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Department of Management, Economics and Industrial Engineering

MSc in Management Engineering

INITIAL PUBLIC OFFERINGS AND SEASONED PUBLIC OFFERNGS IN THE COLOMBIAN STOCK EXCHANGE REPORT

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Abstract

The following report presents a research elaborated within 44 equity issuances in the Colombian stock exchange, between 2001 and 2018, that have offered through an IPO or a seasoned public offering (follow-on). Throughout the development of this analysis, it was determined the impact of equity issuances on shareholders' wealth, considering both the short-run, regarding the initial underpricing, and in the long-run, taking into account cumulated abnormal returns, among other methodologies.

The results confirm that average initial performance is positive with a single digit regarding both IPOs and SPOs, while the probability of not obtaining a loss in a single random issue offering was of 63,6% for the first and 71,4% for the latter. With respect to the long-run, there was not enough evidence to show that none of the offering types were underperforming by a timeline of three years, however, there was identified an alike opposite behavior between IPOs and SPOs during the time event window of 36 months.

Keywords: IPO; Seasoned public offerings; follow-ons; short-run; long-run; aftermarket; Underpricing; Colombian stock exchange

Sommario

Il seguente documento presenta l'analisi di 44 emissioni azionarie nella borsa colombiana, tra il 2001 e il 2018, che hanno offerto tramite una IPO o un'offerta pubblica stagionata (follow-on). Lo studio ha determinato l'impatto delle emissioni azionarie sulla ricchezza degli azionisti, considerando sia il breve periodo, per quanto riguarda la sottovalutazione iniziale, sia a lungo termine, considerando i rendimenti anormali cumulati, tra altre metodologie.

I risultati confermano che la performance iniziale media è positiva con una cifra singola per quanto riguarda sia le IPOs che le SPOs. Mentre la probabilità di non ottenere una perdita in una singola offerta di emissioni casuali era del 63,6% per la prima, mentre per la seconda era pari a 71,4%. Per quanto riguarda il lungo periodo, non ci sono prove sufficienti per dimostrare che nessuno dei tipi di offerta ha sottoperformato in un orizzonte temporale di tre anni, tuttavia, è stato identificato un comportamento similmente opposto tra IPOs e SPOs durante la finestra dell'evento temporale di 36 mesi.

Parole chiave: IPO; Offerte pubbliche stagionali; follow-on; short-run; long-run; aftermarket; underpricing; borsa colombiana

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Introduction

The analysis of this specific topic is motivated by the constant question about whether making an investment in equity issues in the Colombian stock exchange is profitable or not. Could it be that you can invest with closed eyes? Or rather must consider certain key variables to be sure that there will be a positive return? Initially, it is assumed that Initial Public Offerings on their first trading day have on average a return of more than 10% and also that if there were to be a subscriber of a single random issue offering, the expected outcome has about an equal chance for gain or loss, as documented by Ibbotson et al. (Ibbotson & G., 1975). Furthermore, there's an interest about the performance in the long-run of both IPOs and SPOs, considering that it's been demonstrated that in the next 3 years (long-run) after going public (IPOs), firms significantly underperformed (Ritter, 1991).

The general objective and purpose of this paper is to investigate and to make a descriptive analysis of the equity issuances regarding specifically Initial Public Offerings and Seasoned Public Offerings in the Colombian market, therefore companies that have issued equity capital in the Colombian stock exchange "*Bolsa de Valores de Colombia*" (BVC). Moreover, the main goal of this paper is to examine the impact of equity issuances on shareholders' wealth considering both short and long-run.

Furthermore, the structure of this document is divided into five sections, in which the first will describe and roughly explain the fundamental pillars of the analysis to be proposed. Later, a brief introduction to the Colombian market will be exposed, regarding the comparison between the internal market with the Latin-American zone, taking into consideration the top stock exchanges around the world. Afterwards, the methodology will be documented with a short and a long-run perspective which will measure the initial and the aftermarket performance (considering raw returns and benchmark-adjusted returns). Thereafter, the results will be exhibited, taking into account the respective conclusions and further recommendations.

1. Literature Review

Following the main objective of this paper, a way in which the short and long-term performance can be calculated is by checking KPIs, or key performance indicators, of the IPO and SPO issuances. In order to make an analysis in Issuances for IPOs and SPOs, firstly, several notions must be explained formerly, thus, the following review will consider some basic concepts that will be developed throughout the paper.

1.1. Debt and Equity Capital

A company is divided into Debt capital and Equity capital. The first is associated to the sum of money owed to other players like banks, financial institutions or creditors that will be reimbursed back following a scheme of payments and typically a fee will be given in addition to the initial loaned amount. For the latter, it is linked with the funds raised by owners. These funds are represented by stocks, that can be sold to another interested player and also can have the benefit of receiving dividends.

Sooner or later corporations, in order to operate their business at some point will require extra funds to execute new projects, for example, renew physical assets such as buying new machinery in an industrial plant, or change the technological structure of the company by implementing a new system, for instance executing SAP across the company's supply chain. When there is a problem of accessing funds, companies suffer from financing gap, and there are two kinds of solutions in order to obtain capital, by internal or external financing (Gertner, Scharfstein, & Stein, 1994).

1.1.1. Internal Financing and External Financing

Regarding Internal Financing, the companies shall use their internal resources which consider bootstrapping (Winborg & & Landström, 2001), which is the optimization of the company's internal resources (i.e. reducing overall costs of operations or improving cash flows with factoring among others), or retained earnings or an equity issuance for existing shareholders

which can considered advantageous by accessing cheaper sources (Leary & R.Roberts, 2010). Firms that access internal financing, by operating under resource constraints become more efficient and creative. Also, considering the pecking order that can be seen in Figure 1, these companies face less risks, being in a state that has more information asymmetries towards the market and at the same time approach a lower cost of capital when the investment size is lower than C. To clarify better, the amount of C indicates the amount of internal funds available for investments and the difference between D and C represents the amount of leverage that the firm can issue with banks or financial institutions.

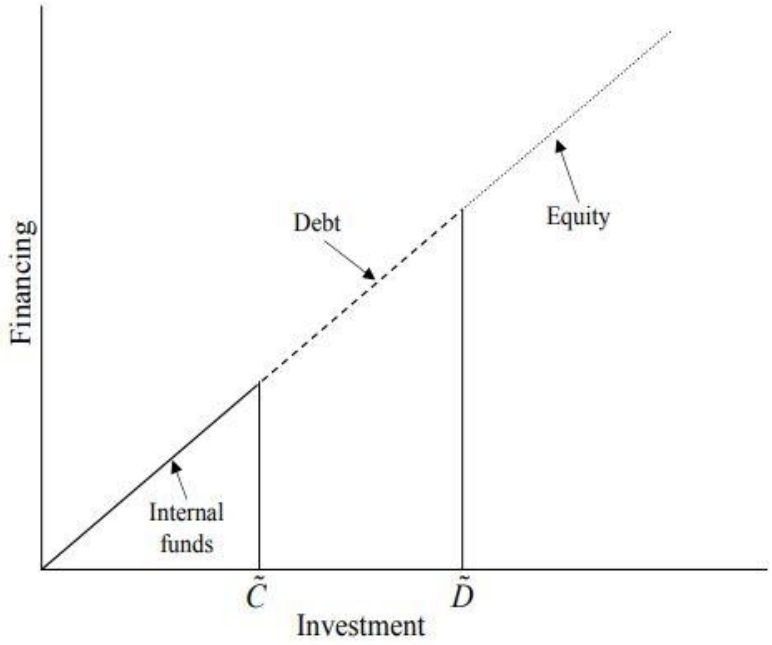

Figure 1: The financing hierarchy of the pecking order.
Source: (Leary & R.Roberts, 2010)

However, for external financing, in order to perform a specific investment that is greater than C and less than D, the company can ask for a loan, but when the investment requirement is higher than D the only possible financing is the most expensive one, equity capital, as it is shown in the previous figure.

1.2. Equity Capital Collection

Moreover, for the Equity Capital Collection, there are three alternatives, Equity Issuance, Private Placements and Public Offerings.

1.2.1. Equity Issuance

The Equity Issuance is targeted to existing shareholders with a right issue, similar to an option, therefore not obliged. In this situation, the shareholders that decide to don't join the offering will dilute, thus the ownership of the company changes.

1.2.2. Private Placement

The next one is Private Placement. It is a private bargain were the company will target the issuance to a certain specific investor or to some specific investors (one or a class or category of particular investors), i.e. a private Equity Fund. Automatically if this process is carried forward there will be a dilution effect that will be proportional to the number of shares that will be placed.

1.2.3. Public Offerings

Public Offerings have a similar characteristic to the previous Equity Capital Collection alternative because there will be an uncertainty, regarding existing shareholders, towards the possibility of buying shares being offered in the issuance (unless the offering allows a first-round dedicated to pre-issue shareholders). In addition, this kind of offering is more complex, due to the uncertainty, more risks, more costs, etc., as a result of having to comply with the law, market authorities, rules of every country, among others.

Furthermore, in the Colombian market, there have been purely Equity Capital Collections, as well as a combination of the previously explained types. For instance, a combination of a Public Offering with an Equity Issuance is divided into two or even more rounds, where there is a precedence granted to existing shareholders and in the next rounds, the offering its directed to institutional and retail investors, therefore to the public.

1.3. IPOs and SPOs

An initial public offer (IPO) is one of the Public Offerings previously mentioned and it is a process in which a company becomes listed in a stock exchange by selling a stake of its

ownership targeting all retail and institutional investors. Moreover, with a similar definition, a subsequent public offering is a seasoned public offering (SPO) or also known as a follow-on, where a company is willing to issue new and/or existing shares to the market. There are several reasons that come along to the firm's owners to decide the when and why should they go for an IPO or an SPO and "become public", for example (Pagano, Panetta, & Zingales, 1998):

- Raising Capital: Raising funds to finance its operations or make new investments in order to create growth or pay debts or increase equity capital (i.e. Basel accords for banks or financial institutions).
- Liquidity: When the shares are listed in the stock exchange it creates a new market that shareholders can benefit from selling their stakes or using them as collateral for loans.
- Prestige: There is an exposure in the capital market of the company by a kind of advertising where the company can increase its brand awareness.

In addition, there are cases in which the IPO does not generate new funds for the company, but a profit/loss for some owners that want to cease being shareholders of the firm. This situation happens when a company sells only pre-existing shares or secondary shares. Typical shareholders that pursue this agreement are venture capitalists, business angels, or other initial investors that are lurking for an exit in order to meet a minimum return.

Moreover, for SPOs, the rationale that comes along from successive offerings is explained by the endless need of seeking and having competitive advantages over competitors, thus invest in projects that create value for the firm. Also, other reasons are to raise funds to pay debt or maybe the enterprise has procurement requirement, therefore they need to increase their equity capitalization (i.e. Basel accords for banks or financial institutions).

The process and phases that both of these issuances, IPOs and SPOs, have to be in accordance with, are the following:

- Selection of Advisors: The firm that will do the issuance must select their legal, tax and financial advisors. The latter is usually selected through a "beauty contest" among investment bankers, where the selected will underwrite the offering.
- Prospectus: It is considered as the official document that a company must disclose detailing the proceeds' usage, must be approved by public agencies supervising financial markets. It must contain quantitative and qualitative information about the business, products and markets in which the company is related to, for instance, future strategies, price of shares, risk disclaimers, among others.
- Offering: The pricing is done by at least two methodologies, first a relative valuation and this is followed by a traditional discounted cash flow model (DCF) in order to have a more precise valuation, considering that mispricing can be crucial.
- Share Allocation: Underwriters select the best combination of bid when applying the book building procedure, or following the rules described in the prospectus (i.e. a minimum percentage of shares must be allocated to retail investors).
- Listing and Aftermarket: The analysis that defines if an equity issuance was successful is defined by their short and long-term behavior, which respectively are identified by the first trading day and from 1-5 years since the offering.

1.3.1. Main Characteristics of the Prospectus

This document is published about two or three weeks prior to the offering's date and the main audience are the potential investors. The typical way in which it is communicated is by a marketing effort, made through the firm's website and by disclosing information through one or two of the most concurred press papers in the country. The purpose of this document is to reduce information asymmetries between the company and their audience, by disclosing their strategic position, ongoing activities, among others. Nevertheless, extensive disclosure may damage the firm's competitive advantage (Chahine & Filatotchev, 2008).

A series of characteristics that can be found, before and after the offering, are the following:

- Offering Price

The offering price is the cost associated to a share of the security that is being offered. This value can be shown as an absolute value, a range or even the price could be said to be public after the offering has finished (commonly seen using the Book Building procedure).

- Book Building

The Book Building Process is carried over by the underwriters, where they gather non-binding expressions of interest from institutional investors in order to learn about the demand from the market, to better determine a final offer price.

- Bid/Ask ratio

One of the most important factors that determine if an equity issue was successful is this ratio, it means that if the value is higher than 1, there was oversubscription or excessive demand, whereas if it's less than 1 it can be assumed as a failure considering that the firm was expecting to receive the amount offered ($n * p$).

- Subscription ratio

The subscription ratio is a percentage of the offered stocks given with priority to pre-existing shareholders, therefore a benefit for these investors. By accepting this "offer", they can prevent their dilution in the company or they can decide to trade these rights if they don't want to exercise them.

- Stock Type

There are mainly two types of stocks, common and preferred. Both of them represent a part of the ownership of the company, however, the main difference is that the first usually have voting rights and the latter have priority payment and usually a fixed and guaranteed dividend payment.

- Ownership Offered

This is the ownership stake, it's a percentage that is calculated by the division between the total shares allocated in the offering and the sum of the same variable and the total outstanding shares before the issuance, as shown in the next formula:

$$Ownership\ Offered_{\%} = \frac{Tot.Sh.\ Allocated}{Tot.Sh.\ Before\ Announcement + Tot.Sh.\ Allocated}$$

- Implicit Valuation

This is the valuation at the precise moment of the offer's announcement, therefore the ratio between the total allocated proceeds and the percentage of ownership offered. The calculation follows the following procedure:

$$Implicit\ Valuation = \frac{Allocated\ Ammount}{Ownership\ Offered}$$

- Use of Proceeds

Companies disclose the reason of why they are making the offering, and the most common uses of the proceeds are related to ordinary activities, mergers & acquisitions, working capital, firm's growth, debt restructuration, among others. In addition, they can specify if the proceeds will be locally and/or internationally, as well as disclosing specific information or by giving a vague explanation of where they will destine these resources.

- Cash Discount or Similar Discounts

Equity issuances are usually considered that are given at a discount price (considering some studies that identify Underpricing – (Altınkılıç & Hansen, 2003), (AlShiab, 2018)), however, sometimes this is not enough to attract retail investors, therefore another way to propose them to invest is by offering a reduction in the offer's price by requesting payment by cash or also for being a specific target investor such as "retail investors receive a 1% discount".

