HOW IS THE ALLOCATION IN BRAZILIAN BOOKBUILDING EQUITY OFFERINGS?

Richard Saito*, João André Marques Pereira**

Abstract

We examine five bookbuilding processes in the Brazilian equity market from 2003 to 2004. In a bookbuilding process, the investment bank has the discretionary power to price the offer and to allocate shares among interested investors. We analyze the allocation determinants and we find empirical evidence that bookbuilding process induce investors to disclose superior information. In addition, we also find evidence that bookbuilding process allows the investment bank to benefit disperse ownership as well as to have a higher allocation for long-term investors.

Keywords: equity offerings, Brazil, bookbuilding, ownership

** Professor of Finance, FGV-EAESP, Fundação Getúlio Vargas*
Tel: +55 11 5506 9281
Email: richard.saito@fgvsp.br
*** Ph. D. Student, FGV-EAESP, Fundação Getúlio Vargas*
Email: joaoandre@gvmail.br
This paper is based on an updated version of the paper published in Revista Brasileira de Finanças 2006.

1. Introduction

The bookbuilding procedure is led by an underwriter (investment bank) that collects price and quantity bids from institutional investors[24] directly or via other intermediaries' syndicate members. In the beginning of the process, the underwriter in agreement with the issuer defines an indicative price range and invites institutions to provide nonbinding offers - each purchaser bid includes the desired amount of shares for each price level. The book of bids is maintained confidentially by the underwriter.

At the end of the process, the underwriter in agreement with the issuing company establishes an offer price and allocates the lots on a discretionary basis. It is clear that the main characteristic that distinguishes the bookbuilding from the traditional auction and fixed price procedures is the discretionary power of the underwriter in pricing the offer and in allocating the shares among investors.

This allocation procedure can be questioned whether it is efficient. Mainly because, for example, some offering quotas are not always directed to investors who outbid the other participants. However, the bookbuilding can bring some benefits for the issuing company. For instance, it enables the issuing company to choose the new shareholders in addition to increasing the efficiency of the process accounted for the returns and volatilities of stocks specially in short-term horizon.

When anticipating the investors' interests, the underwriter has access to important information on the appraised prices and aggregated demand, When determining discretionary policies, the underwriter is able to create award criteria or penalty to induce greater accuracy in disclosing information. The underwriter is also able to plan offering by the existing shareholders to provide more liquidity, to create mechanisms to avoid control acquisition (poison pills), and to provide price stability on the secondary market through the use of investment bank.

In this study, we analyze the determinants of the allocation five Brazilian public offerings: type and bid size, investor type (short vs. long term), its nationality and frequency in the participation coordinated by the same underwriter. Ritter & Welch (2002) and Ljungqvist (2005) confirm that the underpriced issue is common for all types of distribution procedures. Ljungqvist, Jenkinson & Wilhelm (2003) provide international evidence that underpricing is reduced when the discretionarity is applied. In Brazil, Peres (2003) also shows that bookbuilding reduce the underpricing. The author calculates an average underpricing of 2.0% to the adjusted price of the placements by bookbuilding, as long as the Brazilian historical average in issues performed by auction (presented by Aggarwal, Loyal & Hernandez, 1993) is 78.5%.

While the efficiency in pricing process is tested easily, due to the availability of public data, the bookbuilding process and its allocation have not been analyzed in the Brazilian market. This paper

[24] In the paper we will consider bookbuilding as the typical bookbuilding process in Brazil, also called hybrid bookbuilding. In this procedure the retail is not considered in the book construction and the shares allocation to this group is made through a fixed price method.

contributes for the literature in the investigation of the strategic allocation in the stock market through the bookbuilding process in Brazil. Ritter & Welch (2002) review six theories related to the allocation strategy of initial public offerings. We approach three theories that can contribute as determinants of the Brazilian issues: (1) discrimination models among investors to induce information disclosure (information asymmetry theories); (2) ownership structure after the offering, implying an allocation more or less disperse allocation; and (3) price stabilization procedures that include aftermarket trading and the immediate resale presence (flipping). As anticipated by investment banks, there is a certain fear in the investors' participation in the short-term (flippers), which can affect the aftermarket prices negatively. Long term investors are preferred in equity issues.

The paper is structured in five sections besides the introduction. Section two reviews briefly the existing literature. Section three highlights the hypotheses to be tested. The database is described in the fourth section. The fifth section presents the analyses and empirical results, while the sixth section concludes.

