to the Brazilian Securities and Exchange Commission (known as CVM, equivalent to the SEC in the United States of America) instructions, the companies that are becoming publicly held have to follow certain legal procedures and also disclose a large amount of information in order to subsidize investors with relevant inputs during their decision-making process of investing or not in the firm. Among the information to be published by the issuing company, there is the value that is being paid to underwriters for its services during the IPO process. This data is valuable regarding that there

¹ The sum of underpriced and overpriced number of offers does not always match with the total counting since some IPOs presented no variation on the first day of trading

is no common awareness of its effortless availability in many other markets. Even in Brazil, it is not easy to access it considering that databases like Bloomberg most of the time classify this information as Not Disclosed, which is not necessarily true taking into account that it is presented on the offers' prospectus.

Combining the fact that Brazilian IPOs have an interesting historical regarding underpricing and that banks' commission fees are scarce data worldwide available in this country, this specific market was chosen to perform the proposed analysis. The 2007-2018 period range was selected in order to account for the most recent offerings as well as for the IPO Boom in Brazil that occurred in the year of 2007 when 64 firms went public, making this an exceptional year in the country's stock exchange history. The total number of companies that went public in Brazil during this period was 125, which is a satisfactory number of observations considering the difficulty of collecting data for commission fees.

3.2 Data Description

A significant part of the data collection process was done manually due to the already mentioned complexity of finding banks' commission fees data. Considering that it is not available in financial software tools like Bloomberg, the extraction was made straight from each company's definitive prospectus available at iProspecto (2019). A summary spreadsheet from BM&FBOVESPA (2018) containing relevant information of each IPO complemented the dataset, while the Bloomberg platform was used to get the share prices at the first days of trading. To have access to additional information, a news press (Vieira & Cotias, 2007), as well as firms' preliminary prospectus, previous financial statements, and notices to the market (CVM, 2019) were also used. The description of the final inputs that were used to perform the analysis, the eventual adjustments made to polish the data as well as their respective sources are following described:

- a. First-Day Return:** The measure that informs if in the offering occurred an underpricing, overpricing or if the value was in line with the market expectations. It is calculated by dividing the closing price of the first day of trading by the IPO price minus one. The first-day closing prices were collected from the Bloomberg platform, while the issuing final prices were given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).

- b. Commission Fees:** Informs the representativeness of the commission fees paid to the underwriters by the issuers considering the offer size of each IPO. It was calculated adjusting by inflation the monetary values of the fees, divided by the total raised amounts also adjusted to inflation. The commission fees' data are available in total value as well as per the following categories: Coordination, Firm Commitment, Placement, Incentive and Other (includes expenses with structuring, subscription, sales, special coordinators, consortium institutions and taxes). This breakdown made possible to evaluate not only the overall relation between underpricing and commission fees but also the individual effect of each category on it. The fees monetary values were collected from each firm's definitive prospectus available at iProspecto (2019), total raised amounts were given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018) and inflation was extracted from the historical IPCA spreadsheet available at IBGE (2019), the Instituto Brasileiro de Geografia e Estatística, similar to the Bureau of Labor Statistics in the USA.
- c. Range Deviation:** Accounts for the final price deviation in comparison to the initial price range estimated by the underwriters. The calculation method was created by the author and consists in dividing the IPO price by the range average price minus one. The range deviation purpose is to estimate how accurate was the underwriter valuation of the company before the bookbuilding process and also have an intuition of the investors' primary enthusiasm for the IPO. The initial price ranges were collected from each firm's preliminary prospectus available at CVM (2019), while the issuing final prices were given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).
- d. Offering Type:** Disclosure of the amount raised by the issuer classified as primary and secondary offering, calculated as a percentage of the total proceeds. Evidence how much of the offer was destined to the company's treasury (primary offer) as well as to its selling shareholders (secondary offer) due to the issuance of new shares or sale of already existing ones, respectively. To observe that is relevant to analyze the implications of old shareholders' surveillance during the bookbuilding process and how fresh capital to the company would affect underpricing. This information was given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).

- e. Number of Investors:** Count of how many investors participated in each IPO. The data were transformed into natural logarithm (\ln) to make comparable observations from different orders of magnitude. By accounting for that the ambition is to observe how underpricing and commission fees react to fragmented free-float ownership structures as well as for concentrated ones. This information was given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).
- f. Equity Offered:** Indicates in percentage terms the share of the company's equity capital that was offered in the IPO. It was calculated adjusting by inflation the total value raised in the offering, divided by the market cap at the IPO date (total number of shares multiplied by the issuing final price per share) also adjusted by inflation. Observing this information is important to understand how the results differ from companies with different offer sizes. The total raised amounts and final prices per share were given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018), numbers of shares were collected from each firm's definitive prospectus available at iProspecto (2019) and inflation was extracted from the historical IPCA spreadsheet available at IBGE (2019).
- g. Underwriters:** Identify the quantity in natural logarithm of financial institutions that acted as underwriters in each offering. The purpose of this information is to account for the potential increased access level that having more banks involved in the issuing may have to reach different investors worldwide and also estimate how influent a single institution would be in the consortium. The underwriters that participated in the IPOs were collected from each firm's definitive prospectus available at iProspecto (2019).
- h. International Banks:** Access the profile of the underwriters that were contracted by the issuers to participate in the IPOs by measuring the representativeness of foreigner banks in the consortium. The financial institutions were initially classified as international or national, and then the number of international underwriters was divided by the total counting. The idea is to analyze the possible reputational effects of global financial institutions in initial public offerings. The underwriters that participated in the IPOs were collected from each firm's definitive prospectus available at iProspecto (2019).

- i. Investors Participation:** Reflects the distribution of investors' type in the offer, sorted in the following categories: Retail, Institutional, Foreigners and Other. Each classification represents a percentage of the total number of investors that participated in the offering by buying issuer shares. Accounting for that is possible to observe the appetite of different investors' profiles in each offer and consequently its effect on underpricing. This information was given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).
- j. Company Age:** The age the company had when did the IPO, calculated considering the time gap in days between its first day of negotiation in the stock exchange and the firm's foundation date, transforming the result into a natural logarithm. The company's age contributes to estimating the level of historical information and understanding the financial market had about the company and its business when the IPO happened, which may affect the enterprise valuation by the investors and consequently the share pricing. The establishment dates were collected from the companies' registration forms at CVM (2019), while the IPO dates were given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).
- k. Firm Size:** Based on the market cap of each company at the initial public offering date, calculated by multiplying the total number of shares by the issuing final price per share. The data were also adjusted by the period's inflation and transformed into natural logarithm to make comparable the 125 observations. The firm size may be a proxy for information asymmetry as smaller firms tend to have less information available on the financial market. It also affects the volume of proceeds the issuer will get from the offering and consequently the amount of commission fees to be paid to the banks as it is settled as a percentage of the IPO's raised value. The numbers of shares were collected from each firm's definitive prospectus available at iProspecto (2019), final prices per share were given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018) and inflation was extracted from the historical IPCA spreadsheet available at IBGE (2019).
- l. Capital Structure:** Measured by the Debt to Equity Ratio (D/E), it is the quotient of the division of the total amount of debt the company holds by its total equity. It is important to account for the capital structure to observe if debt might play a role in underpricing and in

the amount of fees charged by financial institutions due to the firm's risk of default, for example. Some D/E ratios pre-IPO were available at the Bloomberg platform while others were calculated from the companies' previous financial statements (CVM, 2019) to account for the debt and equity values before the IPO dates.

- m. IPO Year:** Consists in the year that the firm's initial public offering happened. By controlling for the different periods of time that the IPOs happened, the aim is to minimize the effects of external factors in the comparison and inference of results, as for example financial crisis or economic booms. This information was given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).

- n. Listing Segment:** Identify the segment that the firm is listed in the Brazilian Stock Exchange and by doing that, it is possible to account for the level of corporate governance requirements that the company must fulfill. As suggested in the report from the PwC and BM&FBOVESPA (2016), the major differences between segments are the following: Novo Mercado (highest standard of corporate governance), Nível 2 (similar to the Novo Mercado, but with some exceptions), Nível 1 (few additional requirements from what is stated by law), Tradicional (basically demands what is already required by law) and Bovespa Mais (designed for smaller companies with simplified requirements). It was also considered the BDR (Brazilian Depositary Receipts) segment, which is equivalent to the ADR (American Depositary Receipts) in the USA. This information was given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).

- o. Industry:** Distinguish the sector that the company operates by attributing an industry classification. Initially, the 125 selected firms were classified into 46 different industries and reclassification was performed based on the Thomson Financial Macro/Mid Industry Hierarchy (Thomson, n.d.) in order to group them into broader sectors to simplify the data sample and its analysis, resulting in the new quantity of 12 final classifications. The intention is to verify if certain industries are more inclinable to underpricing. The initial industry information was given in the IPOs' summary spreadsheet available at BM&FBOVESPA (2018).

3.3 Excluded Data

IPOs in Brazil can be ruled by two different regulations, as explained by Vieira (2017): CVM 400 is the main regulation with broad requirements from the authorities and unlimited scope, while CVM 476 (also known as restricted offer) is a regulation with fewer requirements and limited scope in regard to the number and profile of investors that will participate in the offer. Only offers that follows the standard CVM 400 regulation were taken into account for this master thesis considering that when an issue is ruled by the restricted offer regulation, in exchange of less bureaucracy and lower costs, the companies are only allowed to present the issuing to a maximum of 75 different professional investors, being only 50 able to really proceed with the investment. In the CVM 476 case, its characteristics might bring other aspects that might lead to a wrong inference of the results, reason why its offerings were excluded from the dataset leaving the 125 selected companies as mentioned before.