1.3.2. Short-run Performance

The analysis that is related to the short-run for every equity issuance is very important for the firm and for investors because in this way it can be identified the successfulness of the event. For an investor that wants to make a quick profit (active investing), or best known as flippers (Fishe, 2002), the most appealing factor will be the stock's return. The flipper will bet and expect an opportunistic behavior of the stock and this can be checked by monitoring the first day return of the mentioned security.

The first day return depends on key dates such as the offering's announcement and the first trading day. However, these key dates can vary between IPOs and SPOs because of their intrinsic characteristics. For instance, IPOs and Non-listed SPOs (NLSs) first day return its related to the variation from the prospectus price and the first trading day closing price, whereas for the Already Listed SPOs (ALSs) the key dates that must be considered are the previous day to the announcement and the announcement's date itself (disclosed information reducing information asymmetries). In this way the price fluctuations can be seen, positive or negative variations will indicate if the security was underpriced or overpriced (see methodology in Chapter 3.1). Finally, if the equity issuances have a positive return they can be considered as a success in an investor's point of view.

For the case of IPOs, its seen around several papers that Underpricing is evidenced, with averages of 34,97% in Switzerland (Drobetz, Kammermann, & Wälchli, 2005), 12,29% in the Spanish market (Alvarez Otero & González Méndez, 2001). Specifically, in a Latin American environment it was documented first day market-adjusted return averages which vary a lot, like 2,8% for Mexico, 78,5% for Brazil and 16,3% for Chile (Aggarwal, Leal, & Hernandez, 1993). On the other hand, for SPOs (ALSs) Altinkilic documented Underpricing of 1,78%, Discounting of 1,43% and Offer-day Return being of 0,23%, yet this last result didn't have enough proof to consider it significantly different from zero (Altınkılıç & Hansen, 2003).

1.3.3. Long-run Performance

On the other hand, investors can contemplate a long-run time horizon when they follow a passive investment strategy, which considers maximizing returns taking into account the least possible transactional costs, for example, investing in an index market, such as S&P500, IGBC index, etc.

The important key points to consider the long-run performance are the consideration of a raw return, for a retail investor point of view since they would react to good news, positive returns, whilst for professional investors, an acute analysis that considers abnormal return with a benchmark, mainly a market index, would be more robust to determine the inclusion of a security (IPOs, SPOs) in a long-term portfolio.

Additionally, its seen that in the long-run, in the US market the raw returns are seen to rise over 40% by the third year, whereas considering cumulated benchmark-adjusted abnormal returns, IPOs tend to underperform by almost 30% (by month 36) (Ibbotson & G., 1975), 12%-20% in the Canadian market (Kooli & Suret, 2001) and around 7,45% for Swiss IPOs (Drobetz, Kammermann, & Wälchli, 2005). However, considering a more even arena, investors who bought IPO stocks at the first trading day's closing price for Mexico, Brazil and Chile, were documented with an 81%, 67% and 83% initial investment value after three years (Aggarwal, Leal, & Hernandez, 1993).

2. Colombian Stock Exchange

The only exchange that is actively working in Colombia is the BVC, *Bolsa de Valores de Colombia*, and it has been operational since 2001, just after the fusion between three previously quoting stock exchanges of the cities of Bogota, Medellin and Cali. Since then, the transactional volume has increased until its peak of about 25 billion USD per year in 2011, as it can be seen in Figure 2, and then it has decreased to almost 13 billion USD per year.

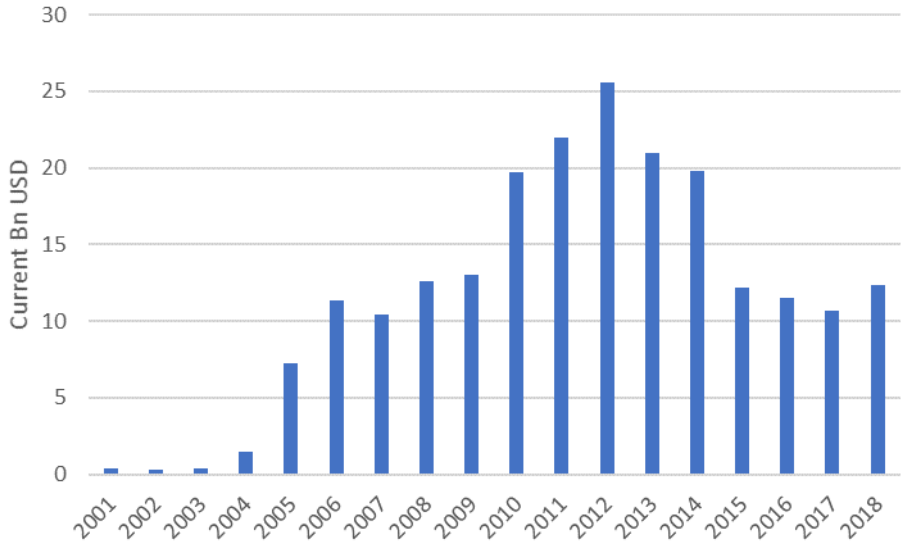

Figure 2: Transaction Volume in Bn USD.
Source: own illustration based on sample data

In addition, to have an idea of the market size, the Colombian stock exchange was in the top 4 in the Latin-American arena in 2018 regarding the average daily trading volume (51 Mn USD) and also in the market capitalization ranking (103.848 Mn USD), however, as it is shown in Table 1, the difference between the doubtless leader Brazil and the rest countries in the region is big. In comparison to the BVC, the major leader is 49 times greater in terms of daily trading volume, 9 times more considering the market cap and about 5 times larger contemplating the number of listed companies. In addition, it must be taken into account that there is potential for the Colombian market as it only has one stock exchange, whereas the direct competitors have from 2-5 (exception being Peru).

Country	# Listed Companies	# Stock Exchanges	Daily Av. Volume (Mn USD)	Market Cap. (Mn USD)
Brasil	335	5	2.495,4	916.824
Mexico	141	2	349,6	385.051
Chile	212	3	162,9	250.740
Colombia	68	1	50,9	103.848
Argentina	96	3	33,0	45.986
Peru	218	1	8,8	93.385

Table 1: Daily av. Volume and Mkt. Cap. of Latin-American Countries.
Source: own illustration based on sample data, (Editorial La República S.A.S. , 2018), (The World Bank, 2018)

Even though Brazil is considered as a Latin American power in the regional context, when it comes to the global picture it is perceived as an insignificant player, ergo the BVC influence becomes even more miniaturized. Table 2 shows that the Latin American relevance gets out of the picture by having almost 30 times less trading volume and market cap than the American bosses (NYSE and NASDAQ), therefore the inferior Colombian market is represented by just 0,1% of the world leader.

Stock Exchange	# Listed Companies	Monthly Av. Volume (Bn USD)	Market Cap. (Bn USD)
NYSE	2.400	1.452,0	30.923
NASDAQ	3.900	1.262,0	10.857
EURONEXT	1.240	174,0	3.927
LONDON SEG	2.261	219,0	3.767
B3 (Sao Paulo)	335	52,4	917

Table 2: Monthly av. Volume and Mkt. Cap. of Top Stock Exchanges.
Source: own illustration based on sample data

3. Data and Methodology

The process carried over to collect the information presented in this report was through a direct contact with the Colombian stock exchange, by requesting a database dated between 2007 and 2019, that on the one hand was already limited by only containing information of the share's closing price and transactional volumes and on the other hand, a list containing the date, offered price and the number of shares allocated in which several companies had an equity issuance with the stock exchange.

For the first part (closing prices), considering the gap of information given between the date when the stock exchange was founded (2001) and the obtained info (2007), a small computer program was developed to perform a cycle dedicated to download every day's public information that wasn't provided in the previously mentioned database, which would have taken about 100 hours if it was done manually[1]. The period of the chosen data (2001-2018) was selected to consider the Colombian market since the origin of the BVC.

On the other case, the list of the companies that had an equity issuance was analyzed and validated with three other sources. The sources that were considered were a newspaper database, the Financial Superintendence of Colombia and the respective websites of the companies that made the equity issuances. Firstly, the newspaper was used to check dates and several information related to the prospectus and offering announcement. This was done by paying a subscription to "*Revista Dinero*", a Colombian newspaper with a special emphasis on business and economic news. For the Financial Superintendence of Colombia, data was obtained directly from their webpage and even though information accessible was limited, it was useful to check the total allocation amount and the date of the announcements. Thirdly, the websites of the companies usually were the most reliable because data such as the prospectus, press releases and announcement offerings were available for the majority of the companies with their respective dates, however, some of them were difficult to find due to the fact that their database were not available for everyone (only for some users, i.e.

[1] Prices of *Bolsa Nacional Agropecuaria* were adjusted due to a reverse-split.

investors) or it was limited until a certain moment of time (i.e. 3 years, 10 years, etc.). Likewise, dividend information wasn't considered in the proposed methodology because of limited data access. Finally, a collapsed dataset of 44 issuances was created.

Furthermore, the dataset will be analyzed as a whole by considering some characteristics of the offerings that are seen in their prospectuses and to consider the short-term and long-run returns, the dataset will be split into subsets.

To clarify the latter, IPOs and SPOs cannot be compared directly because of intrinsic characteristics that define each of the issuances, like the degree of risk or the difference in dates when an investor can trade the offered security. For the risk level, while for IPOs it is considered high due to the elevated degree of information asymmetries that exist prior to the listing, for SPOs the level of uncertainty is comparatively low taking into account that listed companies have already made a big effort in terms of disclosure and compliance with the regulations that apply to the specific stock exchanges (publishing the prospectus).

Additionally, for the discrepancy concerning the investing dates, IPOs only have one possible way in which investors can apply to obtain shares, through the offering presented by the underwriters. On the other hand, for SPOs, potential investors can behave differently in two possible eventualities. First, in the case that the shares to be issued already trade on the market, which means that there is real-time information of the quoting price, or in the case that there's at least one other type of shares that are listed (i.e. preferential, common, privileged shares of the same firm) which partially gives an idea of how the newly offered issuance will behave. Accordingly, the issuances will be cataloged as follows:

A IPOs and SPOs: This is the set of all Initial and Seasoned Public Offerings.

B IPOs: This subset only considers the Initial Public Offerings.

C SPOs: This subset only considers the Seasoned Public Offerings.

D NLSs (Non-listed SPOs): This subset contains all the follow-ons of firms that had not previously traded in the market. For example, a company that had only common shares listed, and at the moment they are offering completely new preferred shares on the market, or the opposite, there are only preferred shares of a company listed and the SPO of the firm will be the offering of completely new common shares.

E ALSs (Already Listed SPOs): For this subset, there are all the follow-ons that, as the name describes, will apply for all the issuances that already had listing on the stock exchange. It's the opposite of the previous subset.

It is also worth noting that the dataset can be explained with the following subset relations:

$$B \subseteq A, \qquad C \subseteq A, \qquad B \cup C = A$$

$$D \subseteq C, \qquad E \subseteq C, \qquad D \cup E = C$$

It must be specified that the descriptive analysis will consider the previously mentioned subsets of NLSs and ALSs, however, for the short-run and the long-run analysis, these subsets will not be considered due to small sample sizes (4 and 29 issuances respectively), but a whole set of SPOs (33 issuances). Nevertheless, for future research, it should be taken into account this segregation in order to perceive if there is any statistical significance that can proof that the subsets don't behave as equals.

For the following methodologies, a parametric t-test and a non-parametric median test (Sign-test (Luoma, 2011)), therefore, the statistical significance of short and long-run methodologies will be estimated to test the null hypothesis that the mean of their returns is equal to zero (or median for the non-parametric test) for the samples of Equity issuances. Regarding these tests, the following will be considered as an assumption:

First, let's start from the fact that the t-Student distribution is symmetric, and that for the non-parametric test of the median (sign-test), the distribution to be used, which is the binomial distribution with same probability ($p = 0{,}5$) that values appear to be below or above the median, is also symmetric. Consequently, it is assumed that if in a statistical test with a level of significance (α) of 0.05 (or any), in which the null hypothesis proposed is whether the mean or the median are equal to zero and that the alternative hypothesis is different from zero (two tails), and the obtained result was significant, therefore the null hypothesis is rejected. By extension, it can be concluded that if the mean or the median are negative (or positive in the opposite case), the aforementioned null hypothesis that was rejected can be directly bypassed to accept an alternative hypothesis in which the mean or the median are less than

zero (or positive in the opposite case) with an $\alpha^* = \frac{\alpha}{2}$. Hence, this analysis will be assumed throughout the paper and it will be inferred as described without the need to carry out an additional statistical test.

3.1. Short-run Methodology

There will be a division in the short-term methodology, one for ALSs and a modification to be applied to IPOs and NLSs because of the dates in which these offers can be invested. For the first, there will be followed the methodology presented in Discounting and Underpricing in Seasoned Equity Offers (Altınkılıç & Hansen, 2003), considering that it's an approach that can be used for the already listed Seasoned Public Offerings (ALS) and modified for the latter.

Underpricing (U) can be defined as the sum of Discounting (D) and the Offer-day Return (R). These three variables can be measured with the following ratios (Altınkılıç & Hansen, 2003):

$$U = \ln\left(\frac{p_1}{p_0}\right), \qquad D = \ln\left(\frac{p_{-1}}{p_0}\right), \qquad R = \ln\left(\frac{p_1}{p_{-1}}\right), \qquad U = D + R$$

$$p_{-1}: previous\ offer's\ day\ closing\ price,$$

$$p_0: offer\ price, \qquad p_1: offer's\ day\ closing\ price$$

ALSs have the particularity of having some key dates, the ones of the prices described earlier, and should be analyzed to understand when are perceived the most significant variations.

On the other hand, the variable that will be used to analyze the short-run for IPOs and NLSs is the Underpricing (U^*). IPOs and NLSs have a similarity regarding the dates in which investments are placed, because both of them don't have a quoting ticker (which is obvious for an IPO) of the same type of stock (common or preferred), therefore the variation can only be calculated between the first trading day closing price and the offered price (subscription price).

$$U^* = \ln\left(\frac{p_1^*}{p_0}\right), \qquad p_0: offer\ price, \qquad p_1^*: first\ trading\ day\ closing\ price$$

Basically, the difference between the described Underpricing's is that for IPOs and NLSs the calculation is very straightforward, starting from a given price in the prospectus and the first trading day closing price, whereas for ALSs its calculated from the shock in the offer's day closing price date, considering that the market through supply and demand adjusts the stock's price with newly disclosed information. To sum up, the formulae are the following:

$$U_1 = \ln\left(\frac{p_1^*}{p_0}\right), \quad U_2 = \ln\left(\frac{p_1}{p_0}\right), \quad D_2 = \ln\left(\frac{p_{-1}}{p_0}\right), \quad R_2 = \ln\left(\frac{p_1}{p_{-1}}\right), \quad U_2 = D_2 + R_2$$

$$p_{-1}: previous\ offer's\ day\ closing\ price, \quad p_0: offer\ price,$$

$$p_1^*: first\ trading\ day\ closing\ price, \quad p_1: offer's\ day\ closing\ price$$

$$U_i \begin{cases} \mathrm{U}_1, & \text{if makes part of the subset } O_1 \\ \mathrm{U}_2, & \text{if makes part of the subset } O_2 \end{cases}$$

$$O_1: IPOs\ \&\ NLSs, \qquad O_2: ALSs$$

3.2. Long-run Methodology

To avoid biases, Underpricing (U) which will be measured in the previous methodology will be excluded from the long-run analysis, therefore excluding the first day of trading for IPOs and NLSs and excluding the offer's day for ALSs.