2. Literature Brief Review

Ritter & Welch (2002) present a recent review of the literature as to the activities, pricing and allocation in initial public offerings. The authors point out that the main interesting area to investigate is related to share allocation by underwriters and subsequently how share change hands. Some researchers' questions of interest include: "How do investors decide in which issues they should request participation?"; "Who receives IPO allocations"; "Do large institutions receive preferential treatment based on the disclosed information?"; "Do Investors who have frequent participation receive preferred allocations?".

Benveniste & Spindt (1989)'s seminal work investigate how the intermediaries use their discretionary power to extract investors' information and reduce the underpricing. Three empirical implications include: new issues will be less underpricing; investors whose participation is on regular basis are prioritized; and investors who provide better information disclosure are also prioritized.

In fixed price issues, the price is established before the offering and the shares are allpcated on a pro-rata basis according to its demand among investors. Under fixed price issues informed investors may face a problem of adverse selection named "winner's curse" as stated by Rock (1986). To compensate for thus adverse selection problem, issues would be defined below the fair value, so informed investors would benefit in participating in the equity offering. In Benveniste and Spindt's model, unlike the procedure for fixed prices, the investor has to submit its demand before the price is fixed, consequently, the informed investors will not be able to choose ex-ante issues with discount and the intermediary can use their indications to adjust the offer price.

The intermediary's discretionary power during the bookbuilding can still reduce the underpricing through repeated sales to regular investors (higher frequency) prioritizing their allocations, in other words, investor's who are customers, in spite of the prices relatively greater (smaller discount), guarantee good returns due to frequent privileged allocations. Another benefit of the combination of the investor's frequency and discretionary allocation is the intermediary's advantage to request (under penalty to be out of future issues) their regular customers' participation in less attractive offerings. This strategy reduces adverse selection.

Benveniste & Wilhelm (1990) and Spatt & Srivastava (1991) show that the bookbuilding mechanisms of information acquisition is efficient to reduce underpricing. Sherman (2000) and Sherman & Titman (2002) extend the model, formalizing the need of the frequent investors' group and the optimal relation between the number of investors and their costs on obtaining information.

Cornelli & Goldreigh (2001) provide empirical evidence that local investors receive priority in the allocation, because, according to the authors, the domestic investors have access to better information on companies of the same nationality. Jenkinson & Jones (2004) also observed the same positive effect on the domestic investor's nationality on their allocation. The authors confirm empirically that the underwriter prioritizes the investors with greater size (number of shares). The explanation is that the investors have greater information level of the issuing company.

The ownership structure is a particularly important factor when the company goes public. The institutional investors are natural candidates to have blocks of shares and are able to influence in the companies' management. Brennan & Frank (1997) propose that one of the benefits of the high demand is to enable the issuer to split the allocations and discriminate investors in order to guarantee smaller individual groups and consequently less influence and external control. In their "reduced monitoring hypothesis", this larger dispersion in the external shareholders' group reduces the incentive to monitor the senior management.

Besides diluting the external control protecting the company from "hostile investors", another advantage of the external shareholders' diffuse structure is proposed by Booth & Chua (1996). According to these authors, a diluted distribution allocation and the combination underpricing and oversubscription (high demand) compensate the information acquisition cost of a larger number of participants. This strategy increases the investor's potential base in the secondary market, consequently increasing the market liquidity of shares, and it

reduces the required return requested by the investors, setting a highest equilibrium price.

Another important point to be considered in the allocation criteria is the presence of short-term investors known as flippers — those that resell and accomplish capital gain on the first trading days. In spite of the interest in setting up a secondary market with liquidity, the investors' short term behavior (flipping) can increase the volatility and it can affect the price negatively. Krigman, Shaw & Womack (1999) show that IPOs with low flipping generate larger returns.

Aggarwal (2000) analyses the underwriters' price stabilization procedures after offering, such as, actions against the flippers. In the United States, investments leading banks have been setting up schemes to discourage the immediate sale of shares. These include imposing penalty bids to syndicate banks that participate in such activity or penalizing flippers by excluding them in future deals. Aggarwal (2003) verifies that these penalties (specially the second one) reduce the flippers' practice. The author also confirms that institutional investors flip larger proportions of their allocations than retail investors. In Brazil, due to high volatility and low size equity market, the discrimination of the allocation to institutional flippers to increase the efficiency in the public offerings, should be considered as stressed by the underwriters.

3. Determinants of Allocation

In line with the literature review (section 2), the determining factors for investor's allocation are related to its individual characteristics, to its relationship with the coordinating bank and to the details of its specific demands at each issue. We separate the determinants of the allocation in the related characteristics to the bids (bid type and bid size), and the investors' specific characteristics (frequency, nationality and investor type).