3.4 Limitations

It is not possible to assure that the firms are not older than the calculated Company Age (based on the foundation dates found on the registration forms) given the fact that, for corporate structure planning reasons, some issuers create holding companies for the IPO and offers the holding shares on the issuing instead of the operational unit ones. The D/E ratios were calculated based on the last available financial statements before the IPOs' dates and it is not possible to guarantee that at the IPO dates the companies had the exact same Capital Structure as estimated. In addition to the underwriters' pricing accuracy and investors' appetite influence on the Range Deviation, macroeconomic and other external factors might also play a role here but they are not being directly taken into account. The number of shares after the IPO as well as the total amount raised in the offering does not consider the possible exercise of call options to issue and sell supplementary shares (greenshoe), which may affect the Market Cap, Commission Fees and Equity Offered calculations. Despite the fact that all IPOs in this dataset were negotiated in a Firm Commitment type of sale contract, for two offerings the specific amount of fees for this category were not specified. In addition, some companies contemplated in the analysis went into bankruptcy, were incorporated by other firms or ended their activities for other reasons, making unavailable few inputs in the dataset.

3.5 Data Statistics

The descriptive statistics of the main data used in the empirical analysis of this academic paper is shown in Table 2 below. In addition to these components, some dummy variables accounting for IPO Year, Listing Segment and Industry (representing 12, 6 and 12 different categories, respectively) were also considered in the regressions performed.

Variable	Mean	Median	Max.	Min.	Std. Dev.	# Obs.
First-Day Return	0.034	0.003	0.521	-0.143	0.095	125
Commis. Fees (Total)	0.035	0.035	0.075	0.010	0.010	125
Commis. Fees (Coordination)	0.005	0.005	0.011	0.000	0.002	125
Commis. Fees (Firm Commit.)	0.006	0.005	0.031	0.000	0.004	125
Commis. Fees (Incentive)	0.007	0.007	0.025	0.000	0.005	125
Commis. Fees (Placement)	0.015	0.016	0.030	0.002	0.005	125
Commis. Fees (Other)	0.001	0.000	0.030	0.000	0.004	125
Range Deviation	-0.086	-0.098	0.333	-0.444	0.140	123
Offering Type (Secondary)	0.294	0.233	1.000	0.000	0.318	125
Number of Investors	8.364	8.565	12.472	2.079	1.519	124
Equity Offered	0.353	0.332	0.945	0.117	0.122	124
Underwriters	1.458	1.386	2.485	0.000	0.444	125
International Banks	0.535	0.500	1.000	0.000	0.229	125
Investors Part. (Foreigners)	0.630	0.670	0.980	0.000	0.206	125
Investors Part. (Institutional)	0.201	0.196	0.593	0.000	0.132	125
Investors Part. (Other)	0.080	0.011	0.925	0.000	0.147	125
Company Age	8.042	8.233	10.268	4.078	1.582	125
Firm Size	21.997	21.824	25.746	18.387	1.024	125
Capital Structure	1.932	0.665	34.396	-2.130	4.384	125

Table 2 – Descriptive Statistics of the Data

3.6 Research Approach

To analyze the relation between underpricing and banks' commission fees in the Brazilian stock market, multiple linear regressions were performed accounting for different variables that may contribute to this phenomenon. The expectation was that the chosen methodology contributed to answering the main research question of this master thesis by providing empirical evidence of the hypothesis that positive first-day stock returns and underwriters' fees are closely related.

Ordinary Least Squares (OLS) is the specific method selected to run the already mentioned multiple linear regressions. This technique provides a straight forward approach and is considered sufficient to perform what is wanted to test. The regression equation was built to account for variables considering all collected data and is described as following:

$$\begin{aligned} \text{First Day Return}_i &= \beta_1 \text{Commission Fees}_i + \beta_2 \text{Range Deviation}_i + \beta_3 \text{Offering Type}_i \\ &+ \beta_4 \text{Number of Investors}_i + \beta_5 \text{Equity Offered}_i + \beta_6 \text{Underwriters}_i \\ &+ \beta_7 \text{International Banks}_i + \beta_8 \text{Investors Participation}_i \\ &+ \omega_1 \text{Company Age}_i + \omega_2 \text{Firm Size}_i + \omega_3 \text{Capital Structure}_i \\ &+ \delta_1 \text{IPO Year}_i + \delta_2 \text{Listing Segment}_i + \delta_3 \text{Industry}_i + \varepsilon_i \end{aligned}$$

Where First-Day Return is the dependent variable, the coefficients β accounts for the explanatory variables, ω for the control variables and δ for the elements represented by dummy variables, while i is each analyzed firm and ε is the error term. Some of the initial control variables were transformed into dummies to isolate the effect of each category in the analysis. The above equation can also be represented in the following simplified form:

$$Y = X\beta + Z\omega + W\delta + \varepsilon$$

Where X , Z , and W are matrices, while Y , β , ω , δ and ε are vectors when adopting a matrix notation form to simplify the original equation. Based on the general form equation, six regression models were performed in order to account for the different categories of commission fees and maintaining the remaining independent variables unchanged:

- a. Model I: Considers the Total amount of commission fees, being the base model
- b. Model II: Considers exclusively the fees paid as part of the Coordination category
- c. Model III: Considers exclusively the fees paid as part of the Firm Commitment category
- d. Model IV: Considers exclusively the fees paid as part of the Incentive category
- e. Model V: Considers exclusively the fees paid as part of the Placement category
- f. Model VI: Considers exclusively the fees paid as part of the Other category

3.7 Hypotheses

The main early theory of this study is that commission fees are negatively related to first-day stock returns, meaning that an increase in underwriters' fees would contribute to minimizing underpricing in an initial public offering. This belief is supported by the literature (Ljungqvist, 2003) and the fact that strengthening the alignment of interests between the issuer and the banks would contribute to reducing agency problems. This general effect among the two main variables (First-Day Return and Commission Fees (Total)) will be tested on Model I, which accounts for the total amount of commissions regardless its breakdown into different categories.

It is also expected that Models II, III, IV, V and VI bring light to the individual effects of these fees classes on the major trend found by Model I results. Firm Commitment (Model III) and Incentive (Model IV) fees categories are foreseen to exercise a greater influence on reducing underpricing since they are directly related to the idea of compensation for the risk the financial institution faces while acting as a dealer in the IPO as well as an extra pecuniary stimulus for the bank to act on behalf of its client (the issuer), respectively. Coordination (Model II) and Placement (Model V) commissions on the other hand, are not predicted to have a strong influence considering that they are inherent to the nature of the service and stands in practically all IPOs of the 2007-2018 period (except by one IPO in 2009 that did not have commissions for Coordination). In addition, Coordination is the category with the lowest standard deviation (0.2%) indicating that the percentage settled follows a market standard and Placement is the most representative fee with a median of 1.5% of the raised value. To conclude, there are no high expectations on the Other (Model VI) fees results considering its generalist and non-recurring characteristics.

4 Results and Analysis

To analyze the obtained results in the correct way, it is important to understand the construction of the models and their assumptions. Six different regressions were performed considering for the base scenario the following dummy variables' categories: 2007 for IPO Year, Novo Mercado for Listing Segment and Consumer Staples for Industry. It means that, when analyzing the effect of each dummy in the results, the interpretation should always be a comparison of this variable with the respective category chosen for the dummy's baseline scenario. The motivations for this specific selection consists of the fact that the year 2007 was the most important in the Brazilian Stock Exchange history when 64 companies went public, the Novo Mercado segment represents 94 companies following the best practices of corporate governance, along with the perception that the Consumer Staples industry is seen as one of the most defensive sectors in the economy, representing in this way a non-cyclical category to compare with the other classifications. In addition to the mentioned dummies, the base scenario also accounts for the shares of primary offers and retail investors in the Offering Type and Investors Participation categories, respectively, excluding them from the model to avoid that 100% of an explanatory variable's data is considered in the same regression.

4.1 Econometric Issues

The models passed through the following diagnostic and specification tests to check for violations of the OLS assumptions as well as other econometric problems:

- a. Multicollinearity:** Assessed by observing the level of correlation among the different variables using correlation matrices. The rule of thumb states that if the correlation among the two components is higher than 0.8, multicollinearity may hold. The highest correlation in the sample was 0.575 between Underwriters and Firm Size in Model I. None of the variables have a correlation above the rule of thumb level, as shown in Tables 5, 8, 11, 14, 17 and 20 found in the Appendix, so it is possible to assume that there is no multicollinearity.
- b. Heteroscedasticity:** The Breusch-Pagan-Godfrey (BPG) Test was performed for all six models and the results indicate that it is not possible to reject the null hypothesis of

homoscedasticity in any case, as shown in Tables 6, 9, 12, 15, 18 and 21 found in the Appendix. It means that heteroscedasticity does not hold and there is no need to correct the regressions using Huber-White robust standard errors, for example.

- c. Non-normality:** Jarque-Bera was the test used to check for non-normality in the sample data observing its skewness and kurtosis. The null hypothesis of normal distribution was rejected in all models considering the test results (probably because of outliers such as the 0.521 observation in First-Day Return, which is five standard deviations from the mean), as shown in Figures 5, 6, 7, 8, 9 and 10 found in the Appendix. However, bearing in mind the Central Limit Theorem, it does not represent a problem to the analysis taking into account that the sample size is large enough.

4.2 Empirical Findings

The regression named as Model I considers the total amount of commission fees paid to underwriters and is the base case for analysis, being complemented by the others models that shown the isolating effect of each fee category on underpricing. The Model I reached an R^2 of 60.2% and the results confirm the initial hypothesis, in accordance with Ljungqvist (2003), of a negative relation between underpricing and underwriters' fees by attributing a coefficient of -3.434 significant at 1% level, as shown in Table 4 found in the Appendix. This effect is relevant also considering the variables' variation, where an increase in fees' standard deviation would reduce underpricing's one by about 1/3.

The other independent variables that presented relevant results are Range Deviation, Offering Type (Secondary), Investors Participation (Institutional) and Company Age, with 0.325***², 0.056*, 0.539* and -0.013** coefficients, respectively. These results endorse the findings of Giudici and Roosenboom (2004) that the greater the price deviation from the initial range, the greater the first-day return. Surprisingly, the effect of secondary offering's portion on an IPO was against of what Ljungqvist and Wilhelm (2003) defend, showing that underpricing slightly increase with it. The participation of Institutional investors in the IPO, together with Foreigners and Other (non-significant results), occasioned positive coefficients that are in accordance with

² Asterisks refers to the significance levels, being *** significant at 1% level, ** at 5% level and * at 10% level

Biais, Bossaerts and Rochet's (2002) theory that increasing the participation of retail investors (consequently with a negative coefficient) should reflect in a maximization of the IPO proceeds. The age of the firms was accounted in days with natural logarithms and the results shows that doubling its number of days of existence would reduce underpricing in 1.3%, also in line with the findings of several authors (Ritter, 1984; Beatty & Ritter, 1986; Ljungqvist & Wilhelm, 2002) relating this effect to Information Asymmetry problems.