The long-run methodology is divided into two parts, the first considering a retail-investor point of view, which follows the ideology to track the success of a single equity issuance investment, and the latter, considering an abnormal return prompt between the offerings' return and a market benchmark performance. Also, it's important to note that if a closing price for a month or year anniversary was unavailable, the closest previous day's (according to the respective date) closing price was considered. In addition, returns were calculated taking into account the closing day price of a specific date (i.e. 20/03/2005) and the next month's previous day closing price (i.e. 19/04/2005). It's important to note that the event

window was decided to be between months 1 and 36 in order to capture the trend from the short to the long-term.

3.2.1. Raw returns

To consider a standalone analysis without addressing the market behavior there will be calculated a raw return considering an analogy to the cumulated abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs) (mentioned in the chapter 3.2.2) and it will be named cumulated raw returns (CRRs) and buy-and-hold raw returns respectively (BHRRs).

- CRRs

The idea of this methodology is to cumulate the individual returns (r_{it}) and then make an average, as shown in the following formulae:

$$r_{it} = \ln\left(\frac{p_{it}}{p_{i(t-1)}}\right), \qquad CRR_{i(1,T)} = \sum_{t=1}^{T} r_{it}\,, \qquad CRR_{(1,T)} = \left(\frac{1}{n_T}\right) * \sum_{i=1}^{n_T} CRR_{i(1,T)}$$

r_{it} is the natural log of the stock's i raw return in the event of month t, p_{it}: is the closing price for stock i in the event of month t, $CRR_{i(1,T)}$ cumulated raw return of the stock's i for the events between month 1 and T, $CRR_{(1,T)}$ is the cumulated raw return for the events between month 1 and T.

- BHRRs

Similarly, this methodology will cumulate the returns, however following the way in which BHARs resemble:

$$R_{it} = (1 + r_{it}), \qquad BHRR_{i(1,T)} = \prod_{t=1}^{T} R_{it}\,, \qquad BHRR_{(1,T)} = \left(\frac{1}{n_T}\right) * \sum_{i=1}^{n_T} BHRR_{i(1,T)}$$

$BHRR_{i(1,T)}$ measures the total raw return from a buy-and-hold strategy where a stock i is purchased at the first closing market price after going public and held until month T.

$BHRR_{(1,T)}$ is the average of the buy-and-hold raw returns between the offerings (n_T) that have values for the events between month 1 and T.

It's important to point out that the difference between methodologies of chapter 3.2.1 and of chapter 3.2.2 is that CARs and BHARs consider a subtraction to a benchmark (market return).

3.2.2. CARs & BHARs

To evaluate the long-run, part of the methodology found in The Long-Run Performance of IPOs (Ritter, 1991) will be considered by calculating the cumulative abnormal returns (CARs) and the buy-and-hold abnormal returns (BHARs) (Kooli & Suret, 2001).

- Market benchmarks

Three market benchmarks were selected, one market index, IGBC (Bloomberg, 2019) (Colombian market Index) and two other elaborated to emulate the CRSP value-weighted index (VWI) and the CRSP equal-weighted index (EWI) in the Colombian market, that are more or less constant in this kind of analysis in the Literature, like Ritter makes use of the CRSP value-weighted NASDAQ index adjustment and the CRSP value-weighted Amex-NYSE index adjustment (Ritter, 1991) or as Drobetz et al. with the SPI, swiss performance index (value-weighted market index) (Drobetz, Kammermann, & Wälchli, 2005), among others. The slightly difference that was encountered was that there was limited information related to the Market Cap of the firms, therefore a modification was made to use the total volume traded, hence the emulated benchmarks are a value-weighted volume traded index ($VWvtI$) and an equal-weighted volume traded index ($EWvtI$).

Before calculating the mentioned indexes, a list of the TOP 30 most traded (with respect to #traded shares multiplied by the price of the transaction) was made for each year for the event time window (2001 to 2018). The decision to make a 30-firm list per year was because by following this reasoning, there was at least 97% of the total average volume traded in the Colombian market for each year (the maximum of the mentioned range was 99,7%).

The first index firm's proportions (w_{iT}) are calculated as follows:

$$TAV_T = \sum_{i=1}^{N=30} AV_{iT}\,, \qquad \forall T \in \{2001, \dots, 2018\}$$

$$AV_{iT} = \sum_{t=0}^{n_T} atr_{it} * p_{it}\,, \qquad \forall T \in \{2001, \dots, 2018\}$$

$$w_{iT} = \frac{AV_{iT}}{TAV_T}, \qquad \forall T \in \{2001, \dots, 2018\}, \forall i \in \{1, \dots, 30\}$$

TAV_T is the total average volume traded of the TOP 30 stocks i for year T, AV_{iT} is the total average volume traded of a stock i for year T, n_T is the number of labor days in the year T, atr_{it} is the average transaction volume of stock i in the labor day t and p_{it} is the closing price of stock i in the labor day t, and w_{iT} is the volume-weighted percentage (to emulate the value-weighted index) that accounts for stock i for year T. The index will be created as shown in the next formulae:

$$VWvtI_0 = 1.000, \qquad VWvtI_t = VWvtI_{t-1} * r(VWvt)_t$$

$$\forall t \in n_T, \forall T \in \{2001, \dots, 2018\}$$

$$r(VWvt)_t = \sum_{i=1}^{N=30} w_{iT} * \ln\left(\frac{p_{it}}{p_{it-1}}\right), \qquad \forall t \in n_T, \forall T \in \{2001, \dots, 2018\}$$

Where $VWvtI$ is the value-weighted volume traded index and $r(VWvt)_t$ is the index's return, which is a weighted average of the stocks' (i) return for each labor-day t of year T.

For the latter emulated index, the same list of firms will apply for the event time window and the unique variation goes in w_{iT} since the fraction will be the same for each company in the list ($3, \overline{3}\%$), ergo the only modification is towards the notation, as shown in the following formulae:

$$w_{iT} = \frac{1}{N}, \qquad \forall T \in \{2001, \dots, 2018\}, \forall i \in \{1, \dots, 30\}$$

$$EWvtI_0 = 1.000, \qquad EWvtI_t = EWvtI_{t-1} * r(EWvtI)_t$$

$$\forall t \in n_T, \forall T \in \{2001, \dots, 2018\}$$

$$r(EWvtI)_t = \sum_{i=1}^{N=30} w_{iT} * \ln\left(\frac{p_{it}}{p_{it-1}}\right), \qquad \forall t \in n_T, \forall T \in \{2001, \dots, 2018\}$$

- CARs

The cumulative abnormal returns will follow the following formulae:

$$AR_{it} = r_{it} - rm_t, \qquad r_{it} = \ln\left(\frac{p_{it}}{p_{i(t-1)}}\right), \qquad rm_t = \ln\left(\frac{Im_t}{Im_{(t-1)}}\right)$$

AR_{it} is the benchmark-adjusted abnormal return for the stock i and the market in the event month of t, r_{it} is the natural log of the stock's i return in the event of month t, p_{it} is the closing price for stock i in the event of month t, $rm_t$is the natural log return of the market index in the event of month t, Im_t is the closing index value for the benchmark in the event of month t.

In the following equations $CAR_{i(1,T)}$ it's the cumulated benchmark-adjusted abnormal returns for the stock i from month 1 until event of month T in the event of month t and CAR_{1T} is the average cumulated benchmark-adjusted abnormal return between the offerings (n_t) that have values from month 1 until event of month T.

$$CAR_{i(1,T)} = \sum_{t=1}^{T} AR_{it}, \quad CAR_{(1,T)} = \left(\frac{1}{n_T}\right) * \sum_{i=1}^{n_T} CAR_{i(1,T)}$$

The statistical significance is estimated to test the null hypothesis that the mean cumulated benchmark-adjusted abnormal returns is equal to zero for the samples of Equity issuances. The conventional t-statistic is calculated as follows:

$$t_{stat}\left(CAR_{(1,T)}\right)_T = \frac{\overline{CAR_{(1,T)}}}{\left(\frac{\sigma\left(CAR_{(1,T)}\right)}{\sqrt{n_T}}\right)}$$

Where $\overline{CAR_{(1,T)}}$ is the sample mean, CSD_t is the standard deviation of the cross-sectional cumulated benchmark-adjusted abnormal returns (of the $CAR_{i(1,T)}$).

However, considering that the values tend to be negatively skewed the t-statistic will be adjusted, therefore, if no positively or negatively skewed data appears the test will perfectly work as the previously shown. The adjustment will apply as follows:

$$t_{stat}\left(CAR_{(1,T)}\right)_T = \sqrt{n_T} * \left(S_T + \frac{1}{3}\hat{\gamma}_T * S_T^2 + \frac{1}{27}\hat{\gamma}_T^2 * S_T^3 + \frac{1}{6n_T}\hat{\gamma}_T\right), \qquad S_T = \frac{\overline{CAR_{(1,T)}}}{\sigma\left(CAR_{(1,T)}\right)}$$

$$\hat{\gamma}_T = \left(\frac{n_T}{(n_T-2)*(n_T-1)}\right) * \sigma\left(CAR_{(1,T)}\right)^{-3} * \sum_{i=1}^{n_T}\left(CAR_{(1,T)} - \overline{CAR_{(1,T)}}\right)^3$$

S_T is the ratio between the mean and the standard deviation of the $CAR_{i(1,T)}$ and $\hat{\gamma}_T$ is the skewness estimation (unbiased by sample size) of the same sample.

- BHARs

The buy-and-hold abnormal returns will follow the following formulae:

$$R_{it} = (1 + r_{it}), \qquad r_{it} = \ln\left(\frac{p_{it}}{p_{i(t-1)}}\right), \qquad Rm_t = (1 + rm_t), \qquad rm_t = \ln\left(\frac{Im_t}{Im_{(t-1)}}\right)$$

$$BHAR_{i(1,T)} = \left(\prod_{t=1}^{T} R_{it}\right) - \left(\prod_{t=1}^{T} Rm_t\right)$$

r_{it} is the natural log of the stock's i return in the event of month t, rm_t is the market natural log return (as in the previous methodology of CARs) and $BHAR_{i(1,T)}$ measures the total return from a buy-and-hold strategy where a stock i is purchased at the first closing market price after going public and held until month T.

$$BHAR_{(1,T)} = \frac{1}{n_T}\sum_{i=1}^{n_T} BHAR_{i(1,T)}$$

$BHAR_{(1,T)}$ is the average of the buy-and-hold benchmark-adjusted abnormal between the offerings (n_T) that have values from month 1 until event of month T.

Similarly, to the previous methodology (CARs) the statistical significance is estimated to test the null hypothesis of zero mean buy-and-hold benchmark-adjusted abnormal return for the samples of Equity offerings. Also, as shown in the previous methodology, the Skewness adjusted t-test will be incorporated as listed below:

$$t_{stat}\left(BHAR_{(1,T)}\right)_T = \sqrt{n_T} * \left(S_T + \frac{1}{3}\hat{\gamma}_T * S_T^2 + \frac{1}{27}\hat{\gamma}_T^2 * S_T^3 + \frac{1}{6n_T}\hat{\gamma}_T\right)$$

$$S_T = \frac{\overline{BHAR_{(1,T)}}}{\sigma\left(BHAR_{(1,T)}\right)}$$

$$\hat{\gamma}_T = \left(\frac{n_T}{(n_T-2)*(n_T-1)}\right) * \sigma\left(BHAR_{(1,T)}\right)^{-3} * \sum_{i=1}^{n_T}\left(BHAR_{(1,T)} - \overline{BHAR_{(1,T)}}\right)^3$$

S_T is the ratio between the mean and the standard deviation of the $BHAR_{i(1,T)}$ and $\hat{\gamma}_T$ is the skewness estimation (unbiased by sample size) of the same sample.

4. Empirical Results

The results of this report will be divided into a descriptive analysis of some particular characteristics of equity issuances, as well as a short-run and long-run analysis of the IPOs and SPOs that have been emitted in the Colombian market.

4.1. Descriptive Analysis

In this chapter the dataset will be analyzed as a whole by considering some characteristics of the offerings that are seen in their prospectuses.

Before analyzing the Colombian Equity market, lets show a picture of how's the relationship between the Debt and the Equity capital market. On Figure 3 it is shown that the Debt issuances are in between 2 and 7 Bn dollars, whereas the equity proceeds fluctuate across time. In addition, on Figure 4 we can see that only on 2007 and 2011 the equity proceeds exceeded the debt ones.