As for the bid type, Cornelli & Goldreigh (2001) (or abbreviating CG) show empirically that bids with price indications (not only quantity indications) have favorableness in the allocation, because their wealth details indicate price expectation and demand elasticity. On the other hand, Jenkinson & Jones (2004) (or abbreviating JJ) show that the bid type is not a relevant factor in the allocation criterion of investment banks, they contest the influence of the information acquisition theory in bookbuilding.

> H1: *Bids that indicate price range contain superior information should be favored in the share allocation.*

As for the bid size, CG, as well as JJ, verify that in the bookbuilding procedures, greater sizes bids denote good indication of interest and they are also prioritized in allocations. In opposition, Booth & Chua (1996) and Brennan & Frank (1997) observe lower allocation in bids of greater sizes.

> H2: *Bidders requesting larger quantities denote good indications and, according to the information acquisition theories, receive greater allocations (H2a). On the other hand, according to control, monitoring, and liquidity approaches, bids with greater quantities receive smaller allocations, in order to avoid excessive ownership concentration for few investors (H2b).*

As for the investor's participation frequency, the relation between coordinating banks and their investors establishes certain bilateral bargaining power, fundamental in the information acquisition and that is performed by the investors through information indications in exchange for favorableness in the allocations. The CG and JJ results show evidences of the truthfulness of this proposition.

> H3: *Investors with higher frequency are fundamental in the information acquisition process and receive higher allocation.*

As for the investor's nationality, Ljungqvist, Jenkinson & Wilhelm (2003) provide empirical evidence that bookbuilding reduces underpricing in offerings outside the United States, conditioned to the participation of US coordinators and/or US investors. CG and JJ provide empirical evidence that different results apply to European data, in which foreign investors (including the US investors) suffered greater cuts in their allocation. For CG AND JJ, local investors have access to better information on local companies.

> H4: *According to the information acquisition theory, US investors are better informed and receive greater allocations (H4a). On the other hand, local (Brazilian) investors have more access to information of local companies and receive greater allocations (H4b).*

As for the type of investor, CG confirms empirically that typically long-term investors, such as pension funds, have been favored in share allocation. In the same line, JJ extends the test and separates the institutions according to quality rankings, whose criteria is related to their flipping activities. Finally they conclude that long-term investors suffer smaller cuts than flippers.

> H5: *Long-term investors receive favorable allocations, because companies and underwriters avoid typically flippers that resell their shares on the first day of trading.*

4. Sample

The database is composed of five books of equity issues in Brazil from 2003 to 2004. The underwriting procedures were led by two different investment banks.

According to the CVM (Brazil equivalent to the US SEC), there were twenty three issues in the period 2003-4 of which nineteen had the bookbuilding as a base procedure, while four issues were done on fixe-price basis. Among the bookbuilding offerings, eight issues were global offerings and eleven were local offerings. The database represents about 34% of the total Brazilian market through the bookbuilding procedure (excluding the amount of depositary receipts that were placed in international markets).

Since two different coordinating investment banks led the five offerings, we separate the sample into two data sets. The first one consists of four offerings performed by one of the largest investment banks in Brazil with a leading market access to the international market. The second one consists of only one offering that was conducted by a major commercial Brazilian bank.

Among the issues of the first data set, we have three offerings of common voting shares and one of preferred non-voting share. In addition, we cover two initial public offerings (IPO) and two follow-on offerings (seasoned equity offerings - SEO). The issuing of the second data set is a seasoned equity offering of a preferred non-voting share.

The average underpricing for our sample was 6.8% (7.8% for the first data set and 1.5% for the second data set) and simple average adjusted by the market return (Ibovespa) was 6.3% on the closing of the first trading day (7.6% for the first data set and 1.1% for the second).

The investors organized in the database are all institutional investors (the retail investors were not considered, since they do not participate in the bookbuilding process). Investors total 270 institutions (which correspond to an average of 106 investors per offering with an average frequency of 1.57 participations).

We did not have access to the participants' identification. However, the institutions were divided as (a) asset management, (b) pension funds, (c) hedge funds, (d) self portfolio or treasury, (e) private banking and (f) non identified investors.[25] They were also separated for nationality: (i) Brazilian, ii) European and (iii) North American.

Each investor can be related to one or more bids according to the number of books. The first data set presents a total of 424 bids of which 42% are from Brazil, 20% from Europe and 38% from the US. Still, 44% of bids are from asset management, 1% pension funds, 9% hedge funds, 4% self portfolio, 3% private bankings and 39% with no identification. The second data set presents a total of 46 bids of which 46% are from asset management, 20% pension funds, 17% hedge funds, 15% self portfolio, 2% private bankings. They were not identified per nationality.