Despite the fact that the remaining explanatory variables do not present results at significant levels, it is worth analyzing their pattern to compare with the literature and initial expectations. The number of investors that participated in the IPOs presented a modest negative coefficient which is against Brennan and Franks' (1997) Control theory that more demand for an issue contributes to fragmented ownership structures and leads to higher first-day returns. The percentage of equity offered was also contradictory with the literature and Beatty and Ritter's (1986) findings, showing a rise in underpricing when the offer size is increased. The effect of having more financial institutions to assist the issuer on the IPO may decrease their individual power on the offering and therefore turn harder to banks exercising influence to benefit its regular clients, being the result of a negative relation between underwriters and first-day stock returns in line with the agency problems raised by Ljungqvist (2007). The result of a positive relationship among international banks participation in IPOs and underpricing follows the Ljungqvist and Wilhelm (2002) pattern on the underwriters' reputational effects, explained by Loughran and Ritter (2002) as a result of the greater market power that international institutions have. In addition, the results obtained from the control variables Firm Size and Capital Structure (also non-significant at any level) indicate that bigger companies tend to experience less underpricing while high leverage firms are more susceptible to an increase on it.

Concerning the dummy variables, as already mentioned the base scenario is the year of 2007 (IPO boom in Brazil), the Novo Mercado segment (highest standard of corporate governance) and the Consumer Staples industry (defensive sector), being all other dummies' results supposed to be compared with them. Except by 2008 and 2018, all other periods presented negative coefficients, showing that when the market faces an overoptimism (bull years, in the financial market jargon) underpricing tend to be greater. The adoption of best practices of corporate governance also seems to maximize first-day returns, possibly because of the investors' enthusiasm and preference for firms considered to be better aligned with the shareholders' interests. This underpricing increasing effect is even greater for Bovespa Mais,

the listing segment intended for small caps. Comparing with the Consumer Staples industry, the other sectors of the economy usually present a higher underpricing (especially Telecommunications), being Media & Entertainment as well as Retail the only two exceptions.

Comparing the main components of the six different models is also possible to see the effect of each fee category on underpricing, as shown in Table 3 below. All models have satisfactory R² and present negative coefficients that are in line with the already mentioned pattern of the Model I: An increase in banks' fees result in a decrease in underpricing. However, the only significant complementary regression is the Model IV (at 5% level), that accounts for Incentive fees and confirms the initial hypothesis of its effectiveness to align the banks and clients' interest minimizing underpricing on initial public offerings. The remaining models are not significant at any significance level, but presents two surprising conclusions: The effect of Firm Commitment fees are not as representative as initially expected and the Coordination commissions account for the most expressive influence on first-day returns. Despite accounting for the highest share of the total fees, Placement does not offer the greatest influence on underpricing, whereas Other is the less representative category in this aspect. The other models remaining explanatory and control variables, as well as the dummies, did not present substantial differences from the major trends presented for Model I, as shown in Tables 7, 10, 13, 16 and 19 found in the Appendix.

Regression	Coefficient	Std. Error	P-Value	R²
Model I (Total)	-3.434	1.022	0.001	0.602
Model II (Coordination)	-5.267	5.939	0.378	0.552
Model III (Firm Commitment)	-1.944	2.272	0.395	0.551
Model IV (Incentive)	-3.608	1.633	0.030	0.573
Model V (Placement)	-2.298	1.771	0.198	0.557
Model VI (Other)	-1.874	2.227	0.403	0.551

Table 3 – Effect of Different Commission Fees Categories on Underpricing

5 Conclusion

This master thesis was developed based on an initial research question that related underwriters' commission fees as being a determinant of IPO underpricing. The Brazilian market was chosen considering its remarkable underpricing track record and the quality of the available data on fees, where not only the amount of commissions paid are disclosed but also its breakdown per category. The study reflected the 2007-2018 period and covered 125 initial public offerings that occurred during both expansion and contraction economic cycles in Brazil. Among the explored underpricing theories based in the existing literature, the Asymmetric Information was the one predominantly used to support the considered variables in the regression models and consequently to justify most of the research findings.

Considering the results found, it was possible to prove that an increase in banks' commission fees contributes to reducing underpricing in a company's initial public offering. This effect is especially noticed for the Incentive category when analyzing the breakdown of the fees, supported by the fact that it contributes to converge the issuer and financial institution interests. As a reflection of that, agency problems tend to be the major stimulus for underpricing at expressive levels to happen, strengthening the hypothesis that underwriters would deliberately act towards it to obtain indirect benefits from the offering, such as selling underpriced stocks to the market at a premium, for example.

To some extent, the general findings of this study were similar to the ones obtained by Ljungqvist (2003) from his analysis of IPOs in the United Kingdom during the years 1991-2002, reinforcing the evidence that it is not an isolated behavior. Taking into account that Firm Commitment is the most common type of sale and have ruled all IPOs in Brazil during the 2007-2018 period, it was not possible to investigate the implications of commission fees on underpricing for different contracts with underwriters. This arises a potential motivation for future research: To analyze the effect of banks' commission fees on underpricing considering the Best Efforts and Pure Auction type of sales, preferably in a financial market other than the British or Brazilian if underwriters' commission fees data are available.