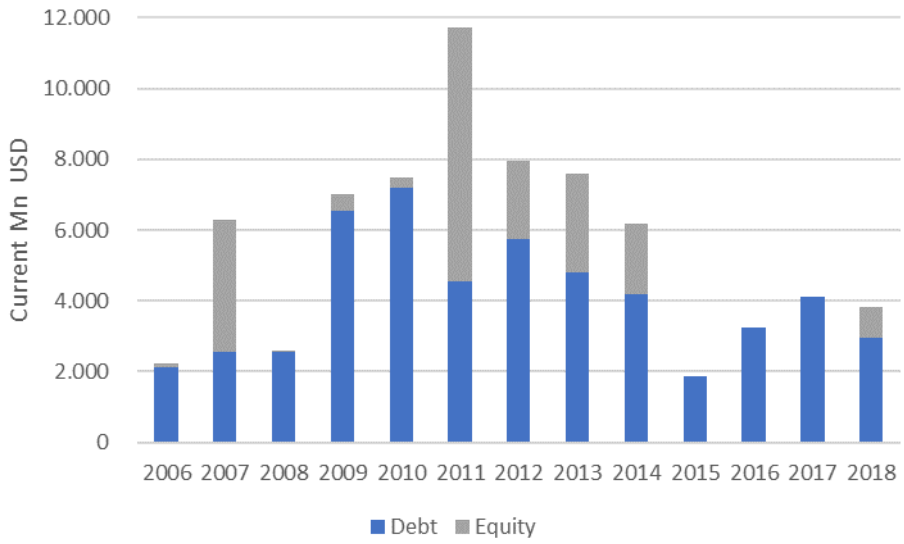

Figure 3: Colombian Debt and Equity Issuances.
Source: own illustration based on sample data

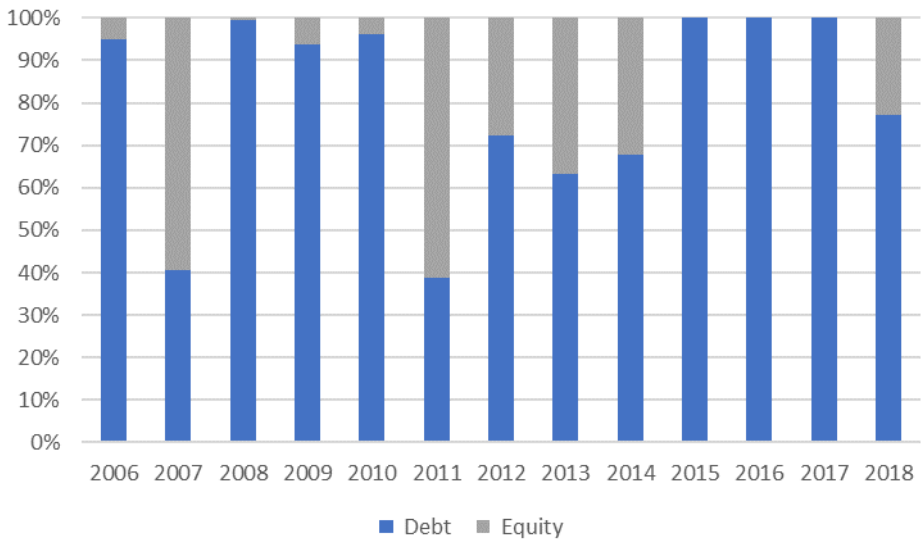

Figure 4: Colombian Debt and Equity Issuances (stacked %).
Source: own illustration based on sample data

Moreover, there have been a total of 44 equity issuances that have occurred in the Colombian stock exchange and there have been three peaks, the two highest with 9 deals for 2007 and 2011 and 7 issuances for 2012 as it can be seen in Figure 5. In addition, it is evidenced how during the financial crisis (2008) the IPO/SPO market fell to its minimum (1 SPO deal of just 16 Mn USD) between a constant period of 9 years of offerings (from 2006 until 2014) whereas the debt market issuances were around 2.500 Mn USD (2008) and almost tripled this value by the next year (2009), mainly explained by the urge of searching for safe investments (see Figure 3). Also, the encouragement of equity issuances was set aside from 2015 for three years.

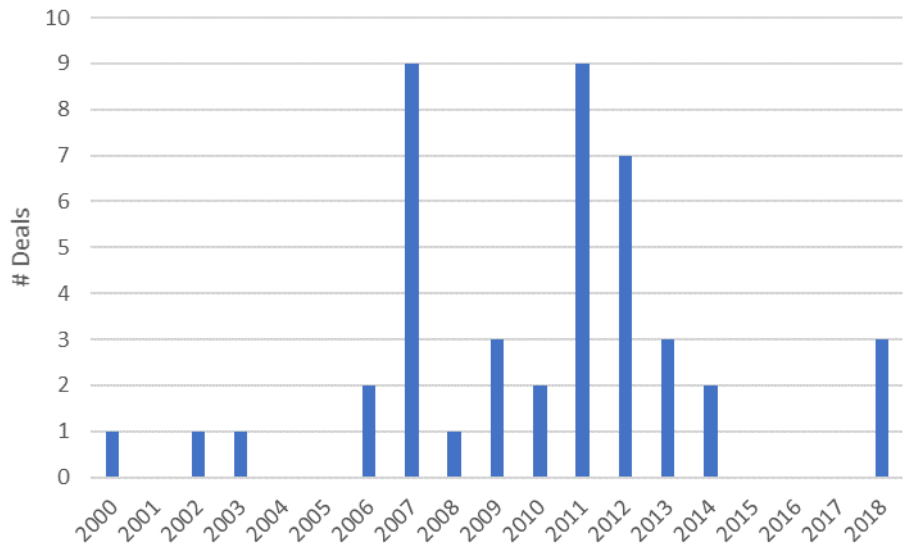

Figure 5: IPO & SPO issues in the Colombian market (2000-2018).
Source: own illustration based on sample data

SPOs have been issued three times more than IPOs as seen in graph Figure 6, and it can be perceived in Figure 7 that the sectors which are more interested to raise funds are the Industrial sector, followed by the Financial sector, which grouped together represent 75% of the issuances.

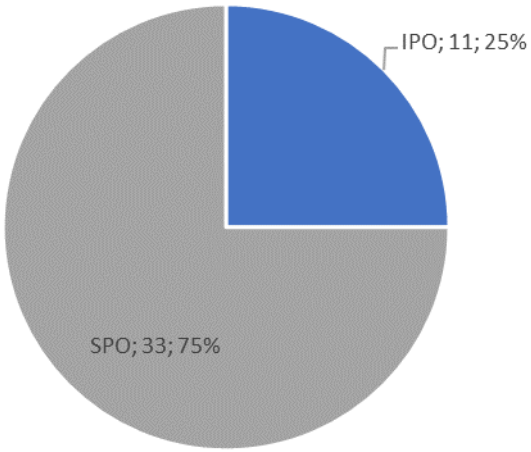

Figure 6: IPOs & SPOs of the BVC (2001-2018).
Source: own illustration based on sample data

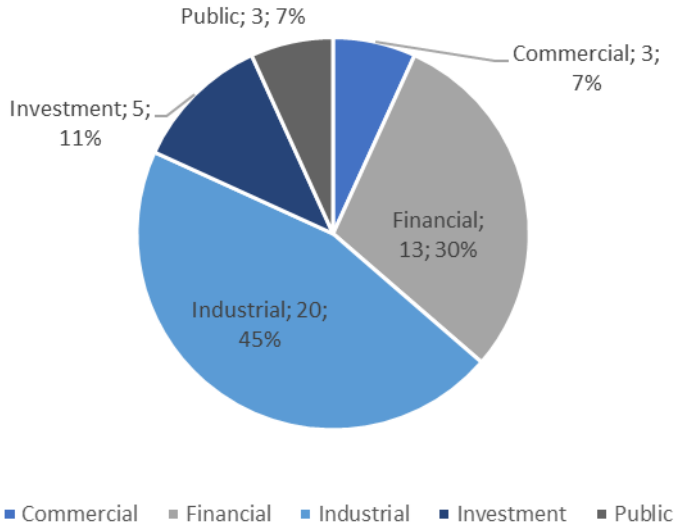

Figure 7: Equity Issuances of the BVC by Sector (2001-2018).
Source: own illustration based on sample data

Moreover, there's a small effect of having discounts that is perceived in the bid/ask ratio. In the sample there are 11 offerings that contain a variety of discounts that sum up from 0,8% up to 15,4%. In the Figure 8 the bid/ask values are slightly higher for the offerings that had discounts. This follows common sense as it is expected that a rational investor will seek a higher return by investing in identified offerings that contain a discount such as paying by cash or being a specific type of investor (i.e. retail investor).

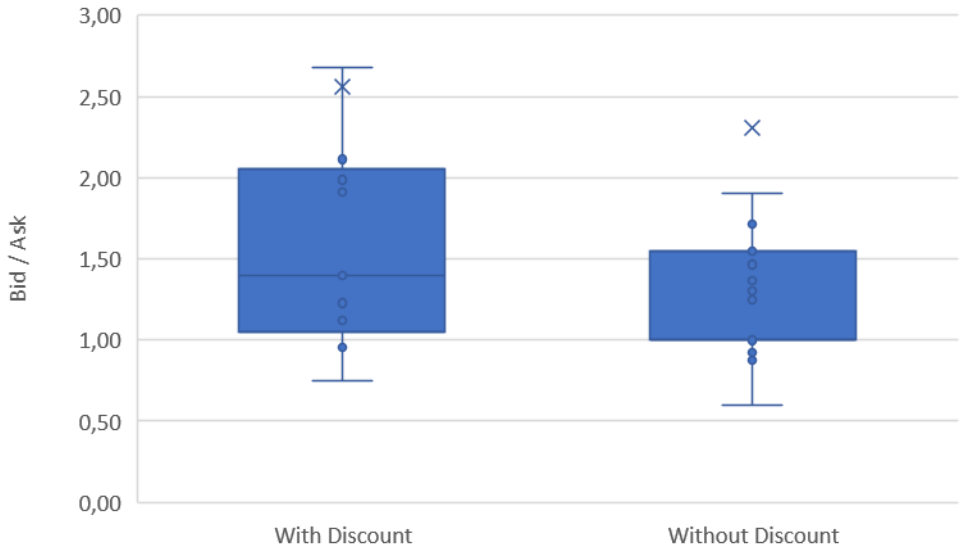

Figure 8: Bid/Ask vs Offering's Discounts.
Source: own illustration based on sample data

4.1.1. Book Building vs Bid/Ask ratio

This relationship is shown in the box and whiskers of Figure 9. let's consider the first box and whiskers as A, the offerings that didn't considered the Book Building methodology (explained in Chapter 1.3.1) and B as the issuances that did considered it. It can be observed that although A has a higher average of Bid/Ask ratio than B (2,40 >2,10), for B the median is more than twice higher and there are no issuances with insufficient demand (Bid/Ask <1,00), whereas A has at least 8 out of 37, about 22% of the offerings with undersubscription. Consequently, for the Colombian market the incorporation of B.B. means a 100% of success regarding at least securing the funds required for the 7 equity issuances that have occurred.

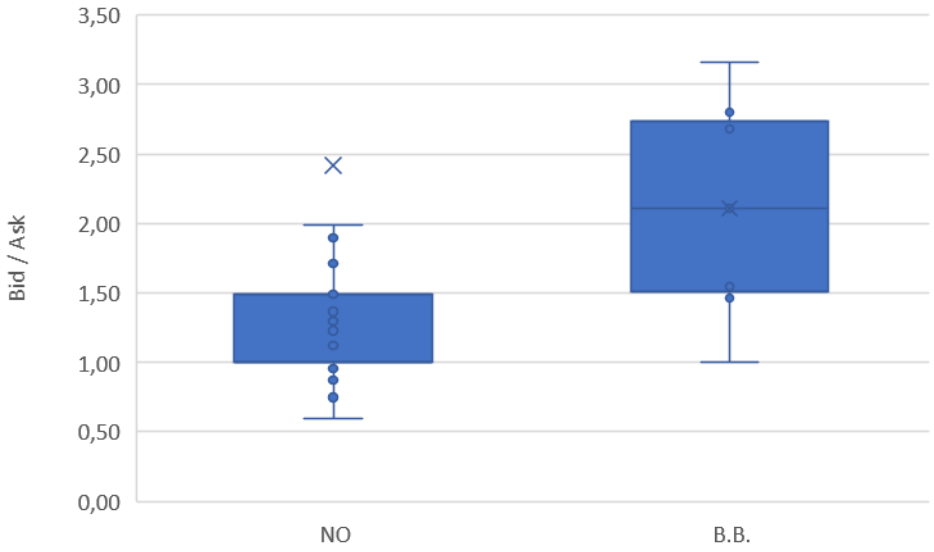

Figure 9: Bid / Ask and Book Building relationship[2].
Source: own illustration based on sample data

4.1.2. Stock Type and Subscription Ratio

First, from the data encountered it can be determined that there are three types of stocks that have been sold in the Colombian stock exchange since 2001 and the most recurrent type are the common shares as shown on Figure 10, followed by the preferred stocks.

[2] This graph does not show the outlier points of the case of not using Book Building (5 points that go from a Bid/Ask ratio of 3,00 up to 17,62)

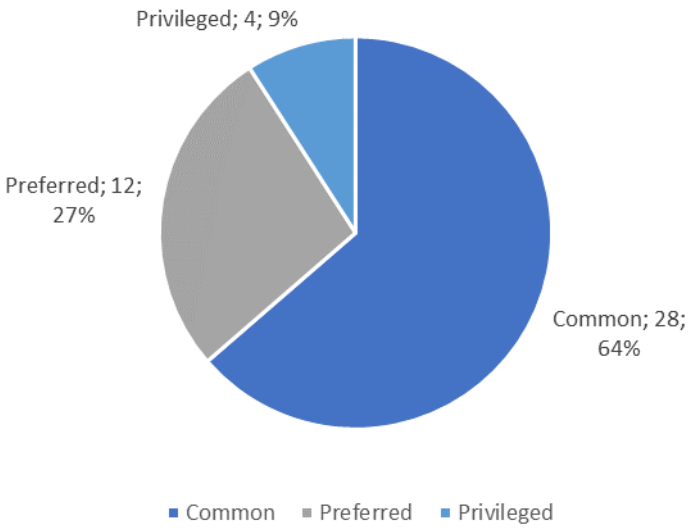

Figure 10: Colombian Stock type Equity issuances (2001-2018).
Source: own illustration based on sample data

The common and the preferred stocks are the top of mind for shares in the financial sector, however, for the Colombian market there has been another type of shares which combines characteristics of the previously mentioned ones. For example, Priv. S. have the same rights that C.S. posses, such as receiving dividends, and can have a preferred dividend for the remaining period of time that the stock keeps having the nomenclature of "Privileged". Eventually, this typology of shares will convert into C.S., after a period of time that oscillates between 3 months and 5 years or sometimes after a preferred dividend payment. Therefore, it can be said that this security has the ideal characteristics, the up-side of the preferred stocks (pecking order hierarchy) and no downside being compared to a C.S. (voting rights) (Isagen S.A. ESP).

Unfortunately, the Priv. S. only represent a minimum percentage in the Colombian equity issuances, less than 10% (only 4 issuances) and since 2007 there has not appeared another one as shown in Figure 11. This can be explained by the idea of condensing securities into the main two types, common and preferred, which becomes easier to comprehend for retail investors and on possible reason was to delete this type of shares, therefore since 2007 there have been preferred equity issuances.