A bid is composed of requested number of shares for each price level. According to the combination of the quantity and price information, bids are differentiated in three types: (a) strike bid - the investor indicates the desire for a certain number of shares independently of the share price to be defined; (b) limit bid - the investor specifies a quantity of shares and the maximum price or limit that he would be willing to pay for; (c) step bid - the investor submits the maximum quantity of shares that the investor would be willing to buy at each price level.

The limit and step bids account for, respectively, 1% and 65% of the total of the bids in the major data set. Consequently, strike bids represent 34% of the data set. In the minor data set there was no identification as for the bid type.

In the book, each bid is also related to the amount of shares allocated to the investor. According to the number of shares allocated to each institution, it might have been favored or not in proportion to its demand. For instance, a participant institution can be totally unfavorable and not receive any share, even if its bid has reached the defined price in the distribution.

5. Empirical Analysis

The paper methodology is based on empirical analysis of the major determinants for share allocation. We make a first analysis using the basic statistics of supply and demand proxies for all issues. The theories and hypotheses presented are then tested through multiple OLS regressions of dummy variables (representing the bids' characteristics) on each individual allocation. It is important to highlight that in order to define the econometric model we first test the major data set, which has more complete information about on bids, and then we include the minor data set to check the robustness of the model.

The tests follow the structure presented by Cornelli & Goldreigh (2001) and Jenkinson & Jones (2004). We grouped the bids of all issues to compose the econometric models but, unlike those authors, we did not attribute the same weight to each issue because we considered that the distributions with greater numbers of investors have greater contribution towards the underwriter's criteria for allocation.

The dependent variable in the regression models represent the relative allocation by the underwriter for each investor related to its demand. This variable is computed as follows:

- Simple rationing: ratio between the allocated amount and the amount demanded by each investor for the book;
- Normalized rationing: ratio between percentage allocation (individual allocation relative to total supply) and percentage demand (individual demand relative to the

[25] Both investment banks use the same types to classify the investors.

total demand) of the investor, or yet, the product of its rationing by the distribution oversubscription.

The normalized rationing is the variable to be observed in the allocation criteria tests, in order to avoid distortions under the oversubscription scenario[26]. Independently of the oversubscription value, in the allocation case to follow equalitarian criteria (pro-rata allocation), all investors' normalized rationing would reach 100% and, in the case of discretionary allocation, any deviation above/below the unit value provides evidence of discretionary power. In the sample, the simple average of the normalized rationing of 115% (116% for the major data set and 107% for the minor data set) and median of 108% (107% for the major data set and 109% for the minor data set) indicate that most of the participants were favored in the allocation.

The independent variables explain the normalized rationing in the regression models, and should capture the general and specific characteristics of each investor for all distributions. As these factors are of qualitative order the variables are defined by a group of dummy variables described in Table I.

INSERT TABLE I

We define two dummy variables to capture the effect of bid characteristics' on the investor's allocation. The first one represents the bid type, such variable distinguishes limit and step bids (price bid) from strike bids. According to the information acquisition theory, price bids have positive influence on allocation. The second one represents the bid size; large demands can have positive effect or negative effect if the underwriter dilutes the shares (control, monitoring and liquidity approaches).

We define a group of variables to capture the investors' characteristics such as frequency, nationality, and institutional type. The influence of the participation in other offerings is estimated through a dummy of higher frequency grouping the investors with three or four participations. Previous studies assume that regular investors should be favored.

We also include two dummies of investor's nationality. We expect the origin of local investors (Brazilian) and/or US investors to have significant effect on their allocation.

Finally, we create five dummies for each investor type to describe the institutional characteristics. In accordance with the underwriters' allocation, long term investors may be preferred while flippers such as hedge funds are avoided (aftermarket stabilization activities). In Table II we list the explanatory variables to the theories and hypothesis defined in sections 2 and 3. We also present the expected signal of these variables on the allocation criteria.

INSERT TABLE II

Table III depicts the average of normalized rationing of the major data set bids inside of the established characteristics groups. The first panel of the table shows the variable separated by the characteristics of demand and issues (stock type, bid type, and bid size). The second and third panels show the variable grouped by the investors' characteristics (nationality, frequency, and institutional type).

INSERT TABLE III

In the first panel of Table III, despite the expected favorable treatment for the price bids, the difference between the average of normalized rationing among groups is small. The bid size provides evidence that the high rationing difference between more and less bulky bids suggest that the minor demands are favored by investment banks.

In the second panel, we see that it seems there are no difference in rationing among nationalities, despite a slightly higher figure for US investors. In addition, the participation frequency variable indicates that there must be a favorableness trend for those who participate in more than one bookbuilding process.