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Appendix

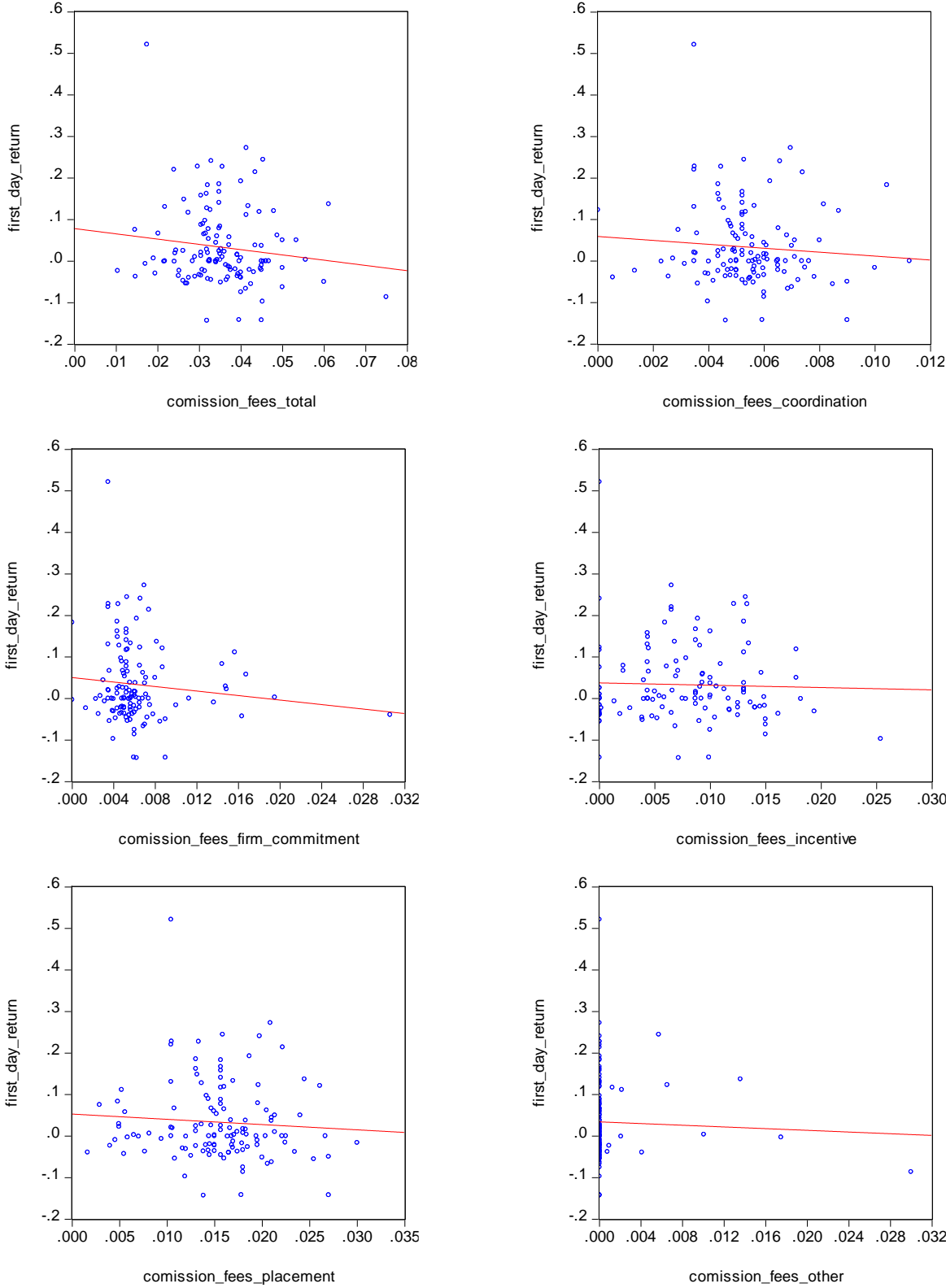


Figure 4 - Underpricing vs. Commission Fees Scatter Plot Graphs

Dependent Variable: First-Day Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Commission Fees (Total)	-3.434357	1.021972	-3.360518	0.0012
Range Deviation	0.325363	0.066204	4.914571	0.0000
Offering Type (Secondary)	0.056455	0.032172	1.754804	0.0830
Number of Investors	-0.002688	0.009806	-0.274079	0.7847
Equity Offered	0.048033	0.075093	0.639645	0.5242
Underwriters	-0.035875	0.027828	-1.289160	0.2010
International Banks	0.053500	0.036137	1.480494	0.1426
Investors Participation (Foreigners)	0.396070	0.286849	1.380764	0.1711
Investors Participation (Institutional)	0.538923	0.304604	1.769256	0.0806
Investors Participation (Other)	0.404272	0.289588	1.396025	0.1665
Company Age	-0.013275	0.006129	-2.165803	0.0332
Firm Size	-0.004460	0.013375	-0.333464	0.7396
Capital Structure	0.002065	0.002111	0.977828	0.3310
IPO Year (Dummy 2008)	0.027077	0.049399	0.548138	0.5851
IPO Year (Dummy 2009)	-0.078226	0.037915	-2.063208	0.0423
IPO Year (Dummy 2010)	-0.053860	0.032933	-1.635427	0.1058
IPO Year (Dummy 2011)	-0.010717	0.030822	-0.347702	0.7290
IPO Year (Dummy 2012)	-0.091311	0.075936	-1.202470	0.2326
IPO Year (Dummy 2013)	-0.105450	0.040470	-2.605652	0.0109
IPO Year (Dummy 2014)	-0.144601	0.090041	-1.605956	0.1121
IPO Year (Dummy 2015)	-0.064152	0.084505	-0.759148	0.4499
IPO Year (Dummy 2016)	-0.156772	0.084700	-1.850919	0.0678
IPO Year (Dummy 2017)	-0.052357	0.043202	-1.211903	0.2290
IPO Year (Dummy 2018)	0.063904	0.068957	0.926714	0.3568
Listing Segment (Dummy Nível 2)	-0.031261	0.028405	-1.100550	0.2743
Listing Segment (Dummy Nível 1)	-0.063752	0.043332	-1.471250	0.1451
Listing Segment (Dummy Tradicional)	-0.008321	0.109394	-0.076065	0.9396
Listing Segment (Dummy Bovespa Mais)	0.078874	0.097298	0.810648	0.4199
Listing Segment (Dummy BDR)	-0.086269	0.042112	-2.048562	0.0437
Industry (Dummy Cons. Prod. & Serv.)	0.077278	0.038076	2.029590	0.0456
Industry (Dummy Energy & Power)	0.010785	0.038226	0.282135	0.7786
Industry (Dummy Financials)	0.076082	0.037228	2.043683	0.0442
Industry (Dummy Healthcare)	0.063247	0.033985	1.861054	0.0663
Industry (Dummy High Technology)	0.079998	0.052146	1.534102	0.1289
Industry (Dummy Industrials)	0.029311	0.034401	0.852018	0.3967
Industry (Dummy Materials)	0.024814	0.047293	0.524690	0.6012
Industry (Dummy Media & Entert.)	-0.006360	0.054132	-0.117499	0.9068
Industry (Dummy Real State)	0.014685	0.029178	0.503283	0.6161
Industry (Dummy Retail)	-0.011389	0.055394	-0.205593	0.8376
Industry (Dummy Telecommunications)	0.127011	0.087899	1.444962	0.1523
R-squared	0.602247	Mean dependent var		0.033931
Adjusted R-squared	0.413072	S.D. dependent var		0.095922
S.E. of regression	0.073487	Akaike info criterion		-2.124983
Sum squared resid	0.442827	Schwarz criterion		-1.205632
Log likelihood	169.6239	Hannan-Quinn criter.		-1.751571
Durbin-Watson stat	2.097237			

Table 4 - Regression Results Model I (Total Fees)

Correlation	First-Day Return	Commission Fees (Total)	Range Deviation	Offering Type (Secondary)	Number of Investors	Equity Offered	Underwriters	Internat. Banks	Investors Part. (Foreigners)	Investors Part. (Institutional)	Investors Part. (Other)	Company Age	Firm Size	Capital Structure
First-Day Return	1.000000													
Commission Fees (Total)	-0.135195	1.000000												
Range Deviation	0.535778	-0.021939	1.000000											
Offering Type (Secondary)	0.310427	-0.156916	0.188334	1.000000										
Number of Investors	0.233989	-0.285572	0.410439	0.178737	1.000000									
Equity Offered	0.118014	0.213930	0.004315	0.071294	-0.035047	1.000000								
Underwriters	0.048836	-0.444168	0.118021	0.221337	0.295256	-0.119529	1.000000							
Internat. Banks	0.236149	0.026198	0.120559	0.032450	-0.016180	-0.034551	-0.145739	1.000000						
Investors Part. (Foreigners)	0.108889	0.085762	0.105559	-0.032540	0.158789	0.108589	0.065126	0.233778	1.000000					
Investors Part. (Institutional)	0.000341	-0.089493	-0.109948	0.175331	-0.030239	0.042509	0.042625	-0.194981	-0.606998	1.000000				
Investors Part. (Other)	-0.151856	-0.016847	-0.057161	-0.099857	-0.232139	-0.171866	-0.073699	-0.125525	-0.669200	-0.141236	1.000000			
Company Age	-0.071158	-0.195857	0.062555	-0.034178	0.071134	0.016104	-0.063774	-0.020290	-0.044999	0.186056	-0.142666	1.000000		
Firm Size	0.212802	-0.415616	0.342830	0.181084	0.474837	-0.444020	0.575215	0.106769	0.163085	-0.147479	-0.019495	-0.150394	1.000000	
Capital Structure	-0.036491	-0.081106	-0.048450	-0.111644	0.065373	-0.078039	0.127846	-0.084847	0.022816	-0.061449	0.015657	0.149615	0.138397	1.000000

Table 5 - Correlation Matrix Model I (Total Fees)

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.838380	Prob. F(40,81)	0.7273
Obs*R-squared	35.72083	Prob. Chi-Square(40)	0.6632
Scaled explained SS	33.92280	Prob. Chi-Square(40)	0.7395

Table 6 - BPG Test for Heteroscedasticity Model I (Total Fees)

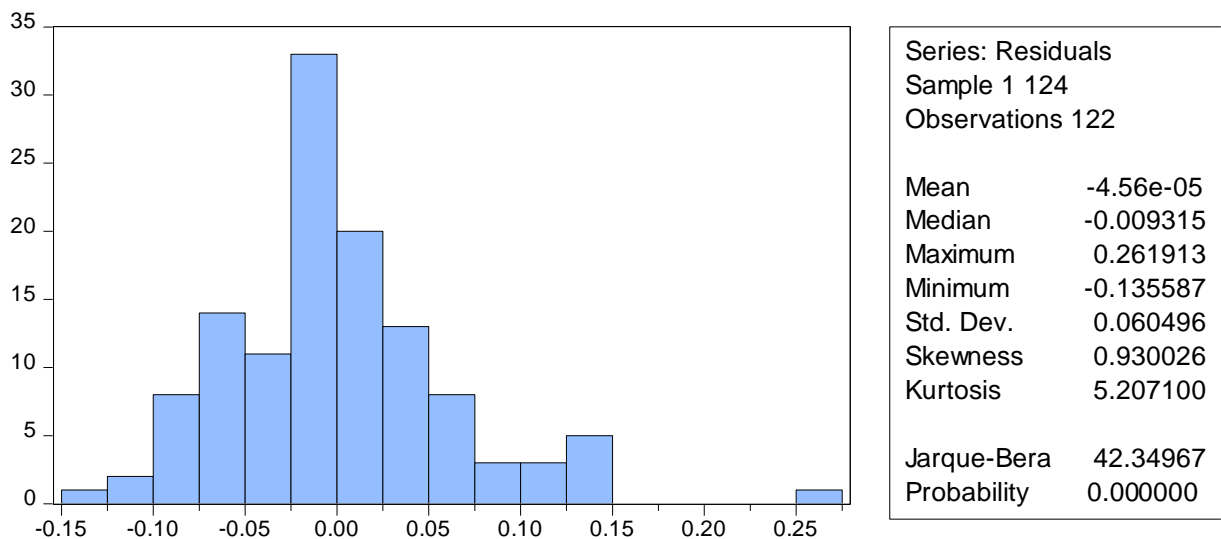


Figure 5 - Jarque-Bera Test for Normality Model I (Total Fees)

Dependent Variable: First-Day Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Commission Fees (Coordination)	-5.267184	5.939145	-0.886859	0.3777
Range Deviation	0.294749	0.069756	4.225442	0.0001
Offering Type (Secondary)	0.047497	0.034280	1.385560	0.1696
Number of Investors	0.001825	0.010304	0.177164	0.8598
Equity Offered	0.013999	0.079218	0.176716	0.8602
Underwriters	-0.014720	0.028802	-0.511070	0.6107
International Banks	0.071549	0.037917	1.886974	0.0627
Investors Participation (Foreigners)	0.215464	0.299255	0.720001	0.4736
Investors Participation (Institutional)	0.328843	0.316480	1.039067	0.3018
Investors Participation (Other)	0.215342	0.301723	0.713706	0.4774
Company Age	-0.010814	0.006457	-1.674775	0.0978
Firm Size	-0.004947	0.014205	-0.348288	0.7285
Capital Structure	0.001438	0.002232	0.644445	0.5211
IPO Year (Dummy 2008)	0.005014	0.051942	0.096532	0.9233
IPO Year (Dummy 2009)	-0.074621	0.041847	-1.783216	0.0783
IPO Year (Dummy 2010)	-0.023502	0.034188	-0.687438	0.4937
IPO Year (Dummy 2011)	-0.007535	0.032739	-0.230141	0.8186
IPO Year (Dummy 2012)	-0.027741	0.077878	-0.356206	0.7226
IPO Year (Dummy 2013)	-0.082108	0.043677	-1.879903	0.0637
IPO Year (Dummy 2014)	-0.119105	0.095325	-1.249458	0.2151
IPO Year (Dummy 2015)	-0.047795	0.089546	-0.533745	0.5950
IPO Year (Dummy 2016)	-0.151324	0.089905	-1.683161	0.0961
IPO Year (Dummy 2017)	-0.021401	0.044868	-0.476983	0.6346
IPO Year (Dummy 2018)	0.080190	0.073374	1.092890	0.2776
Listing Segment (Dummy Nível 2)	-0.037558	0.030091	-1.248176	0.2155
Listing Segment (Dummy Nível 1)	-0.045104	0.045656	-0.987910	0.3261
Listing Segment (Dummy Tradicional)	-0.053395	0.115737	-0.461346	0.6458
Listing Segment (Dummy Bovespa Mais)	0.068390	0.103373	0.661586	0.5101
Listing Segment (Dummy BDR)	-0.077148	0.044790	-1.722428	0.0888
Industry (Dummy Cons. Prod. & Serv.)	0.048310	0.039279	1.229898	0.2223
Industry (Dummy Energy & Power)	0.004628	0.041075	0.112675	0.9106
Industry (Dummy Financials)	0.077887	0.039650	1.964373	0.0529
Industry (Dummy Healthcare)	0.056895	0.036084	1.576751	0.1187
Industry (Dummy High Technology)	0.078453	0.056215	1.395600	0.1666
Industry (Dummy Industrials)	0.038347	0.036409	1.053207	0.2953
Industry (Dummy Materials)	0.024164	0.050215	0.481209	0.6316
Industry (Dummy Media & Entert.)	-0.016810	0.057363	-0.293044	0.7702
Industry (Dummy Real State)	0.013525	0.030976	0.436641	0.6635
Industry (Dummy Retail)	-0.005257	0.058784	-0.089435	0.9290
Industry (Dummy Telecommunications)	0.129492	0.093430	1.385971	0.1695
R-squared	0.551767	Mean dependent var		0.033931
Adjusted R-squared	0.338584	S.D. dependent var		0.095922
S.E. of regression	0.078011	Akaike info criterion		-2.005502
Sum squared resid	0.499027	Schwarz criterion		-1.086151
Log likelihood	162.3356	Hannan-Quinn criter.		-1.632090
Durbin-Watson stat	2.141050			