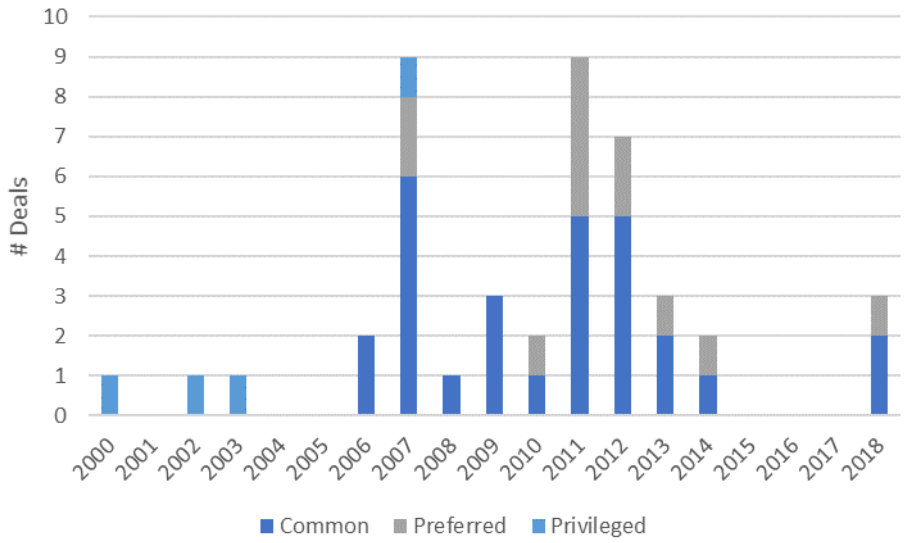

Figure 11: Equity issuances by stock type in the Colombian market (2000-2018).
Source: own illustration based on sample data

Additionally, considering the type of shares of the issuance and the sector of the company of the mentioned offering, C.S. follow almost the same pattern evidenced in Figure 7, however the Priv. S. are equally distributed between public and industrial companies. Finally, a difference is seen in the distribution of preferred shares as shown in Figure 12, since most of the financial firms (58%) choose it and this can be explained by the fact that banks or financial institutions require to raise funds to comply with regulations, but they don't wish to lose control of the board of directors (BoD).

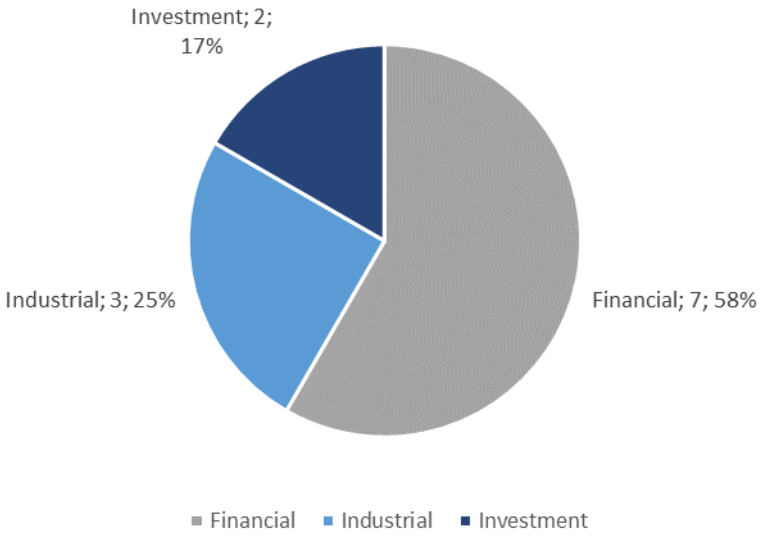

Figure 12: Equity Issuances of the BVC by Sector (2001-2018).
Source: own illustration based on sample data

Now, regarding the subscription ratio (see Chapter 1.3.1), it can be seen that more or less half of the cases in which a S.R. was proposed in an offer's Prospectus and in the other half of the cases it was absent (Figure 13). Nevertheless, if we examine the cases in which there was a S.R., a wide spectrum can be seen and the range of the box and whiskers plot (Figure 14) varies between 8% and 45%.

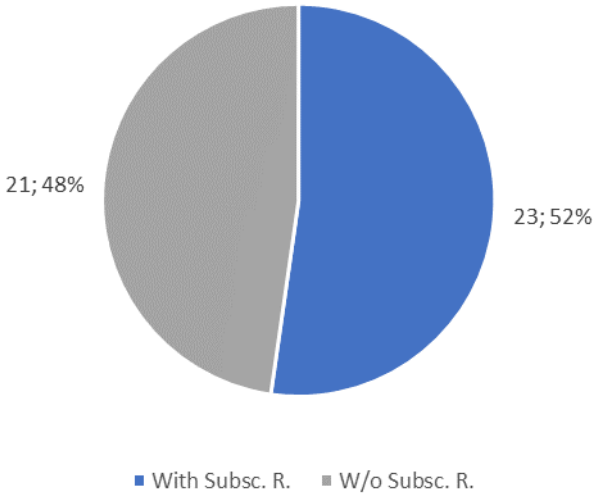

Figure 13: Equity issuances With and Without Subscription Ratio.
Source: own illustration based on sample data

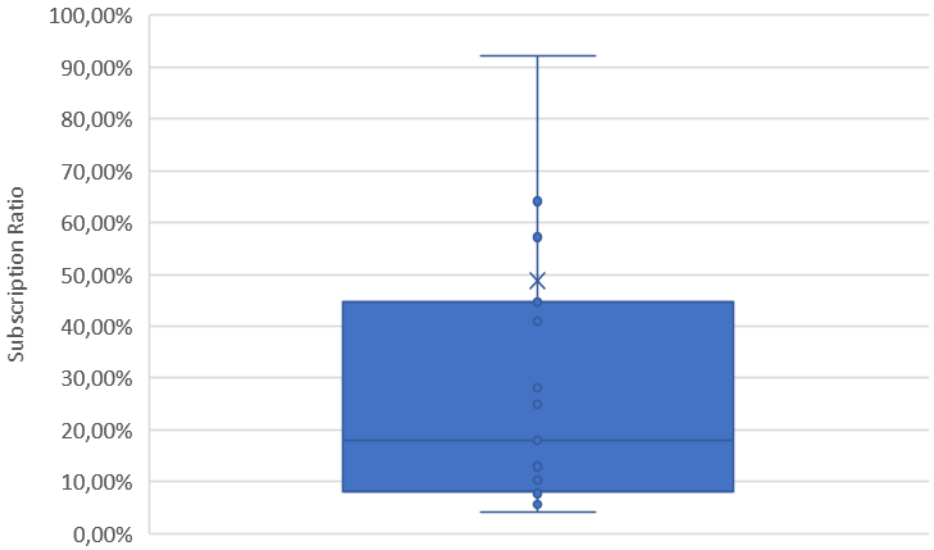

Figure 14: Equity issuances with a Subscription Ratio[3].
Source: own illustration based on sample data

[3] This graph does not show outlier points, there are two offerings, the first offered 121% and the second 491%.

Furthermore, by checking the relationship between the stock type and the subscription ratio, it can be observed that firstly, there are no privileged shares that contain a subscription ratio and secondly, that common stocks have a higher average of S.R. than preferred stocks and at the same time the S.R. of common stocks are higher than the highest S.R. of the preferred shares by almost 40% of the cases (as shown in Figure 15).

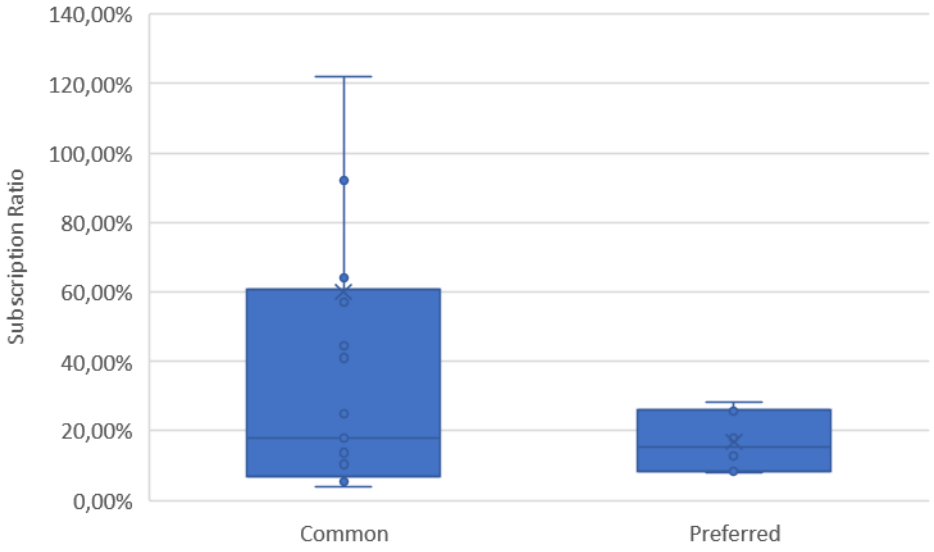

Figure 15: Subscription Ratio vs Stock type[4].
Source: own illustration based on sample data

4.1.3. Ownership Offered, Implicit Valuation and Offer Size

The ownership offered to the public seems to follow a Poisson distribution in the histogram of Figure 16, explaining that usually the size of the offers are low, however, if we go deeper we can see that 16% of the sample tender an ownership up to 5%, 43% up to 10%, 64% up to 15% and 75% up to 20% respectively, therefore, the piece given to investors is small. On the contrary, regarding Pham et al. (Pham, Pham, & Alavi, 2008), the expected average of ownerships offered was 35,95% for 555 firms observed in the Australian Stock Exchange and varied within subgroups like the pre-IPO managerial ownership between 60-80 percent which presented the lowest average of ownership offered (30,07%) and the largest average

[4] This graph does not show the outlier point, the Common share offering of a subscription ratio of 491%.

was for the range of 0-20 percent of pre-IPO managerial ownership (39,79%), therefore it is not the case to perceive a resemblance for the Colombian market.

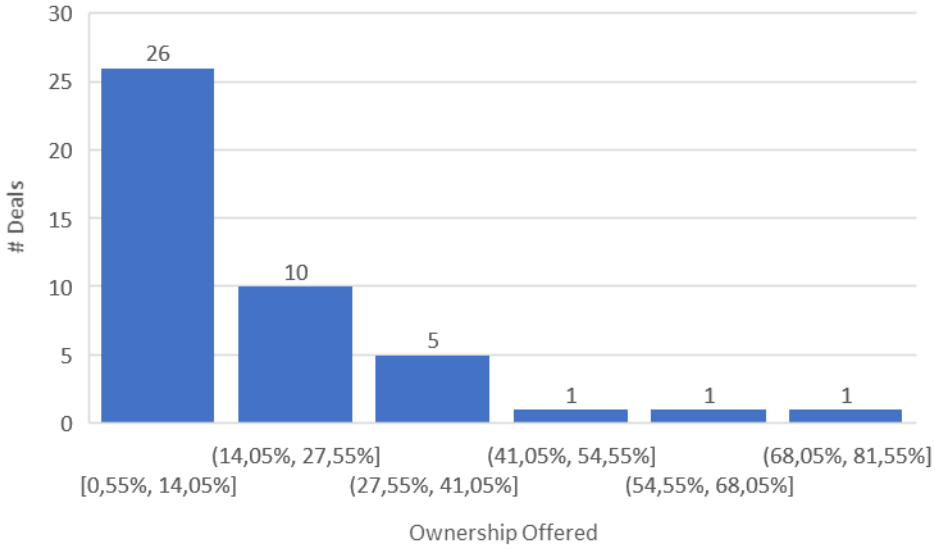

Figure 16: Histogram of Ownership offered for the Equity issuances.
Source: own illustration based on sample data

It can be observed in that there's no difference regarding the amount of ownership offered between IPOs and SPOs, both types of equity issuances behave similarly except from the outliers.

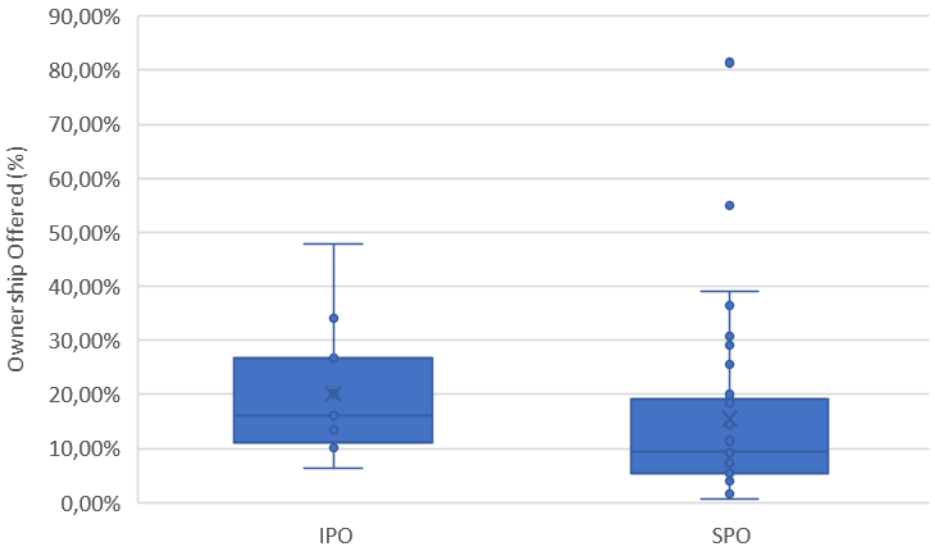

Figure 17: Ownership offered for IPOs and SPOs.
Source: own illustration based on sample data

Regarding the offer size and the implicit valuation (see in Chapter 1.3.1) of the issuances we can observe that both of these variables behave almost equally, the only difference is one order of magnitude as seen in Figure 18 and Figure 19.

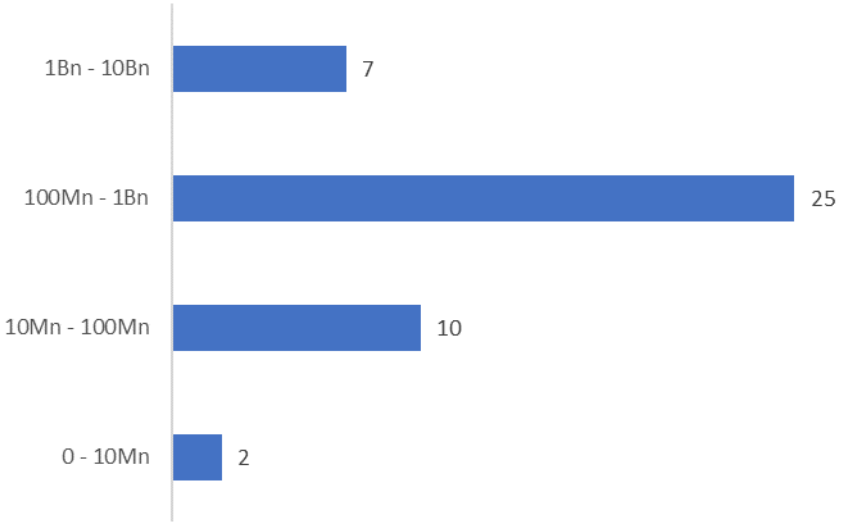

Figure 18: Offer Size of Equity Issuances in Current USD.
Source: own illustration based on sample data

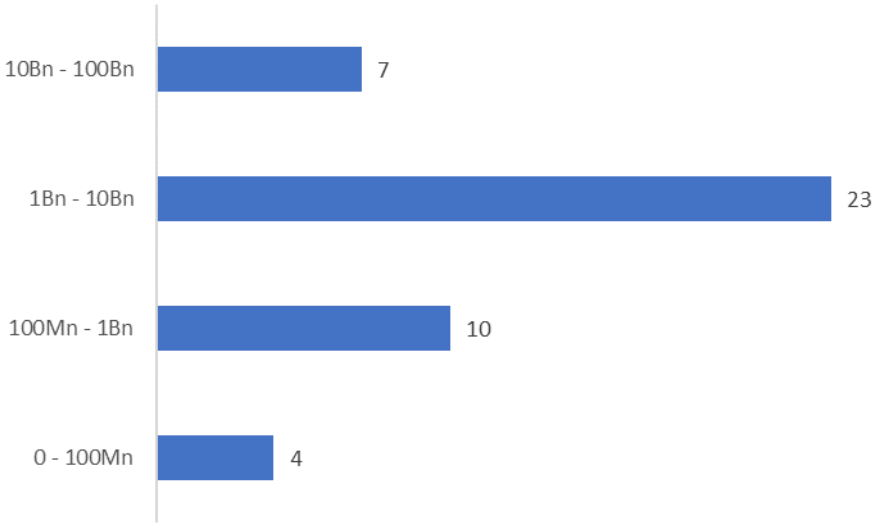

Figure 19: Implicit Valuation of Equity Issuances in Current USD.
Source: own illustration based on sample data

If we consider IPOs and SPOs separately, the Offering size has a similar average whereas for the Implicit Valuation, the SPOs have an average larger than the one of IPOs, more than double of its proportion as seen in Table 3.