As expected the third panel shows that the hedge funds, unlike the pension funds, are the institutions that suffer greater cuts. The difference between the two groups probably occurs because they might tend to flip. The bidders without identification also have, on average, their allocation unfavorable in relation to other groups. Table IV presents interactions among the characteristics that seem to have greater impact on the rationing variable of the major data set. We have grouped the bids with the least frequencies (up to two participations) and greatest frequencies (three or four participations), according to the size of their demand and to the institutional type[27].

INSERT TABLE IV

The discrimination between bid size and institution type seems to be robust in relation to the frequency of investor participation, except for hedge fund type investors, whose rationing was even more penalized as the number of times they participate in the issues increased.

Table V shows the simple averages of normalized rationing of the minor data set bids inside of some established characteristics groups. We have in the first panel of the Table the variable separated by the bid size, and in the second panel the variable is separated by the institutional type. We did not have access to the bid type nor the investor nationality.

INSERT TABLE V

[26] Oversubscription is the relation between demand and supply or how many times the offering total demand overcomes the total supply given the established price.

27 We considered in the analysis only the institutional types apparently discriminated: hedge funds and non identified bidders. The other groups (asset management, pension fund, private bank, and treasury) were gathered to form the type "others".

We notice in the first panel of Table V that the greater allocation for smaller bids follows the same trend for the first dataset. On the other hand, in the second panel we do not see so strong differentiation in the allocation among the investor types.

5.1. Results

Table VI shows some of several allocation models that were tested by regressing the demand characteristics variables (dummy variables) on the normalized rationing (explained variable that represents the allocation). The results from regressions using the major data set are presented in regressions 1 to 5. Regression 6 presents the model using only the minor data set, and regression 7 presents the model using the both data sets. Notice in Table VI that we introduce three offering dummies, in order to remove possible fixed effects, since each issue could have specific characteristics not captured by the independent variables. Despite the fact of using the fixed effect variables, these corrections have no significant influence on the results. We also include a dummy "major undwr" to check the investment bank effect on the allocation variable.

INSERT TABLE VI

Analyzing the major data set models described in the Table VI (regressions 1 to 5), we can provide empirical evidence that:

(1) The bid type does not influence the investor's allocation. The coefficients of the "price bid" variable in regressions 1 to 3 are not significant and do not confirm the hypothesis H1. This result is due to a particularity observed in the data, which is common in the Brazilian market: the bids of initial public offerings are almost all price bids; while on the contrary, the bids in follow-on offerings are almost totally strike bids[28]. Using the CG construction, in which the price bids contain superior information, we can interpret, roughly, that on IPOs all bids contain information and on SEOs none of the bids contain information. Thus, it is not possible to either differentiate individual informational content among bids of the same distribution or apply any favorableness criterion to this characteristic.

On the one hand, the contents of SEO bids are restricted to the demand quantities and they do not contribute with superior information as verified by Jenkinson & Jones (2004). However, even though the empirical tests are not significant, there is superior information acquisition in IPOs because almost all bids provide price sensibility but they just can not be differentiated.

(2) The size of the bid influences negatively in the allocation, in other words, larger bidders receive unfavorable allocations. The variable coefficients "greater size" are negative and statistically significant in all models (regressions 1 to 5), confirming the expected indication for H2b but not for H2a. Demands for greater amounts have normalized rationings (ceteris paribus) in the order of 33 percentage points less than for smaller amounts. The investment banks show greater concern in diluting existing shareholders.

Regarding the investors' characteristics, we can provide some discussion as follows:

(1) The greatest frequency of bidders in the underwriter's issues influences positively its allocation. The coefficients of the variable "greater freq" are statistically significant and have positive sign in regressions 1 to 5. The more the institution participates in the issues, the greater its normalized rationing is, confirming H3.

(2) The investor's nationality does not influence its allocation. Regressions 2 and 3 do not confirm H4a or H4b; neither US nor domestic (Brazilian) investors receive differentiated apportionment. The "North American" variable is not statistically significant in regression 2, as well as the "Brazilian" variable in regression 3 and both continue not being statistically significant in other tested specifications.