Table 7 - Regression Results Model II (Coordination Fees)

Correlation	First-Day Return	Commission Fees (Coord.)	Range Deviation	Offering Type (Secondary)	Number of Investors	Equity Offered	Underwriters	Internat. Banks	Investors Part. (Foreigners)	Investors Part. (Institutional)	Investors Part. (Other)	Company Age	Firm Size	Capital Structure
First-Day Return	1.000000													
Commission Fees (Coord.)	-0.086481	1.000000												
Range Deviation	0.535778	-0.158092	1.000000											
Offering Type (Secondary)	0.310427	-0.265666	0.188334	1.000000										
Number of Investors	0.233989	-0.152272	0.410439	0.178737	1.000000									
Equity Offered	0.118014	0.282658	0.004315	0.071294	-0.035047	1.000000								
Underwriters	0.048836	-0.437740	0.118021	0.221337	0.295256	-0.119529	1.000000							
Internat. Banks	0.236149	-0.007691	0.120559	0.032450	-0.016180	-0.034551	-0.145739	1.000000						
Investors Part. (Foreigners)	0.108889	0.129243	0.105559	-0.032540	0.158789	0.108589	0.065126	0.233778	1.000000					
Investors Part. (Institutional)	0.000341	-0.069312	-0.109948	0.175331	-0.030239	0.042509	0.042625	-0.194981	-0.606998	1.000000				
Investors Part. (Other)	-0.151856	-0.120306	-0.057161	-0.099857	-0.232139	-0.171866	-0.073699	-0.125525	-0.669200	-0.141236	1.000000			
Company Age	-0.071158	-0.062147	0.062555	-0.034178	0.071134	0.016104	-0.063774	-0.020290	-0.044999	0.186056	-0.142666	1.000000		
Firm Size	0.212802	-0.479379	0.342830	0.181084	0.474837	-0.444020	0.575215	0.106769	0.163085	-0.147479	-0.019495	-0.150394	1.000000	
Capital Structure	-0.036491	-0.004926	-0.048450	-0.111644	0.065373	-0.078039	0.127846	-0.084847	0.022816	-0.061449	0.015657	0.149615	0.138397	1.000000

Table 8 - Correlation Matrix Model II (Coordination Fees)

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.605278	Prob. F(40,81)	0.9591
Obs*R-squared	28.07457	Prob. Chi-Square(40)	0.9220
Scaled explained SS	33.85186	Prob. Chi-Square(40)	0.7423

Table 9 - BPG Test for Heteroscedasticity Model II (Coordination Fees)

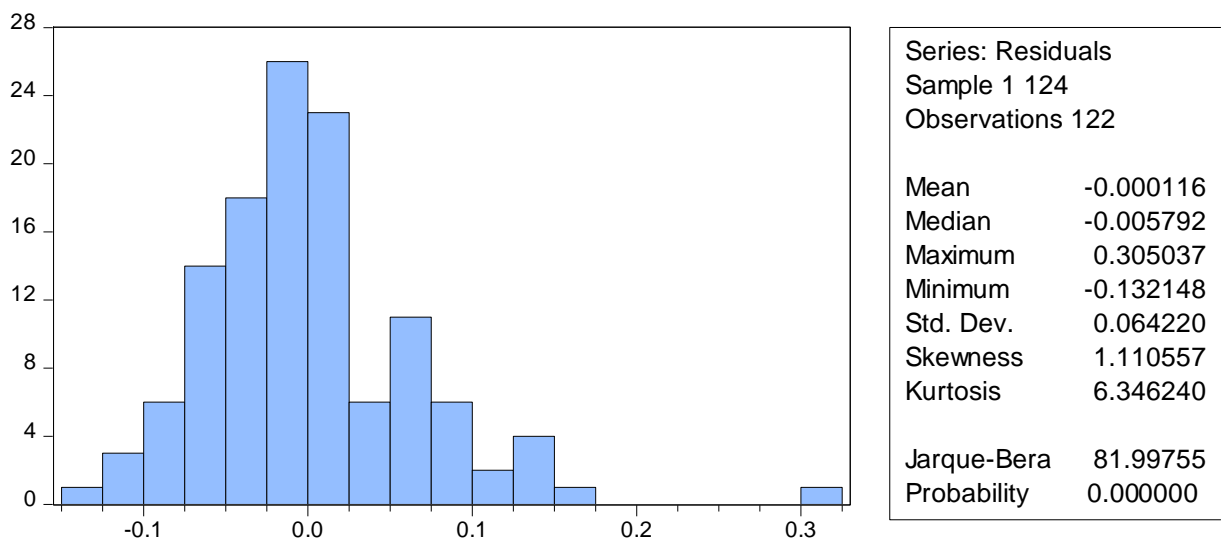


Figure 6 - Jarque-Bera Test for Normality Model II (Coordination Fees)

Dependent Variable: First-Day Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Commission Fees (Firm Commitment)	-1.944030	2.271863	-0.855699	0.3947
Range Deviation	0.301288	0.069906	4.309873	0.0000
Offering Type (Secondary)	0.051990	0.034153	1.522282	0.1318
Number of Investors	0.001382	0.010342	0.133604	0.8940
Equity Offered	0.006502	0.078589	0.082731	0.9343
Underwriters	-0.012088	0.028508	-0.424023	0.6727
International Banks	0.068756	0.038341	1.793289	0.0766
Investors Participation (Foreigners)	0.216939	0.299749	0.723736	0.4713
Investors Participation (Institutional)	0.342217	0.319219	1.072045	0.2868
Investors Participation (Other)	0.216355	0.302167	0.716010	0.4760
Company Age	-0.010827	0.006459	-1.676206	0.0975
Firm Size	-0.006025	0.014219	-0.423702	0.6729
Capital Structure	0.001589	0.002244	0.708210	0.4808
IPO Year (Dummy 2008)	0.010342	0.052709	0.196208	0.8449
IPO Year (Dummy 2009)	-0.065130	0.040035	-1.626834	0.1076
IPO Year (Dummy 2010)	-0.017367	0.032857	-0.528559	0.5985
IPO Year (Dummy 2011)	-0.007410	0.032746	-0.226278	0.8215
IPO Year (Dummy 2012)	-0.033648	0.078572	-0.428249	0.6696
IPO Year (Dummy 2013)	-0.071050	0.041506	-1.711819	0.0907
IPO Year (Dummy 2014)	-0.120442	0.095512	-1.261012	0.2109
IPO Year (Dummy 2015)	-0.055261	0.090150	-0.612993	0.5416
IPO Year (Dummy 2016)	-0.154067	0.090060	-1.710711	0.0909
IPO Year (Dummy 2017)	-0.016844	0.044396	-0.379411	0.7054
IPO Year (Dummy 2018)	0.083105	0.073076	1.137250	0.2587
Listing Segment (Dummy Nível 2)	-0.037089	0.030103	-1.232064	0.2214
Listing Segment (Dummy Nível 1)	-0.044036	0.045580	-0.966129	0.3368
Listing Segment (Dummy Tradicional)	-0.043058	0.115610	-0.372444	0.7105
Listing Segment (Dummy Bovespa Mais)	0.060586	0.103215	0.586984	0.5588
Listing Segment (Dummy BDR)	-0.076685	0.044860	-1.709437	0.0912
Industry (Dummy Cons. Prod. & Serv.)	0.049486	0.039424	1.255220	0.2130
Industry (Dummy Energy & Power)	0.019912	0.042126	0.472677	0.6377
Industry (Dummy Financials)	0.085761	0.039881	2.150409	0.0345
Industry (Dummy Healthcare)	0.061559	0.036245	1.698390	0.0932
Industry (Dummy High Technology)	0.073267	0.055468	1.320890	0.1902
Industry (Dummy Industrials)	0.040505	0.036515	1.109293	0.2705
Industry (Dummy Materials)	0.026679	0.050388	0.529468	0.5979
Industry (Dummy Media & Entert.)	-0.017528	0.057380	-0.305472	0.7608
Industry (Dummy Real State)	0.017343	0.031398	0.552344	0.5822
Industry (Dummy Retail)	-0.003858	0.058772	-0.065649	0.9478
Industry (Dummy Telecommunications)	0.128298	0.093406	1.373549	0.1733
R-squared	0.551473	Mean dependent var		0.033931
Adjusted R-squared	0.338149	S.D. dependent var		0.095922
S.E. of regression	0.078036	Akaike info criterion		-2.004846
Sum squared resid	0.499354	Schwarz criterion		-1.085495
Log likelihood	162.2956	Hannan-Quinn criter.		-1.631434
Durbin-Watson stat	2.108039			