Offering Size	IPOs	SPOs	Total
0 - 10Mn	1	1	**2**
10Mn - 100Mn	3	7	**10**
100Mn - 1Bn	6	19	**25**
1Bn - 10Bn	1	6	**7**
Total	**11**	**33**	**44**
Average (Mn)	**443**	**452**	**450**

Implicit Valuation	IPOs	SPOs	Total
0 - 100Mn	1	3	**4**
100Mn - 1Bn	5	5	**10**
1Bn - 10Bn	4	19	**23**
10Bn - 100Bn	1	6	**7**
Total	**11**	**33**	**44**
Average (Mn)	**3.654**	**6.702**	**5.940**

Table 3: IPO&SPO Offering Size & Implicit Valuation.
Source: own illustration based on sample data

This last comparison can be explained by the fact that an SPO is a subsequent offering and it is considered of common sense that the subsequent valuations would be higher than the previous ones. In fact, there were 26 equity issuances that were at least made twice by the same company (several 3 and a couple 4 times), therefore an IPO followed by an SPO or an SPO followed by another. The variation in the implicit valuations, explained by the following formula, reveals that for 17 cases, the vast majority (16) had positive values and the average was about a 150% growth. The only exception that shows that there was a reduction of the implicit valuation (-1,6%) was a bank in 2014.

$$\Delta Impl.Val. = \frac{Imp.Val._i}{Imp.Val._{i-1}}$$

4.1.4. IPOs

Initially, to have a macro idea about the IPOs global market the following graph shows the number of IPOs and the total value of the mentioned offers per year. As can be seen in Figure 20, there is a cyclical behavior in which the market is bullish or bearish (Ernst&Young, 2001-2018).

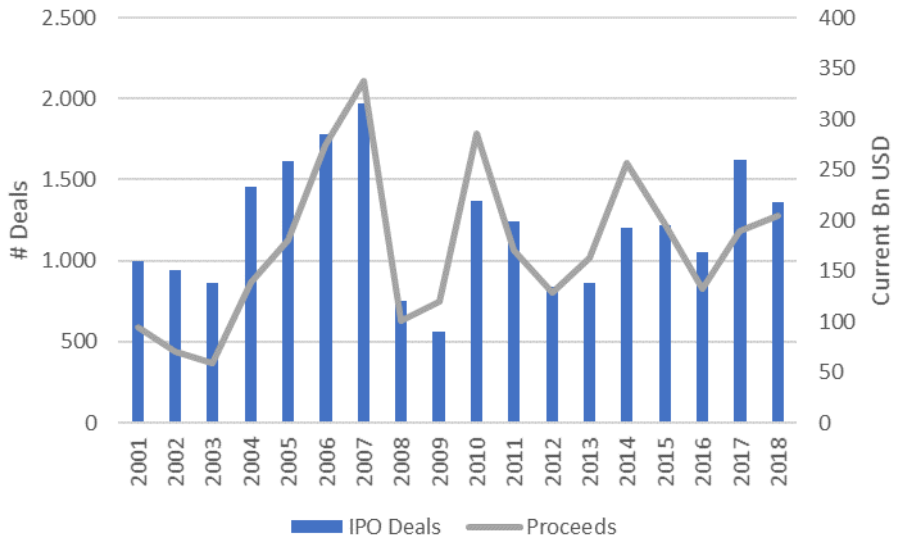

Figure 20: Global IPO deals and Proceeds.
Source: (Ernst&Young, 2001-2018)

Since 2012, data collected is more detailed with respect to the regions where IPOs were issued, for example as shown in Figure 21, which displays that the majority of offers where conducted in Asia-Pacific, owning the market between 43% and 60% over the last 7 years, while EMEIA is the second contender, between 25% and 32%, and finally, Americas, which oscillates between 13% and 31% respectively.

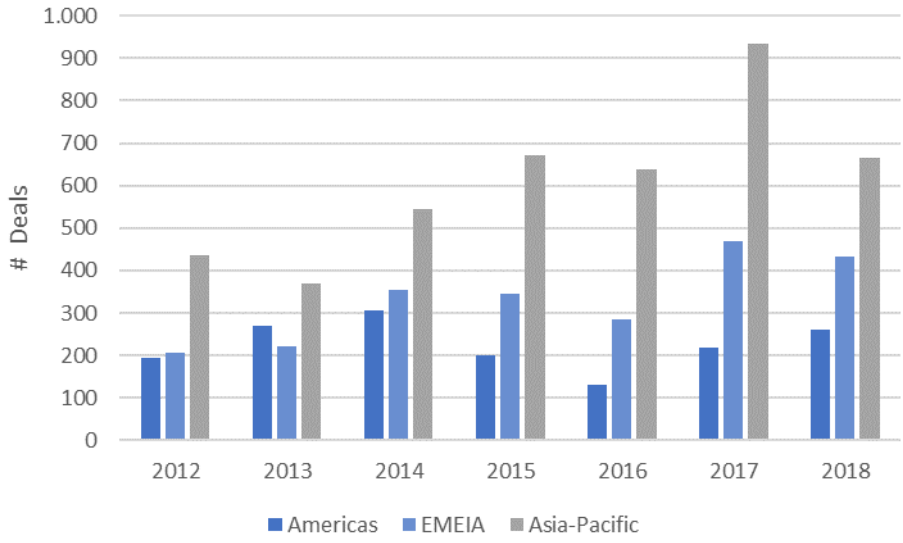

Figure 21: Global IPO Market, Regional number of deals.
Source: (Ernst&Young, 2001-2018)

Checking with lenses (as shown in Figure 22) to go more in depth in the Americas we can see that the real contenders of the continent are the US and Canada, however the real leader

is US because represents 77% of the America's IPO market in 2012 and it has oscillated between 90% and 95% until 2018. Moreover, Although Latin-American represents a low percentage of the market share in the region, they have increased in the last 5 years their IPO deals, therefore an average growth of 60% show that they are starting to become a key competitor and it should be noted that the main countries that lead the graph are Mexico and Brazil.

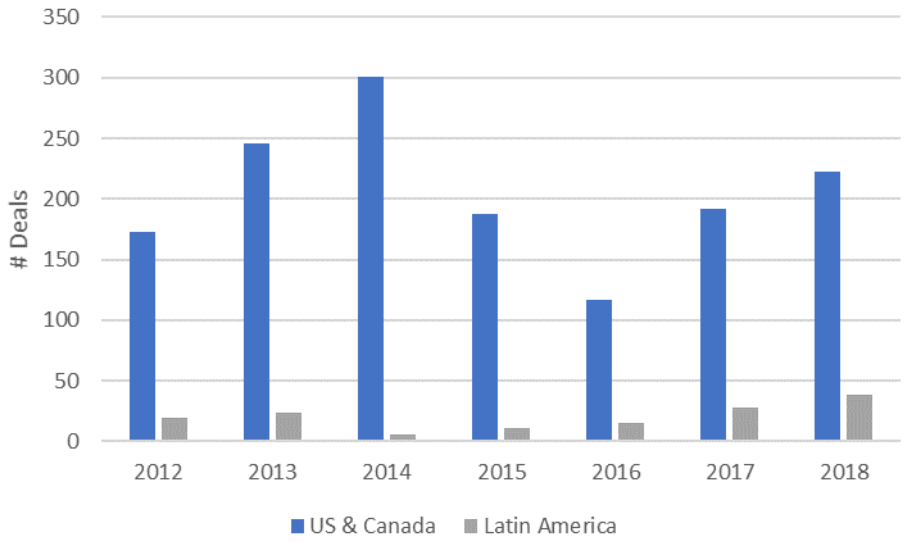

Figure 22: Americas IPO Market, number of deals.
Source: (Ernst&Young, 2001-2018)

Moreover, in the Colombian market we can see that there has been a quite small quantity of IPO offers, just a total of 11 registered in the BVC. Additionally, we can observe in Figure 23, that for 2007 the highest peak of grouped offerings coincides with the same year's uppermost global IPO market (Figure 20).

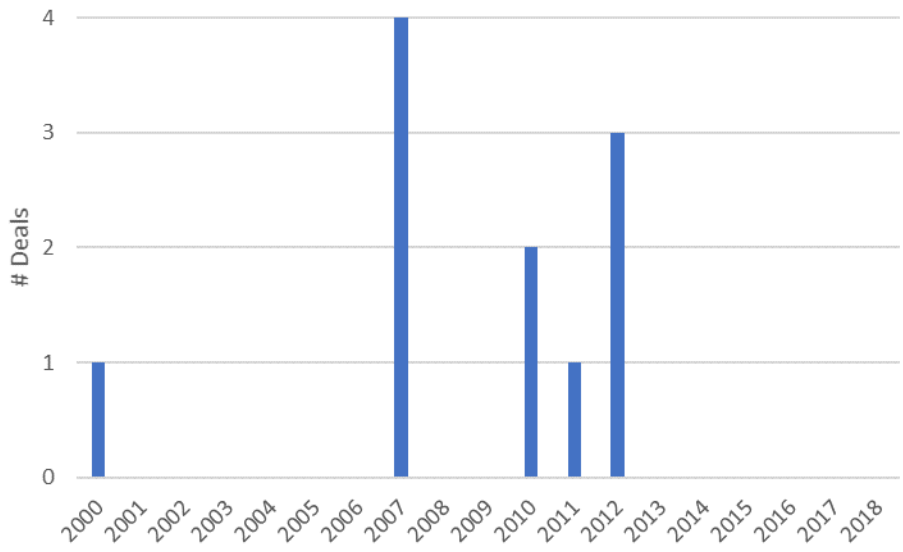

Figure 23: Colombian Stock Exchange IPOs[5].
Source: own illustration based on sample data

4.2. The Short-Run Performance

The short-run performance will be divided into IPOs and SPOs with the mentioned methodology in Chapter 3.1 regarding the Underpricing (U). Furthermore, SPOs (ALSs) will be analyzed with the variables Discounting (D) and Offering-day Return (R).

4.2.1. IPOs

Table 4 reports that the Colombian IPOs show an average Underpricing of 9,50% that come from 6 initial public offerings that were underpriced (54,55%) with an average of 19,04%, 4 that where overpriced (36,36%) with an average of 2,44% and only one company that was correctly priced (9,09%). This means that approximately almost 2 out of 3 times you will expect a non-negative return by investing in an IPO offering or that the probability that a single random IPO offering the expected outcome is a gain.

[5] The graph considers the dates of the official announcements of IPOs. For instance, the official announcement of the IPO of the firm "ISA" was the 27/11/2000 and it's first trading day was on the 09/02/2001.

IPOs	Underpriced	Overpriced	Correctly Priced	Total
Average	19,04%	-2,44%	0,00%	9,50%
p-value	(0,01)	(0,02)		(0,04)
Median	22,79%	-2,27%		5,83%
p-value	(0,03)	(0,13)		(0,75)
Min	5,83%	-3,96%		-3,96%
Max	31,75%	-1,24%		31,75%
N	6	4	1	11
%	54,55%	36,36%	9,09%	100,00%

Table 4: IPOs Underpricing.
Source: own illustration based on sample data

In addition, it is possible to note from Table 4 that the median of the underpriced IPOs is higher than the mean, representing that the distribution of the first trading day's return of the "successful" issuances are negatively skewed, hence represents that there are more frequent larger returns than 19,04% and a few with smaller returns (for the range of returns between 5,83% and 31,75%). On the other hand, considering the total IPO issuances, the median is lower than the mean, explaining that the distribution of the Underpricing (U) is positively skewed, hence represents attractiveness towards investors because in this way, they will expect frequent smaller returns than the mean but fewer large gains (for the range of returns between -3,96% and 31,75%). Also, considering the small sample size of IPOs the distribution cannot be confirmed to follow a normal distribution, therefore the evidence shown by the mean being strictly positive can't be trusted. In addition, takin into account the non-parametric test (sign test) there is not sufficient evidence to reject the null hypothesis of having the median of Underpricing (U) equal.

In addition, by considering the sample's interval, it is shown in Figure 24 that on 2007, 2010 and 2011 (the average Underpricing was 13,25%, 27,07% and 5,83% respectively) was evidenced Underpricing whereas in 2012 the Colombian IPO market was remarkably bearish because all of the IPOs that were announced in this year (3 overpriced IPOs and 2 out of 4 SPOs in 2012, and the other overpriced IPO was in 2007) were overpriced (average of 2,84%). Therefore, the successive deserted offering years (2013-2018) could be explained by this last matter and by the fact that there was a reduction from a 27,07% Underpricing to a 2,84% overpricing in a couple of years, hence this could have led investors to become reluctant to new IPOs.