(3) The type of investor has influence on its allocation, short term institutions are disfavored. When we control the normalized rationing for institutional type we observe considerable increase in the explanation power of regressions. The coefficient value of the "PF" variable is positive and of high magnitude although not statistically significant. On the other hand, the variable coefficient "Hedge" is always negative sign and statistically significant (regressions 4 and 5), indicating that the stock funds receive unfavorable allocation. The hedge fund's normalized rationing (ceteris paribus) is 52 percent points smaller than the other identified institutions. These results for the hedge funds are probably related to the short-term characteristics of these institutions. If we use this variable as proxy of institutions as flippers, H5 is confirmed. The non-identified institutions are also unfavorable. The "No ID" variable is statistically significant and presents negative sign in regressions 4 and 5, indicating that such institutions receive 32 percentile points smaller than the identified institutions (excluding hedge funds). In regression 6 we have the model based on the minor data set. We can observe that the trend to favor larger bids still holds. However, there is no evidence that different allocation treatment for the investor type (none of the investor type coefficients is significant). When we run the model with the whole sample (regression 7) we confirm the trend confirmed in the previous regressions: negative influence for bid size; positive influence for investor participation in

[28] As explained by some Brazilian underwriters, it happens because follow-on offerings already have a price reference in the stock market and because an initial offering bid without price indications are avoided as long as it can bring the bidder under suspicion of being interested in hostile takeovers.

the offerings; and negative influence for short term investors.

6. Conclusions and Final Comments

In this paper we analyze the allocation determinants by two coordinating underwriters (one is a major investment bank with greater market access in international markets) of five Brazilian equity issues performed by bookbuilding. We can highlight that the allocation determinants are defined (a) by the bid size, in which demands for smaller amounts are favored; (b) by the investor's participation frequency, in which those who participate more are benefited; and (c) by the investor's institutional type, in which short term investors, with flipping activity tendencies suffer larger cuts. On the other hand, the purchase bid type and the investor's nationality do not seem to be major determinants. The results show evidence that the information is acquired via bookbuilding process confirming international empirical evidence. However, it is clear that the characteristics of more diffuse issue distributions and directed to long-term investors show that theoretical approaches of control, monitoring, market liquidity, and flipping activities exert larger influence on share allocation criteria. It reflects a more fragile market with less liquidity and more ownership concentration.

REFERENCES

1. AGGARWAL, R. Stabilization activities by underwriters after new offerings. *Journal of Finance*, v. 55, p. 1075-1104, 2000.
2. AGGARWAL, R. Allocation of Initial Public Offerings and Flipping Activity. *Journal of Financial Economics*, v. 68, p. 111-135, 2003.
3. AGGARWAL, R.; LEAL, R.; HERNANDEZ, L. The Aftermarket Performance of Initial Public Offerings in Latin America. *Financial Management*, v. 22, n. 1, p. 42-53, Spring 1993.
4. BENVENISTE, L.M.; SPINDT, P.A. How Investment Bankers Determine the Offer Price and Allocation of New Issues, *Journal of Financial Economics*, v. 24, p. 343-361, 1989.
5. BENVENISTE, L.M.; WILHELM, W.J. A comparative Analysis of IPO Proceeds under Alternative Regulatory Environments. *Journal of Financial Economics*, v. 28, n. 1/2, p. 173-208, Nov./Dec. 1990.
6. BOOTH, J.R.; CHUA, L. Ownership Dispersion, Costly Information, and IPO Underpricing. *Journal of Financial Economics*, v. 41, p. 291–310, 1996.
7. BRENNAN, M.J.; FRANKS, J. Underpricing, Ownership and Control in Initial Public Offerings of Equity Securities in the UK, *Journal of Financial Economics*, v. 45, p. 391–413, 1997.
8. CORNELLI, F.; GOLDREICH, D. Bookbuilding and Strategic Allocation. *Journal of Finance*, v. 56, p. 2337-2369, 2001.
9. JENKINSON, T.; JONES, H. Bids and Allocations in European IPO Bookbuilding. *Journal of Finance*, v. 59, n. 5, p. 2309-2339, Oct. 2004.
10. KRIGMAN, L.; SHAW, W.H.; WOMACK, K.L. The Persistence of IPO Mispricing and the Predictive Power of Flipping. *Journal of Finance*, v. 54, n. 3, p. 1015-1044, Jun. 1999.
11. LJUNGQVIST, A.P. IPO Underpricing. In: AGGARWAL R. et al. Handbook of Corporate Finance: Empirical Corporate Finance. B. Espen Eckbo (ed.), 2005, chap. 12.
12. LJUNGQVIST, A.P.; JENKINSON, T.; WILHELM, W.J. Global Integration in Primary Equity Markets: The Role of U.S. Banks and U.S. Investors, *Review of Financial Studies*, v. 16, p. 63-99, 2003.
13. PERES, M.A. *Bookbuilding* como Instrumento de Precificação e Alocação Estratégica nas Emissões de Ações de Empresas Brasileiras. 122 p. (Dissertação de Mestrado em Administração de Empresas) -: EAESP/FGV, São Paulo, 2003.
14. RITTER, J.R.; WELCH, I. A Review of IPO Activity, Pricing, and Allocations. *Journal of Finance*, v. 57, p. 1795-1828, 2002.
15. ROCK, K. Why New Issues are Underpriced. *Journal of Financial Economics*, v.15, n. 1/2, p.187-212, Jan./Feb. 1986.
16. SPATT, C.; SRIVASTAVA, S. Preplay Communication, Participation Restrictions, and Efficiency in Initial Public Offerings. *Review of Financial Studies*, v. 4, p. 709-726, 1991.
17. SHERMAN, A.E. IPOs and Long-term Relationships: An Advantage of Book Building, *Review of Financial Studies*, v. 13, p. 697-714, 2000.
18. SHERMAN, A.E.; TITMAN, S. Building the IPO Order Book: Underpricing and Participation Limits with Costly Information. *Journal of Financial Economics*, v. 65, p. 3-29, 2002.
19. STOUGHTON, N.M.; ZECHNER, J. IPO-mechanisms, Monitoring and Ownership Structure. *Journal of Financial Economics*, v. 49, p. 45–77, 1998.
20. WHITE, H.S. A heterecedasticity-consistent Covariance Matrix Estimator and Direct Test for Heterocedasticity. *Econometrica*, v. 48, p. 817-838.