Table 10 - Regression Results Model III (Firm Commitment Fees)

Correlation	First-Day Return	Commission Fees (F. Com.)	Range Deviation	Offering Type (Secondary)	Number of Investors	Equity Offered	Underwriters	Internat. Banks	Investors Part. (Foreigners)	Investors Part. (Institutional)	Investors Part. (Other)	Company Age	Firm Size	Capital Structure
First-Day Return	1.000000													
Commission Fees (F. Com.)	-0.105493	1.000000												
Range Deviation	0.535778	-0.047147	1.000000											
Offering Type (Secondary)	0.310427	-0.063563	0.188334	1.000000										
Number of Investors	0.233989	-0.216362	0.410439	0.178737	1.000000									
Equity Offered	0.118014	0.109631	0.004315	0.071294	-0.035047	1.000000								
Underwriters	0.048836	-0.091221	0.118021	0.221337	0.295256	-0.119529	1.000000							
Internat. Banks	0.236149	-0.097886	0.120559	0.032450	-0.016180	-0.034551	-0.145739	1.000000						
Investors Part. (Foreigners)	0.108889	-0.069910	0.105559	-0.032540	0.158789	0.108589	0.065126	0.233778	1.000000					
Investors Part. (Institutional)	0.000341	0.094233	-0.109948	0.175331	-0.030239	0.042509	0.042625	-0.194981	-0.606998	1.000000				
Investors Part. (Other)	-0.151856	0.047848	-0.057161	-0.099857	-0.232139	-0.171866	-0.073699	-0.125525	-0.669200	-0.141236	1.000000			
Company Age	-0.071158	-0.061342	0.062555	-0.034178	0.071134	0.016104	-0.063774	-0.020290	-0.044999	0.186056	-0.142666	1.000000		
Firm Size	0.212802	-0.114146	0.342830	0.181084	0.474837	-0.444020	0.575215	0.106769	0.163085	-0.147479	-0.019495	-0.150394	1.000000	
Capital Structure	-0.036491	-0.044752	-0.048450	-0.111644	0.065373	-0.078039	0.127846	-0.084847	0.022816	-0.061449	0.015657	0.149615	0.138397	1.000000

Table 11 - Correlation Matrix Model III (Firm Commitment Fees)

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.682040	Prob. F(40,81)	0.9083
Obs*R-squared	30.73796	Prob. Chi-Square(40)	0.8536
Scaled explained SS	37.32215	Prob. Chi-Square(40)	0.5915

Table 12 - BPG Test for Heteroscedasticity Model III (Firm Commitment Fees)

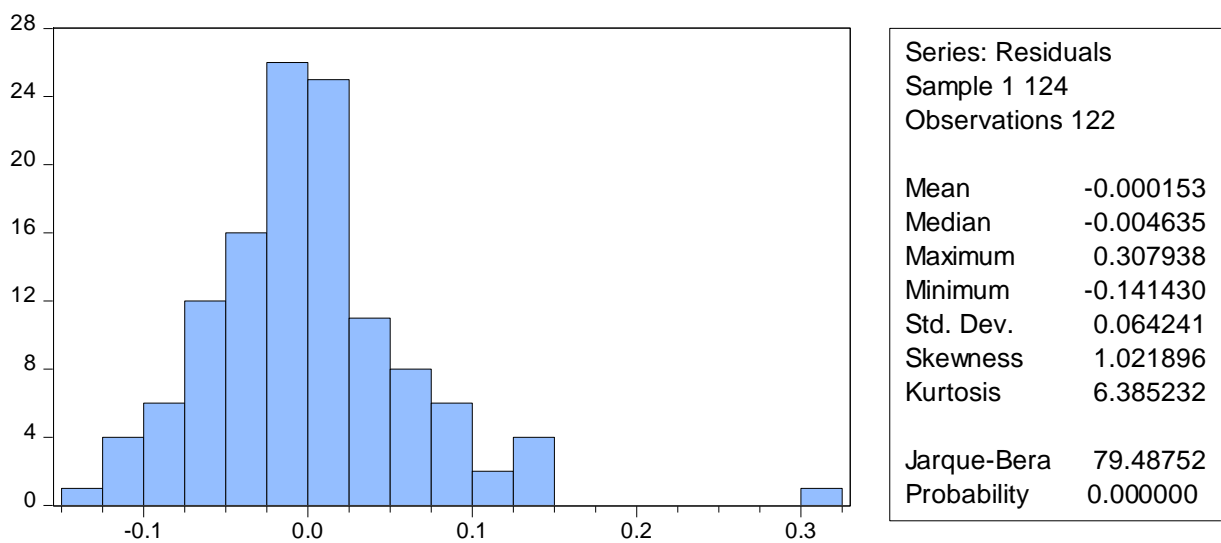


Figure 7 - Jarque-Bera Test for Normality Model III (Firm Commitment Fees)

Dependent Variable: First-Day Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Commission Fees (Incentive)	-3.608411	1.633442	-2.209084	0.0300
Range Deviation	0.322406	0.069007	4.672062	0.0000
Offering Type (Secondary)	0.046456	0.033342	1.393338	0.1673
Number of Investors	0.001504	0.010055	0.149537	0.8815
Equity Offered	0.016441	0.076846	0.213946	0.8311
Underwriters	-0.025496	0.028567	-0.892526	0.3747
International Banks	0.072738	0.036905	1.970945	0.0521
Investors Participation (Foreigners)	0.236313	0.290882	0.812402	0.4189
Investors Participation (Institutional)	0.341946	0.307200	1.113106	0.2689
Investors Participation (Other)	0.231655	0.292972	0.790705	0.4314
Company Age	-0.012285	0.006343	-1.936895	0.0562
Firm Size	-0.004395	0.013865	-0.316990	0.7521
Capital Structure	0.001496	0.002179	0.686622	0.4943
IPO Year (Dummy 2008)	0.014639	0.050923	0.287475	0.7745
IPO Year (Dummy 2009)	-0.059027	0.039089	-1.510056	0.1349
IPO Year (Dummy 2010)	-0.016146	0.031918	-0.505873	0.6143
IPO Year (Dummy 2011)	0.000904	0.032050	0.028197	0.9776
IPO Year (Dummy 2012)	-0.047994	0.076681	-0.625897	0.5331
IPO Year (Dummy 2013)	-0.067194	0.040503	-1.658987	0.1009
IPO Year (Dummy 2014)	-0.098415	0.093009	-1.058126	0.2931
IPO Year (Dummy 2015)	-0.032741	0.087620	-0.373667	0.7096
IPO Year (Dummy 2016)	-0.136763	0.087938	-1.555217	0.1237
IPO Year (Dummy 2017)	-0.013923	0.043294	-0.321583	0.7486
IPO Year (Dummy 2018)	0.102090	0.071329	1.431245	0.1562
Listing Segment (Dummy Nível 2)	-0.039316	0.029385	-1.337960	0.1846
Listing Segment (Dummy Nível 1)	-0.053801	0.044726	-1.202893	0.2325
Listing Segment (Dummy Tradicional)	-0.013698	0.113727	-0.120444	0.9044
Listing Segment (Dummy Bovespa Mais)	0.054399	0.100765	0.539865	0.5908
Listing Segment (Dummy BDR)	-0.095865	0.044175	-2.170123	0.0329
Industry (Dummy Cons. Prod. & Serv.)	0.057022	0.038580	1.478005	0.1432
Industry (Dummy Energy & Power)	0.009425	0.039613	0.237921	0.8125
Industry (Dummy Financials)	0.075885	0.038618	1.965035	0.0528
Industry (Dummy Healthcare)	0.060558	0.035198	1.720467	0.0891
Industry (Dummy High Technology)	0.055900	0.054274	1.029973	0.3061
Industry (Dummy Industrials)	0.021923	0.036303	0.603889	0.5476
Industry (Dummy Materials)	0.022132	0.049007	0.451609	0.6527
Industry (Dummy Media & Entert.)	-0.001368	0.056455	-0.024225	0.9807
Industry (Dummy Real State)	0.002322	0.030613	0.075839	0.9397
Industry (Dummy Retail)	-0.015237	0.057595	-0.264558	0.7920
Industry (Dummy Telecommunications)	0.106666	0.091472	1.166107	0.2470
R-squared	0.572887	Mean dependent var		0.033931
Adjusted R-squared	0.369748	S.D. dependent var		0.095922
S.E. of regression	0.076151	Akaike info criterion		-2.053765
Sum squared resid	0.475514	Schwarz criterion		-1.134414
Log likelihood	165.2797	Hannan-Quinn criter.		-1.680353
Durbin-Watson stat	2.141181			

Table 13 - Regression Results Model IV (Incentive Fees)

Correlation	First-Day Return	Commission Fees (Incent.)	Range Deviation	Offering Type (Secondary)	Number of Investors	Equity Offered	Underwriters	Internat. Banks	Investors Part. (Foreigners)	Investors Part. (Institutional)	Investors Part. (Other)	Company Age	Firm Size	Capital Structure
First-Day Return	1.000000													
Commission Fees (Incent.)	-0.037959	1.000000												
Range Deviation	0.535778	0.158175	1.000000											
Offering Type (Secondary)	0.310427	-0.012971	0.188334	1.000000										
Number of Investors	0.233989	-0.196349	0.410439	0.178737	1.000000									
Equity Offered	0.118014	-0.056777	0.004315	0.071294	-0.035047	1.000000								
Underwriters	0.048836	-0.168163	0.118021	0.221337	0.295256	-0.119529	1.000000							
Internat. Banks	0.236149	0.106745	0.120559	0.032450	-0.016180	-0.034551	-0.145739	1.000000						
Investors Part. (Foreigners)	0.108889	-0.027825	0.105559	-0.032540	0.158789	0.108589	0.065126	0.233778	1.000000					
Investors Part. (Institutional)	0.000341	-0.040241	-0.109948	0.175331	-0.030239	0.042509	0.042625	-0.194981	-0.606998	1.000000				
Investors Part. (Other)	-0.151856	0.074540	-0.057161	-0.099857	-0.232139	-0.171866	-0.073699	-0.125525	-0.669200	-0.141236	1.000000			
Company Age	-0.071158	-0.155580	0.062555	-0.034178	0.071134	0.016104	-0.063774	-0.020290	-0.044999	0.186056	-0.142666	1.000000		
Firm Size	0.212802	-0.109754	0.342830	0.181084	0.474837	-0.444020	0.575215	0.106769	0.163085	-0.147479	-0.019495	-0.150394	1.000000	
Capital Structure	-0.036491	-0.123220	-0.048450	-0.111644	0.065373	-0.078039	0.127846	-0.084847	0.022816	-0.061449	0.015657	0.149615	0.138397	1.000000