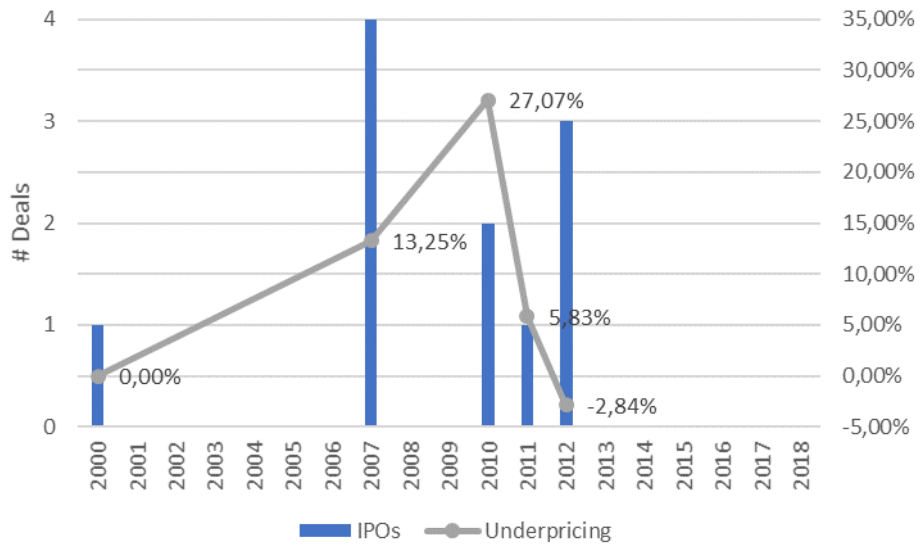

Figure 24: IPOs Underpricing between 2000-2018.
Source: own illustration based on sample data

4.2.2. SPOs

For the Seasoned Public Offerings, the analysis that relates to Underpricing (U) will be applied to both NLSs and ALSs, but for Discounting (D) and Offer-day Return (R) only ALSs were taken into consideration, as described in the short-run methodology.

- SPOs (NLSs & ALSs) Underpricing (U)

Table 5 shows that the SPOs in the Colombian market have a smaller average Underpricing with respect to IPOs, of 9,19% (IPOs: 9,50%), however, if we stop contemplating outliers (applying the 1,5 x Inter Quartile Range to calculate the upper and lower fences) the average gets quite reduced to 2,34%. The first average could be assumed to follow a normal distribution (considering that it's a large sample, $n \geq 30$), but there's not enough evidence to show that the mean is different from 0%. On the other hand, considering the non-parametric test (sign test) to the median, the data shows that with and without the outliers the median is significantly different from 0% with an alpha of 0,05, therefore data without outliers will be consider from now on. In addition, there were almost 2/3 underpriced offerings with an average of 4,43%, 8 issuances were overpriced (28,57%) with an average of 2,35% and one firm that was correctly priced (3,57%). With a higher probability (71,43%),

compared to IPOs, SPOs expect a non-negative return when investing in the announcement date.

	With Outliers				Without Outliers			
SPOs	**Underpriced**	**Overpriced**	**Correctly Priced**	**Total**	**Underpriced**	**Overpriced**	**Correctly Priced**	**Total**
Average	18,53%	-13,64%	0,00%	9,19%	4,43%	-2,35%	0,00%	2,34%
p-value	(0,04)	(0,26)		(0,19)	(0,00)	(0,00)		(0,00)
Median	4,80%	-2,73%		3,13%	4,65%	-2,64%		2,01%
p-value	(0,00)	(0,00)		(0,02)	(0,00)	(0,01)		(0,05)
Min	0,34%	-103,99%		-103,99%	0,34%	-4,55%		-4,55%
Max	179,18%	-0,03%		179,18%	9,84%	-0,03%		9,84%
N	23	9	1	33	19	8	1	28
%	69,70%	27,27%	3,03%	100,00%	67,86%	28,57%	3,57%	100,00%

Table 5: SPOs Underpricing.
Source: own illustration based on sample data

Moreover, like it happened for IPOs, Table 5 reports that the median of the underpriced offers is higher than mean, therefore there are more frequent larger returns than 4,43% and a few with smaller returns (for the range of returns between 0,34% and 9,84%), however the difference between the mean and the median is very short. On the other hand, considering the whole set without outliers, the distribution of Underpricing (U) is slightly skewed to the right, just like IPOs.

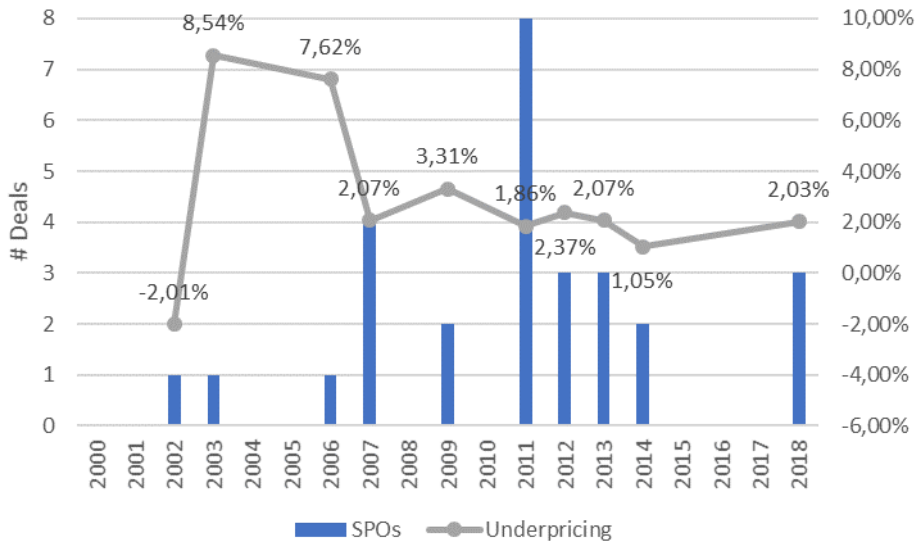

Figure 25: SPOs Underpricing between 2000-2018.
Source: own illustration based on sample data

In addition, by considering the sample's interval, it is shown in Figure 25 that Underpricing has been evidenced on average from 2003 until 2018 from a low of 1,05% to a high of 8,54% (except overpricing of 2,01% in 2002).

- ALSs Underpricing (U), Discounting (D) and Offer-day Return (R)

First, to let's make a recap and explain the meaning of the percentage of Underpricing, Discounting and Offer-day Return. The first, as it has been analyzed previously in this chapter, is the effect that can be seen when an investor acquires shares at the offer's price and then sees the respective profit at the end of the day, so if the value is positive it means that there is a gain for the investor because the value of the stock was underpriced. On the other hand, Discounting is an immediate effect that is seen on the offer's day, if the percentage is positive it means that the shares were offered at a discount with respect to the close of the previous day. Finally, the Offer-day Return captures the effect of disclosing information to the public by considering the subscription price as negligible, since it only considers the variation between the closing price prior to the announcement and the offer's day closing price.

Table 6 shows that there are 5 outliers for Underpricing (3,30x, 8,82x, twice 15,29x and 25,36x away from the IQR) and Discounting (2,62x, twice 7,19x, 12,75x and 20,97x away from the IQR), which in fact are very extreme. This can be explained by the fact that the offering had a very different value with respect to the quoting price, where for one case it was a perfect investment since the offering was underpriced by almost 30% and at the end of the day the price barely changed. On the negative cases, the only reason for which the stocks should have been subscribed would be when it was needed to gain more share ownership, in order to have more control of the company (BoD) because with a pure financial perspective, for the investor's perspective, it's a clear mistake to buy shares that are sharply overpriced. On the other hand, Offer-day Returns had 6 outliers that weren't as extreme as the previously mentioned (1,60x, 1,98x, 2,39x, 2,45x, 3,63x and 4,38x away from the IQR).

	Underpricing				
	Average	**Median**	**Min**	**Max**	**N**
With Outliers	9,95%	3,13%	-103,99%	179,18%	29
p-value	(0,22)	(0,04)			
W.O. Outliers	2,11%	2,01%	-4,55%	9,84%	24
p-value	(0,02)	(0,09)			

	Discounting				
	Average	**Median**	**Min**	**Max**	**N**
With Outliers	10,51%	3,62%	-103,99%	179,18%	29
p-value	(0,19)	(0,04)			
W.O. Outliers	2,77%	2,51%	-9,31%	13,53%	24
p-value	(0,02)	(0,09)			

	Offer-day Return				
	Average	**Median**	**Min**	**Max**	**N**
With Outliers	-0,56%	0,00%	-5,04%	4,76%	29
p-value	(0,12)	(0,06)			
W.O. Outliers	-0,30%	0,00%	-2,29%	1,46%	23
p-value	(0,13)	(0,09)			

Table 6: ALSs Underpricing, Discounting and Offer-day Return.
Source: own illustration based on sample data

Therefore, considering the data without outliers it can be seen that on average there's evidenced Underpricing of 2,11%, an average Discounting of 2,77% and a negative average of Offer-day Return of 0,30%.

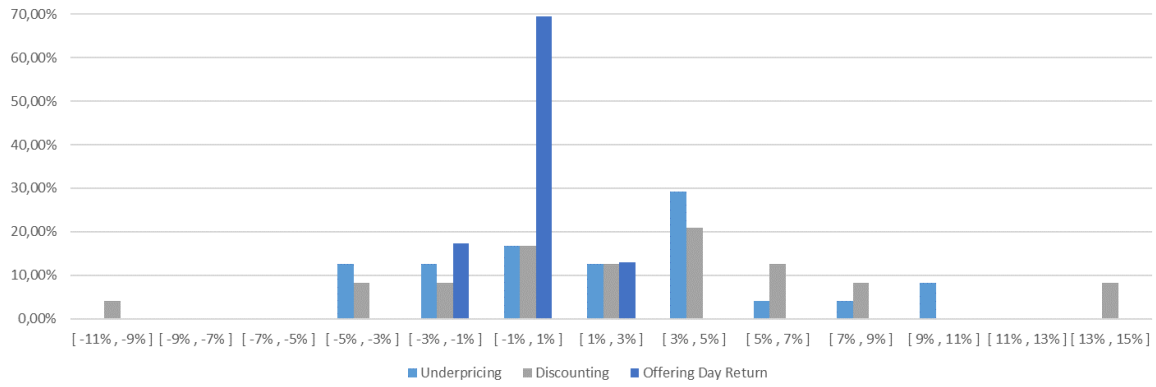

Figure 26: Frequency Distribution of Underpricing, Discounting and Offer-day Return (ALSs) from 2001 to 2018.
Source: own illustration based on sample data

With respect to statistical tests, it can be seen that the amount of data is strictly less than 30, so it couldn't be assumed that the data follow a normal distribution. Additionally, the graph of Figure 26 shows the frequency distribution function of Underpricing (U), Discounting (D) and Offer-day Return (R) between -11% and 15% with 2% separations (without considering outliers), and it seems that the Underpricing and Discounting have the same distribution and that also both of them seem to have positively skewed long tails, whereas the Offer-day Return has large frequency at zero (10 zero values, 43,48% of the values) with a frequency distribution around 70% between -1% and 1%.

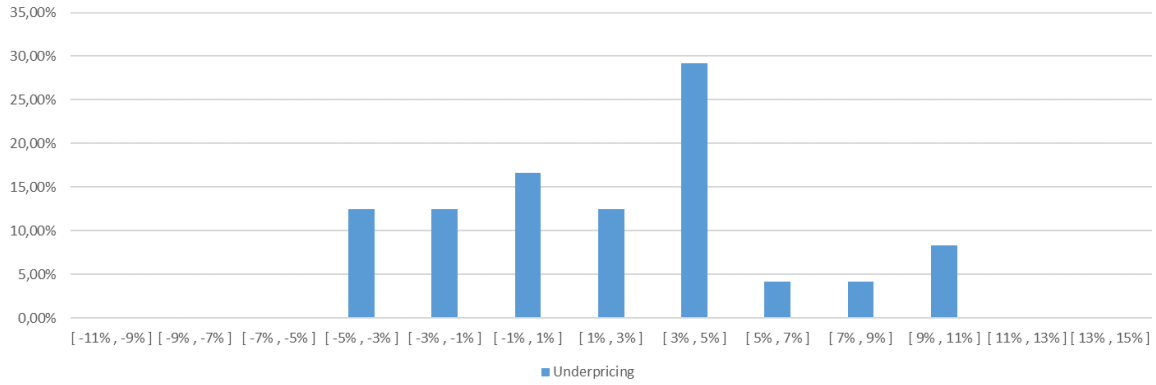

Figure 27: Frequency Distribution of Underpricing (ALSs) from 2001 to 2018.
Source: own illustration based on sample data

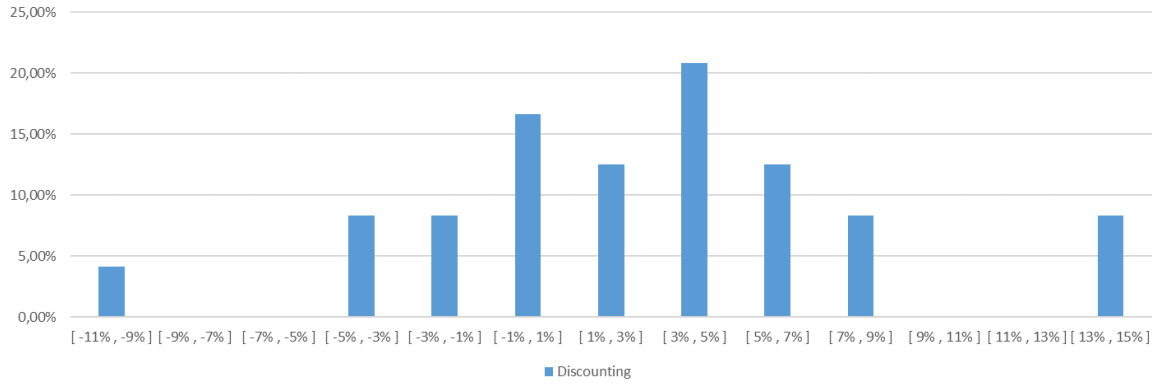

Figure 28: Frequency Distribution of Discounting (ALSs) from 2001 to 2018.
Source: own illustration based on sample data

Now, seeing the Underpricing in Figure 27 and Discounting in Figure 28 it can be seen more clearly that they do not seem to have the same distribution and that the frequency distributions do not have a resemblance of a normal distribution, therefore we could only consider the p-value of the non-parametric test with respect to the median. In addition, the Offer-day Return seemed to be roughly symmetrical in Figure 26, but when seen under a magnifying glass as shown in Figure 29 there's also not a clear resemblance of the behavior of a normal distribution, plus it is shown negative skewness, therefore as well as Underpricing and Discounting this variable should be analyzed with the median non-parametric test.