Appendices

Table I. Independent Variables

Dummy variables that represent the main qualitative characteristics of demand in the multiple regression models.

Characteristic	Dummy Variable	Variable Description
Bid type	-Price bid	-It takes value of one for limit bids or step bids.
Bid size	-Greater size	-It takes value of one for bids which sizes are greater than the median.
Participation frequency of the investor	-Greater freq. (3x or 4x)	-It takes value of one if the investor participates in 3 or 4 issues.
Investor nationality	-North American -Brazilian	-It takes value of one if the investor is North American. -It takes value of one if the investor is local (Brazilian).

Investor type	-PF	-It takes value of one if the investor is a pension fund.
	-PB	-It takes value of one if the investor is a private bank.
	-Self	-It takes value of one if the investor is a treasury (self portfolio).
	-Hedge	-It takes value of one if the investor is a hedge fund.
	-No ID	-It takes value of one if the investor did not have the type identified.

Table II. Hypothesis, Dummy Variables, and Expected Signs

Expected signs of the dummy variables that represent the determinants of bidder's allocations in the multiple regression models. Each dummy variable is related to the defined hypothesis and to the theories and empirical evidences described. The variables that describe investor types are: PF – pension fund; PB – private bank; Self – self portfolio or treasury; Hedge - hedge fund; No ID – non identified bidders.

Hypothesis	Expected Sign	Empirical Evidence / Theory
H1: Bid type		
-Price bid	+	-Cornelli & Goldreigh (2001) / Information acquisition theories
H2: Bid size		
-Greater size		
H2a	+	-Cornelli & Goldreigh (2001) e Jenkinson & Jones (2004) / Information acquisition theories
H2b	-	-Brennan & Franks (1997) e Booth & Chua (1996) / Control, monitoring and liquidity approaches
H3: Frequency		
-Greater freq. (3x or 4x)	+	-Cornelli & Goldreigh (2001) e Jenkinson & Jones (2004) / Information acquisition theories
H4: Nationality		
-North American		
H4a	+	- Ljungqvist, Jenkinson & Wilhelm (2003) / Information acquisition theories
-Brazilian		-Cornelli & Goldreigh (2001) e Jenkinson & Jones (2004) / Information
H4b	+	acquisition theories
H5: Investor type		
-PF	+	
-PB	0	-Cornelli & Goldreigh (2001) e Jenkinson & Jones (2004) / Aftermarket
-Self	0	stabilization activities
-Hedge	-	
-No ID	+/-	

Table III. Allocation Variable (major data set)

The major data set allocation variables (normalized rationing) grouped according the stock characteristic, bid characteristic, or investor characteristic. In the first panel of the table, the simple averages of normalized rationing are grouped by stock type, bid type, and bid size. In the second panel of the table, the same variable is grouped by investor nationality and participation frequency. In the third panel of the table, the variable is grouped by investor type.