Table 14 - Correlation Matrix Model IV (Incentive Fees)

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.634420	Prob. F(40,81)	0.9429
Obs*R-squared	29.10379	Prob. Chi-Square(40)	0.8987
Scaled explained SS	30.53439	Prob. Chi-Square(40)	0.8598

Table 15 - BPG Test for Heteroscedasticity Model IV (Incentive Fees)

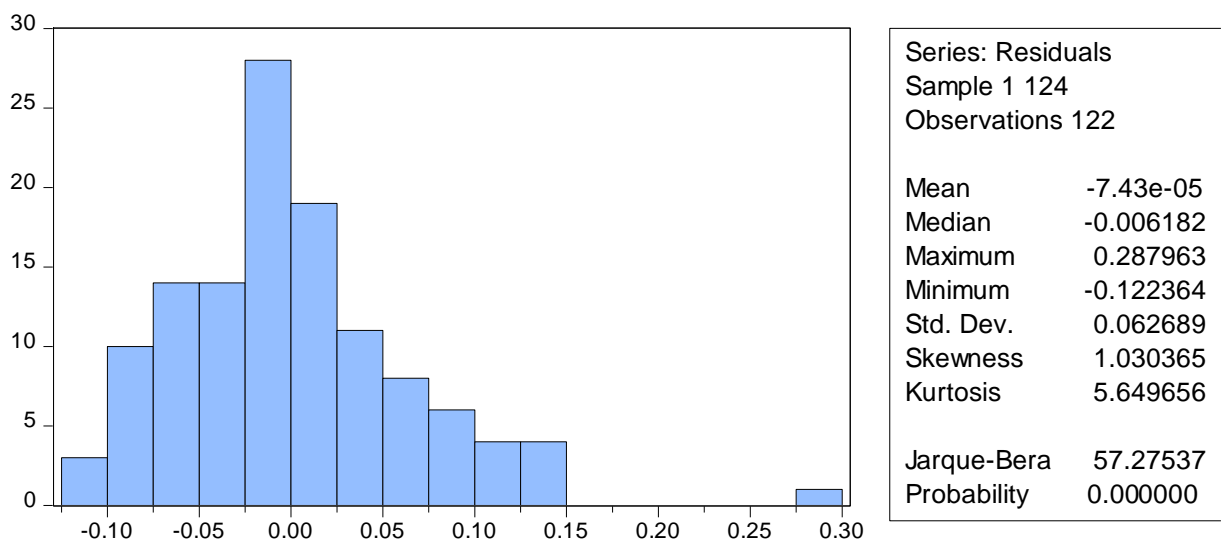


Figure 8 - Jarque-Bera Test for Normality Model IV (Incentive Fees)

Dependent Variable: First-Day Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Commission Fees (Placement)	-2.297690	1.770828	-1.297523	0.1981
Range Deviation	0.297299	0.069333	4.287972	0.0000
Offering Type (Secondary)	0.047427	0.034006	1.394648	0.1669
Number of Investors	0.001739	0.010246	0.169693	0.8657
Equity Offered	0.017050	0.078683	0.216688	0.8290
Underwriters	-0.011796	0.028316	-0.416580	0.6781
International Banks	0.074739	0.037600	1.987733	0.0502
Investors Participation (Foreigners)	0.241863	0.298865	0.809272	0.4207
Investors Participation (Institutional)	0.366254	0.317265	1.154412	0.2517
Investors Participation (Other)	0.253168	0.302773	0.836166	0.4055
Company Age	-0.011463	0.006448	-1.777727	0.0792
Firm Size	-0.005853	0.014124	-0.414394	0.6797
Capital Structure	0.001501	0.002221	0.675649	0.5012
IPO Year (Dummy 2008)	0.001112	0.051584	0.021552	0.9829
IPO Year (Dummy 2009)	-0.068192	0.039923	-1.708099	0.0914
IPO Year (Dummy 2010)	-0.030602	0.034768	-0.880171	0.3813
IPO Year (Dummy 2011)	-0.007279	0.032527	-0.223783	0.8235
IPO Year (Dummy 2012)	-0.031330	0.077553	-0.403982	0.6873
IPO Year (Dummy 2013)	-0.087282	0.043357	-2.013129	0.0474
IPO Year (Dummy 2014)	-0.127854	0.095259	-1.342172	0.1832
IPO Year (Dummy 2015)	-0.050205	0.089099	-0.563476	0.5746
IPO Year (Dummy 2016)	-0.153349	0.089447	-1.714403	0.0902
IPO Year (Dummy 2017)	-0.030620	0.045651	-0.670743	0.5043
IPO Year (Dummy 2018)	0.075844	0.073042	1.038368	0.3022
Listing Segment (Dummy Nível 2)	-0.038061	0.029932	-1.271553	0.2071
Listing Segment (Dummy Nível 1)	-0.043660	0.045240	-0.965056	0.3374
Listing Segment (Dummy Tradicional)	-0.056878	0.115138	-0.494002	0.6226
Listing Segment (Dummy Bovespa Mais)	0.080933	0.103584	0.781325	0.4369
Listing Segment (Dummy BDR)	-0.076560	0.044508	-1.720125	0.0892
Industry (Dummy Cons. Prod. & Serv.)	0.050483	0.039134	1.289994	0.2007
Industry (Dummy Energy & Power)	-0.000133	0.041150	-0.003221	0.9974
Industry (Dummy Financials)	0.078863	0.039313	2.006053	0.0481
Industry (Dummy Healthcare)	0.057920	0.035852	1.615522	0.1100
Industry (Dummy High Technology)	0.079190	0.055485	1.427235	0.1573
Industry (Dummy Industrials)	0.041410	0.036294	1.140944	0.2572
Industry (Dummy Materials)	0.022730	0.049933	0.455210	0.6502
Industry (Dummy Media & Entert.)	-0.015564	0.057068	-0.272720	0.7858
Industry (Dummy Real State)	0.011802	0.030816	0.382990	0.7027
Industry (Dummy Retail)	-0.001863	0.058449	-0.031870	0.9747
Industry (Dummy Telecommunications)	0.131371	0.092926	1.413710	0.1612
R-squared	0.556572	Mean dependent var		0.033931
Adjusted R-squared	0.345674	S.D. dependent var		0.095922
S.E. of regression	0.077592	Akaike info criterion		-2.016279
Sum squared resid	0.493677	Schwarz criterion		-1.096928
Log likelihood	162.9930	Hannan-Quinn criter.		-1.642867
Durbin-Watson stat	2.163301			

Table 16 - Regression Results Model V (Placement Fees)

Correlation	First-Day Return	Commission Fees (Placem.)	Range Deviation	Offering Type (Secondary)	Number of Investors	Equity Offered	Underwriters	Internat. Banks	Investors Part. (Foreigners)	Investors Part. (Institutional)	Investors Part. (Other)	Company Age	Firm Size	Capital Structure
First-Day Return	1.000000													
Commission Fees (Placem.)	-0.080115	1.000000												
Range Deviation	0.535778	-0.137564	1.000000											
Offering Type (Secondary)	0.310427	-0.172479	0.188334	1.000000										
Number of Investors	0.233989	-0.095472	0.410439	0.178737	1.000000									
Equity Offered	0.118014	0.262656	0.004315	0.071294	-0.035047	1.000000								
Underwriters	0.048836	-0.360954	0.118021	0.221337	0.295256	-0.119529	1.000000							
Internat. Banks	0.236149	0.024636	0.120559	0.032450	-0.016180	-0.034551	-0.145739	1.000000						
Investors Part. (Foreigners)	0.108889	0.095572	0.105559	-0.032540	0.158789	0.108589	0.065126	0.233778	1.000000					
Investors Part. (Institutional)	0.000341	-0.075389	-0.109948	0.175331	-0.030239	0.042509	0.042625	-0.194981	-0.606998	1.000000				
Investors Part. (Other)	-0.151856	-0.070174	-0.057161	-0.099857	-0.232139	-0.171866	-0.073699	-0.125525	-0.669200	-0.141236	1.000000			
Company Age	-0.071158	-0.081027	0.062555	-0.034178	0.071134	0.016104	-0.063774	-0.020290	-0.044999	0.186056	-0.142666	1.000000		
Firm Size	0.212802	-0.402757	0.342830	0.181084	0.474837	-0.444020	0.575215	0.106769	0.163085	-0.147479	-0.019495	-0.150394	1.000000	
Capital Structure	-0.036491	0.029153	-0.048450	-0.111644	0.065373	-0.078039	0.127846	-0.084847	0.022816	-0.061449	0.015657	0.149615	0.138397	1.000000

Table 17 - Correlation Matrix Model V (Placement Fees)

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.683312	Prob. F(40,81)	0.9072
Obs*R-squared	30.78082	Prob. Chi-Square(40)	0.8523
Scaled explained SS	35.61336	Prob. Chi-Square(40)	0.6680

Table 18 - BPG Test for Heteroscedasticity Model V (Placement Fees)

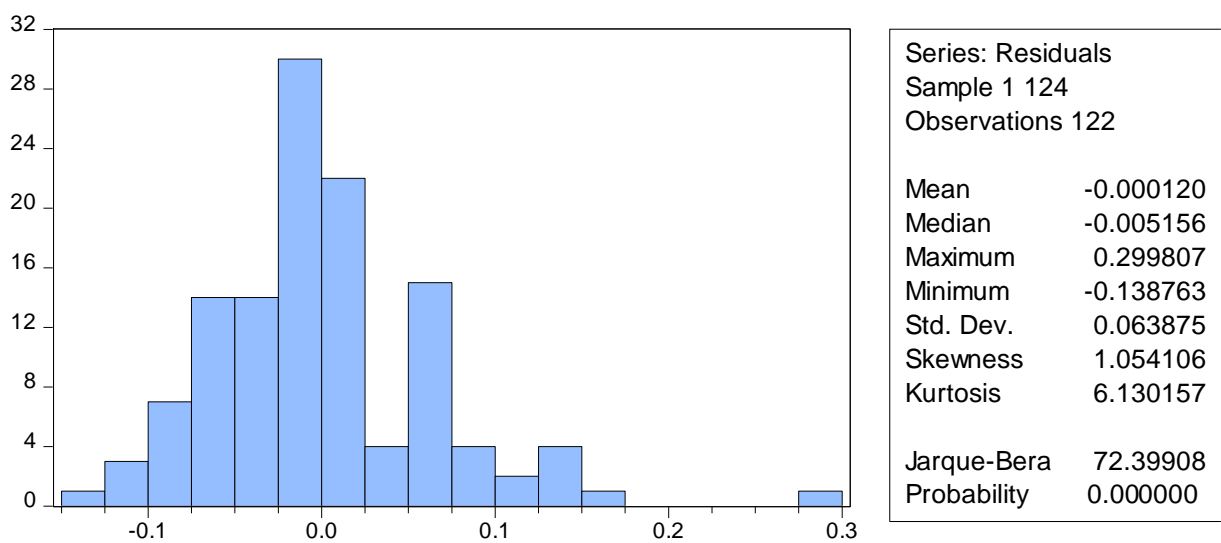


Figure 9 - Jarque-Bera Test for Normality Model V (Placement Fees)

Dependent Variable: First-Day Return

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Commission Fees (Other)	-1.874332	2.227337	-0.841512	0.4025
Range Deviation	0.295851	0.069755	4.241276	0.0001
Offering Type (Secondary)	0.058262	0.035316	1.649735	0.1028
Number of Investors	0.001144	0.010374	0.110298	0.9124
Equity Offered	0.007497	0.078640	0.095331	0.9243
Underwriters	-0.013362	0.028636	-0.466623	0.6420
International Banks	0.069353	0.038251	1.813099	0.0735
Investors Participation (Foreigners)	0.177821	0.297135	0.598453	0.5512
Investors Participation (Institutional)	0.281698	0.314316	0.896225	0.3728
Investors Participation (Other)	0.170778	0.299580	0.570058	0.5702
Company Age	-0.010454	0.006464	-1.617240	0.1097
Firm Size	-0.004585	0.014235	-0.322060	0.7482
Capital Structure	0.001417	0.002233	0.634541	0.5275
IPO Year (Dummy 2008)	0.001749	0.051883	0.033717	0.9732
IPO Year (Dummy 2009)	-0.065056	0.040038	-1.624858	0.1080
IPO Year (Dummy 2010)	-0.016410	0.032774	-0.500703	0.6179
IPO Year (Dummy 2011)	-0.008704	0.032876	-0.264762	0.7919
IPO Year (Dummy 2012)	-0.032554	0.078435	-0.415038	0.6792
IPO Year (Dummy 2013)	-0.071254	0.041521	-1.716119	0.0899
IPO Year (Dummy 2014)	-0.115391	0.095150	-1.212730	0.2287
IPO Year (Dummy 2015)	-0.051269	0.089757	-0.571202	0.5694
IPO Year (Dummy 2016)	-0.152517	0.089991	-1.694804	0.0939
IPO Year (Dummy 2017)	-0.020243	0.044747	-0.452382	0.6522
IPO Year (Dummy 2018)	0.086059	0.072879	1.180835	0.2411
Listing Segment (Dummy Nível 2)	-0.032916	0.030583	-1.076267	0.2850
Listing Segment (Dummy Nível 1)	-0.040892	0.045469	-0.899349	0.3711
Listing Segment (Dummy Tradicional)	-0.035832	0.116272	-0.308175	0.7587
Listing Segment (Dummy Bovespa Mais)	0.060295	0.103239	0.584035	0.5608
Listing Segment (Dummy BDR)	-0.082642	0.044782	-1.845411	0.0686
Industry (Dummy Cons. Prod. & Serv.)	0.049032	0.039382	1.245027	0.2167
Industry (Dummy Energy & Power)	0.012200	0.040662	0.300029	0.7649
Industry (Dummy Financials)	0.079422	0.039555	2.007895	0.0479
Industry (Dummy Healthcare)	0.057780	0.036069	1.601958	0.1130
Industry (Dummy High Technology)	0.066853	0.055353	1.207746	0.2306
Industry (Dummy Industrials)	0.037132	0.036452	1.018653	0.3114
Industry (Dummy Materials)	0.021143	0.050282	0.420501	0.6752
Industry (Dummy Media & Entert.)	-0.020929	0.057551	-0.363664	0.7170
Industry (Dummy Real State)	0.015971	0.031189	0.512090	0.6100
Industry (Dummy Retail)	-0.002138	0.058802	-0.036367	0.9711
Industry (Dummy Telecommunications)	0.126467	0.093364	1.354564	0.1793
R-squared	0.551343	Mean dependent var		0.033931
Adjusted R-squared	0.337957	S.D. dependent var		0.095922
S.E. of regression	0.078048	Akaike info criterion		-2.004555
Sum squared resid	0.499500	Schwarz criterion		-1.085204
Log likelihood	162.2778	Hannan-Quinn criter.		-1.631143
Durbin-Watson stat	2.101255			

Table 19 - Regression Results Model VI (Other Fees)

Correlation	First-Day Return	Commission Fees (Other)	Range Deviation	Offering Type (Secondary)	Number of Investors	Equity Offered	Underwriters	Internat. Banks	Investors Part. (Foreigners)	Investors Part. (Institutional)	Investors Part. (Other)	Company Age	Firm Size	Capital Structure
First-Day Return	1.000000													
Commission Fees (Other)	-0.038605	1.000000												
Range Deviation	0.535778	0.034964	1.000000											
Offering Type (Secondary)	0.310427	0.049966	0.188334	1.000000										
Number of Investors	0.233989	-0.038871	0.410439	0.178737	1.000000									
Equity Offered	0.118014	0.018528	0.004315	0.071294	-0.035047	1.000000								
Underwriters	0.048836	-0.097036	0.118021	0.221337	0.295256	-0.119529	1.000000							
Internat. Banks	0.236149	-0.025151	0.120559	0.032450	-0.016180	-0.034551	-0.145739	1.000000						
Investors Part. (Foreigners)	0.108889	0.138761	0.105559	-0.032540	0.158789	0.108589	0.065126	0.233778	1.000000					
Investors Part. (Institutional)	0.000341	-0.130155	-0.109948	0.175331	-0.030239	0.042509	0.042625	-0.194981	-0.606998	1.000000				
Investors Part. (Other)	-0.151856	-0.042459	-0.057161	-0.099857	-0.232139	-0.171866	-0.073699	-0.125525	-0.669200	-0.141236	1.000000			
Company Age	-0.071158	-0.080551	0.062555	-0.034178	0.071134	0.016104	-0.063774	-0.020290	-0.044999	0.186056	-0.142666	1.000000		
Firm Size	0.212802	-0.000284	0.342830	0.181084	0.474837	-0.444020	0.575215	0.106769	0.163085	-0.147479	-0.019495	-0.150394	1.000000	
Capital Structure	-0.036491	-0.030177	-0.048450	-0.111644	0.065373	-0.078039	0.127846	-0.084847	0.022816	-0.061449	0.015657	0.149615	0.138397	1.000000

Table 20 - Correlation Matrix Model VI (Other Fees)

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.670664	Prob. F(40,81)	0.9175
Obs*R-squared	30.35281	Prob. Chi-Square(40)	0.8652
Scaled explained SS	37.05131	Prob. Chi-Square(40)	0.6037

Table 21 - BPG Test for Heteroscedasticity Model VI (Other Fees)

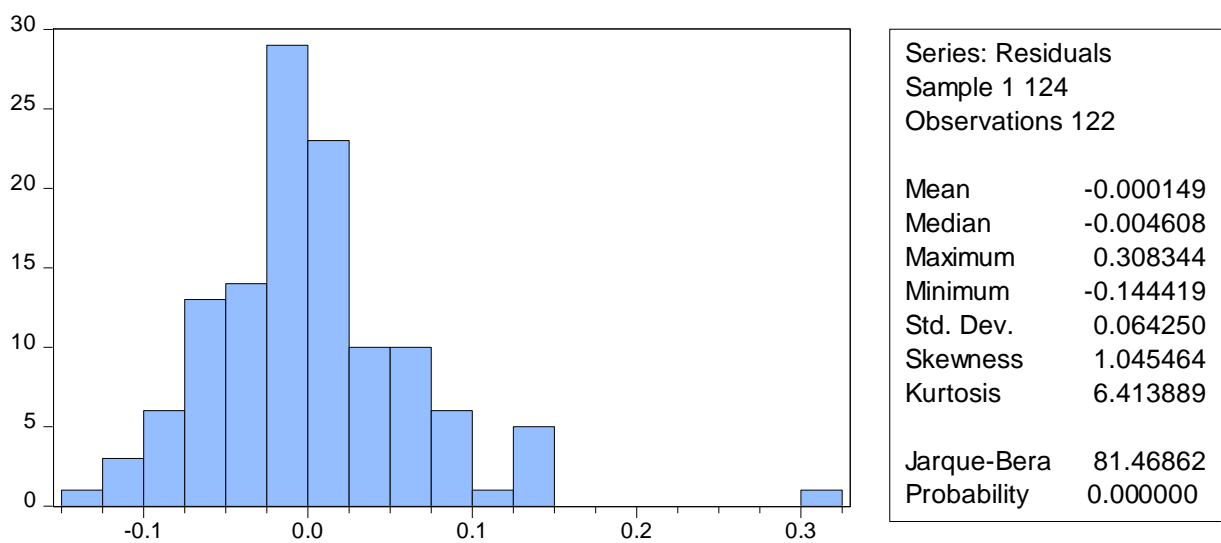


Figure 10 - Jarque-Bera Test for Normality Model VI (Other Fees)