	Stock type			Bid type			Bid size	
	Common	Preferred		Price	Strike		Smaller	Greater
# Bids	366	58		280	144		214	210
Norm. Rat.	118.33%	101.53%		118.81%	110.65%		129.73%	102.08%

	Investor nationality				Participation frequency			
	Brazil	Europe	USA		1x	2x	3x	4x
# Bids	178	86	160		164	132	96	32
Norm. Rat.	113.44%	111.94%	121.12%		106.51%	113.98%	131,51%	126,88%

	Investor type					
	Asset Management	Pension Fund	Hedge Fund	No Identif.	Private Banking	Self Portfolio
# Bids	187	6	38	164	14	15
Norm. Rat.	136.17%	173.22%	78.55%	96.10%	142.77%	130.11%

Table IV. Allocation Variable (Characteristics Interactions)

Interactions of characteristics for the major data set. In the first part of the table, the simple average of normalized rationing are grouped by the participation frequency and bid size combined. In the second part of the table, the same variable is grouped by participation frequency and investor type (asset management, pension fund, private bank, and treasury form the type "others") combined.

	Smaller frequency (1x or 2x)			Greater frequency (3x or 4x)	
	Smaller size	Greater size		Smaller size	Greater size
# Bids	172	124		42	86
Norm. Rat.	121.03%	94.32%		165.35%	113.27%

	Smaller frequency (1x or 2x)			Greater frequency (3x or 4x)		
	Hedge Fund	No Id.	Others	Hedge Fund	No Id.	Others
# Bids	16	149	131	22	15	91
Norm. Rat.	88.76%	94.41%	129.96%	71.13%	112.91%	147.55%

Table V. Allocation Variable (minor data set)

The minor data set allocation variables (normalized rationing) grouped according the stock characteristic, bid characteristic, or investor characteristic. In the first panel of the table, the simple averages of normalized rationing are grouped by bid size. In the second panel of the table, the same variable is grouped by investor type.

	Bid size	
	Smaller	Greater
# Bids	23	23
Norm. Rat.	113.36%	100.95%

	Investor type					
	Asset Management	Pension Fund	Hedge Fund	No Identif.	Private Banking	Self Portfolio
# Bids	21	9	8	0	1	7
Norm. Rat.	107.33%	99.31%	104.31%	-	109.70%	119.60%

Table VI. Allocation Models

The dependent variable is the normalized rationing and the independent variables are the dummy variables of characteristics. In regressions 1 to 5 we use the major underwriter sample. In regression 6 we use the minor underwriter sample. In regression 7 we use the whole sample. We include fixed effect variables to capture specific effects among the issues. The t-statistic is adjusted for heterocedasticity by White (1980)'s variance-covariance matrix. The symbol (*) represents a significance level of 1% and (**) represents a significance level of 5%.

	Major Underwriter										Minor Underwriter		Both Underwriters	
	Reg. 1		Reg. 2		Reg.3		Reg. 4		Reg. 5		Reg. 6		Reg. 7	
Bid's Characteristics														
Price bid	-0.25		-0.24		-0.25									
	(-1.14)		(-1.10)		(-1.16)									
Greater size	-0.34	*	-0.36	*	-0.37	*	-0.33	*	-0.33	*	-0.15	**	-0.32	*
	(-3.88)		(-3.83)		(-4.03)		(-3.69)		(-3.78)		(-3.84)		(-4.04)	
Investor's Characteristics														
Greater freq.							0.24	**	0.23	**			0.22	**
3x ou 4x							(2.30)		(2.15)				(2.11)	
North American			0.09											
			(1.05)											
Brazilian					-0.06									
					(-0.72)									
PF							0.46				-0.13			
							(1.01)				(-1.33)			
PB							-0.04				0.06			
							(-0.15)				(1.10)			
Self							-0.05				0.01			
							(-0.18)				(0.13)			
Hedge fund							-0.52	*	-0.52	*	-0.12		-0.46	*
							(-5.59)		(-5.84)		(-1.19)		(-5.50)	
No ID							-0.34	*	-0.35	*			-0.34	*
							(-2.63)		(-2.81)				(-2.71)	
Major Undwr													0.04	
													(0.38)	
$K_{Offering\ 2}$	0.05		0.04		0.04		0.02		0.03				0.03	
	(0.68)		(0.44)		(0.52)		(0.21)		(0.35)				(0.36)	
$K_{Offering\ 3}$	0.55		0.52		0.54		0.12		0.12				0.12	
	(2.49)		(2.38)		(2.44)		(1.14)		(1.13)				(1.15)	
$K_{Offering\ 4}$	0.34		0.32		0.33		0.08		0.08				-0.08	
	(1.40)		(1.32)		(1.38)		(0.78)		(0.76)				(0.75)	
K	1.09	*	1.02	*	1.08	*	1.35	*	1.36	*	1.19	*	1.31	*
	(21.06)		(14.95)		(13.24)		(11.42)		(11.78)		(19.88)		(22.45)	
Ajust. R^2	5.7%		5.7%		5.6%		9.0%		9.3%		5.6%		8.9%	