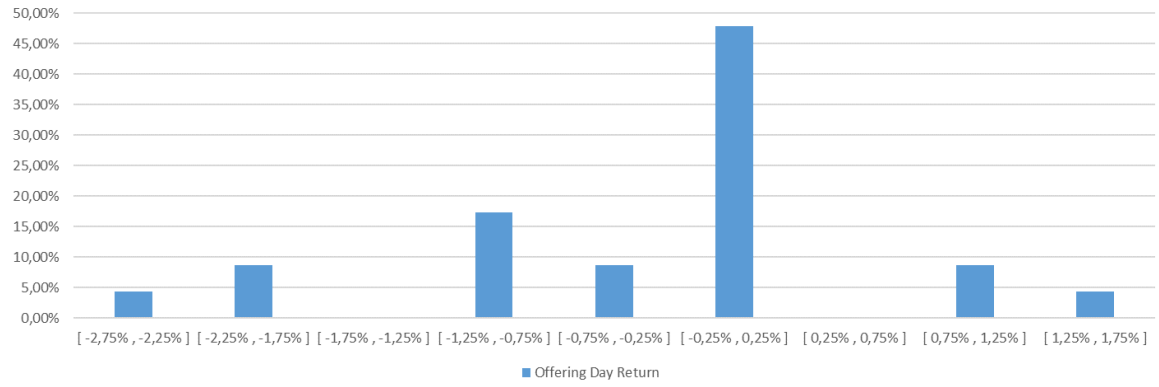

Figure 29: Frequency Distribution of Offering-day Return (ALSs) from 2001 to 2018.
Source: own illustration based on sample data

Consequently, there's not enough evidence to show that the medians of Underpricing (U) nor Discounting (D) are different from 0% with an α of 0,05 but it does with an α of 0,1, therefore both medians are positive. Likewise, the α of 0,05 is not enough for Offer-day Return (R) to reject the null hypothesis of having a median different to 0%, but the sign test can give enough evidence to show that the median is negative.

Conclusively, positive Underpricing and Discounting are evidenced, therefore applying to a SPO (ALS) issuance should be profitable, at least considering that the investor could have acquired the security at the offer's price and sold it at the announcement's day closing price. However, Offer-day Returns are evidenced to be negative, therefore, as well as Altinkilic (Altınkılıç & Hansen, 2003) concludes, it could be deduced that the negative effect is given by an inaccurate valuation of the security, or may be related to behavioral finance.

4.3. Long-Run Performance

The long-run performance will be divided into a retail-investor point of view regarding the raw returns and the other about abnormal returns, with a market-oriented (benchmark) perspective that will consider the cumulated benchmark-adjusted abnormal returns and the buy-and-hold benchmark-adjusted abnormal returns. In addition, the analysis will be carried over IPOs and SPOs following the methodology explained in Chapter 3.2.

In addition, there will be considered the assumption that stock returns for the event time window from months 1 until month 36, which are basically the sum of continuously compounded daily returns, are normally distributed. Therefore, the assumptions required to

perform the t-test and skewness adjusted t-test on the mean, and the non-parametric test (sign-test) on the median will be meet. The assumptions are demonstrated by MacKinley (MacKinlay, 1997) and are summarized by Schimmer et al. (Schimmer, Levchenko, & Müller, 2014).

4.3.1. Raw Returns

For the Raw Returns, first, it is seen in Figure 30 the trend of the CRRs and BHRRs for IPOs, whereas in Figure 31 the plot stands for SPOs. Both of the graphs are very similar, seems as if one line marginally offsets from the other, but for Figure 30 there is a wider difference evidenced between months 33 and 36, whereas for Figure 31 the discrepancy arises after a year and a half (month 18).

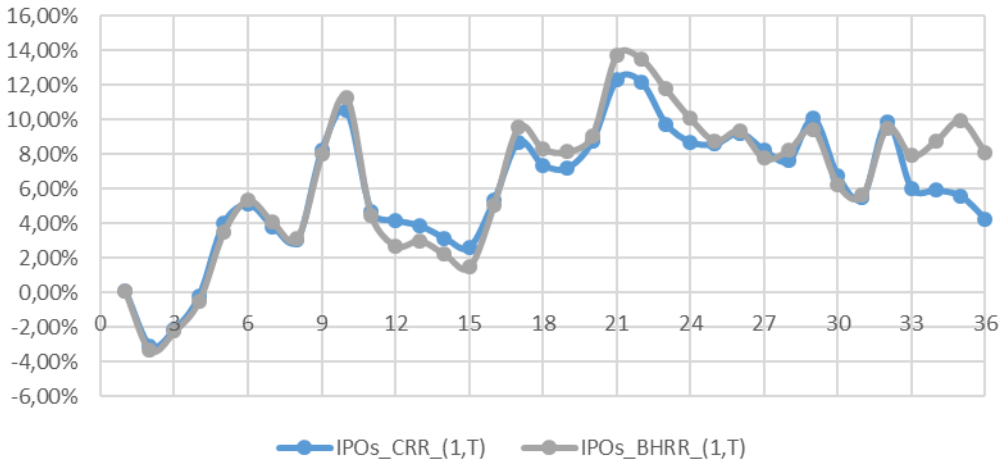

Figure 30: CRRs and BHRRs of IPOs.
Source: own illustration based on sample data

In addition, it can be perceived that for IPOs, for both calculations, CRRs and BHRRs, the only months in which these variables are below zero are between months 2 and 4, plus the monthly average of the cumulated raw returns is 5,99% and the monthly average of the buy-and-hold raw returns is 6,44%, where the first oscillated from -3,10% to 12,33% and the latter from -3,34% to 13,75%.

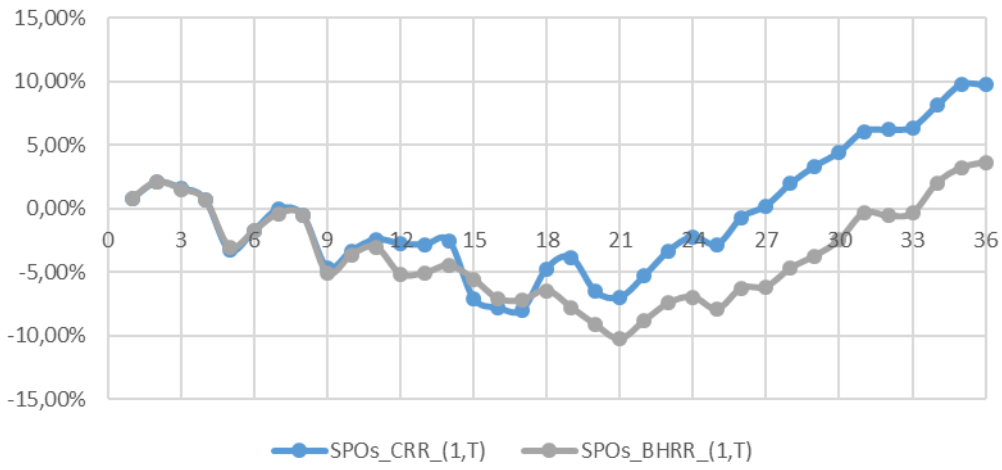

Figure 31: CRRs and BHRRs of SPOs.
Source: own illustration based on sample data

In contrast, CRRs and BHRRs for SPOs look to be negative since the fourth month until month 26 for the CRR curve and until month 33 for the BHRR line, like if a constant negative trend were to apply for the returns of these issuances since the beginning. Afterwards, there appears to be a constant positive tendency for roughly 15 months (since month 21) with a higher slope compared to the previous negative trend. Also, the monthly average of CRRs is -0,63% and instead, to some extent lower for the BHRRs, -3,56%, plus their returns varied from -8,01% to 9,76% for the first and from -10,88% to 3,64% for the latter.

T	N	IPOs							
		CRR		Median		BHRR		Median	
1	11	0,05%	(0,99)	-0,57%	(0,55)	0,05%	(0,99)	-0,57%	(0,55)
2	11	-3,10%	(0,52)	1,05%	(1,00)	-3,34%	(0,47)	0,16%	(1,00)
3	11	-2,17%	(0,69)	0,58%	(1,00)	-2,25%	(0,68)	-0,31%	(1,00)
4	11	-0,21%	(0,97)	-0,73%	(0,55)	-0,49%	(0,93)	-0,85%	(0,23)
5	11	4,00%	(0,47)	0,18%	(1,00)	3,49%	(0,54)	0,06%	(1,00)
6	11	5,09%	(0,48)	4,57%	(0,55)	5,33%	(0,50)	3,71%	(1,00)
7	11	3,82%	(0,64)	5,13%	(1,00)	4,05%	(0,61)	4,29%	(1,00)
8	11	3,02%	(0,71)	7,33%	(0,55)	3,13%	(0,70)	6,58%	(0,55)
9	11	8,27%	(0,32)	14,36%	(1,00)	8,04%	(0,34)	13,07%	(1,00)
10	11	10,51%	(0,29)	11,12%	(0,55)	11,29%	(0,28)	9,41%	(1,00)
11	11	4,67%	(0,64)	11,45%	(1,00)	4,47%	(0,66)	-1,01%	(1,00)
12	11	4,16%	(0,63)	8,46%	(1,00)	2,70%	(0,76)	4,58%	(1,00)
13	11	3,83%	(0,69)	7,78%	(1,00)	2,99%	(0,76)	4,58%	(1,00)
14	11	3,13%	(0,74)	7,44%	(1,00)	2,21%	(0,83)	5,10%	(1,00)
15	11	2,60%	(0,78)	2,18%	(1,00)	1,47%	(0,88)	-0,15%	(1,00)
16	11	5,32%	(0,61)	1,10%	(1,00)	5,04%	(0,66)	-1,24%	(1,00)
17	11	8,71%	(0,44)	1,46%	(1,00)	9,55%	(0,49)	-0,88%	(1,00)
18	11	7,37%	(0,53)	-4,51%	(1,00)	8,31%	(0,55)	-6,80%	(1,00)
19	11	7,21%	(0,55)	-4,09%	(1,00)	8,14%	(0,55)	-5,44%	(1,00)
20	11	8,75%	(0,46)	-3,42%	(1,00)	9,06%	(0,47)	-4,81%	(1,00)
21	11	12,33%	(0,34)	-2,53%	(1,00)	13,75%	(0,35)	-4,19%	(1,00)
22	11	12,18%	(0,35)	0,09%	(1,00)	13,51%	(0,37)	-1,45%	(1,00)
23	11	9,75%	(0,48)	-0,45%	(1,00)	11,77%	(0,44)	-4,54%	(1,00)
24	11	8,71%	(0,52)	-0,68%	(1,00)	10,06%	(0,49)	-2,33%	(1,00)
25	11	8,58%	(0,50)	1,54%	(1,00)	8,76%	(0,54)	-0,12%	(1,00)
26	11	9,23%	(0,48)	4,10%	(0,23)	9,35%	(0,50)	2,45%	(1,00)
27	11	8,24%	(0,52)	8,12%	(0,55)	7,75%	(0,55)	5,01%	(0,55)
28	11	7,63%	(0,58)	11,02%	(0,55)	8,24%	(0,55)	6,72%	(0,55)
29	11	10,05%	(0,44)	16,80%	(0,55)	9,43%	(0,45)	12,72%	(0,55)
30	11	6,71%	(0,61)	13,72%	(0,55)	6,22%	(0,62)	7,86%	(1,00)
31	11	5,48%	(0,69)	9,10%	(0,55)	5,61%	(0,68)	2,88%	(1,00)
32	11	9,83%	(0,47)	10,06%	(0,55)	9,52%	(0,48)	3,87%	(0,55)
33	11	6,00%	(0,72)	9,51%	(0,55)	7,92%	(0,58)	3,53%	(0,55)
34	11	5,91%	(0,74)	11,35%	(0,23)	8,78%	(0,56)	5,82%	(0,55)
35	11	5,56%	(0,76)	7,10%	(1,00)	9,94%	(0,56)	1,94%	(1,00)
36	11	4,25%	(0,82)	7,10%	(0,55)	8,08%	(0,62)	1,94%	(1,00)

* significant at 1%, ** significant at 5% and *** significant at 10%

Table 7: Mean and Median of CRRs and BHRRs for IPOs.
Source: own illustration based on sample data

Moreover, Table 7 and Table 8 report, for both IPOs and SPOs, the averages and medians of CRRs and BHRRs, and right next to them, their respective p-values for the event time window (months 1-36). Also its important to mention that for IPOs, from a cross-sectional perspective (for each month), there is not enough evidence to say that exists any month that has a median nor a mean of the cumulated raw returns, neither the buy-and-hold raw returns different from zero, however, there's considerable evidence, for both CRRs and BHRRs, to

reject the null hypothesis of having a mean and a median equal to 0% across the whole time window with an α of 0,05. Actually, the mean and median are positive with less than $\frac{\alpha}{2}$ (p-value 0,00 for both tests), consequently, investing in IPOs, when being considered without a benchmark, will give a gain for investors on average in the long-run in the Colombian market.

T	N	SPOs							
		CRR		Median		BHRR		Median	
1	33	0,77%	(0,38)	0,00%	(1,00)	0,77%	(0,38)	0,00%	(1,00)
2	33	2,05%	(0,25)	0,00%	(0,71)	2,11%	(0,24)	0,00%	(1,00)
3	33	1,62%	(0,36)	1,24%	(0,46)	1,53%	(0,37)	0,00%	(0,71)
4	33	0,71%	(0,74)	0,79%	(0,46)	0,68%	(0,74)	0,00%	(0,71)
5	33	-3,31%	(0,43)	0,00%	(0,86)	-3,03%	(0,45)	0,00%	(1,00)
6	33	-1,75%	(0,67)	3,35%	(0,36)	-1,77%	(0,66)	3,00%	(0,36)
7	33	-0,07%	(0,99)	0,62%	(0,36)	-0,41%	(0,92)	0,47%	(0,58)
8	31	-0,54%	(0,90)	1,23%	(0,57)	-0,58%	(0,90)	1,08%	(0,57)
9	31	-4,67%	(0,40)	0,00%	(0,71)	-5,09%	(0,37)	0,00%	(1,00)
10	31	-3,34%	(0,56)	3,29%	(0,71)	-3,66%	(0,53)	2,16%	(0,71)
11	31	-2,44%	(0,67)	0,00%	(1,00)	-3,04%	(0,60)	0,00%	(1,00)
12	31	-2,78%	(0,57)	0,00%	(0,71)	-5,15%	(0,37)	-3,68%	(0,26)
13	31	-2,86%	(0,57)	0,00%	(1,00)	-5,10%	(0,39)	-0,88%	(0,46)
14	30	-2,55%	(0,65)	-0,79%	(0,85)	-4,50%	(0,48)	-2,68%	(0,57)
15	30	-7,10%	(0,41)	0,00%	(1,00)	-5,57%	(0,46)	0,00%	(1,00)
16	30	-7,85%	(0,34)	0,00%	(1,00)	-7,11%	(0,35)	-1,42%	(0,57)
17	30	-8,01%	(0,34)	0,93%	(0,85)	-7,24%	(0,35)	0,10%	(0,85)
18	30	-4,76%	(0,51)	0,00%	(1,00)	-6,46%	(0,42)	0,00%	(1,00)
19	30	-3,86%	(0,55)	1,34%	(0,57)	-7,79%	(0,31)	0,00%	(1,00)
20	30	-6,56%	(0,34)	0,00%	(1,00)	-9,17%	(0,22)	0,00%	(1,00)
21	30	-7,02%	(0,30)	0,73%	(0,57)	-10,29%	(0,18)	-0,48%	(0,85)
22	30	-5,34%	(0,45)	-0,99%	(0,85)	-8,87%	(0,27)	-2,82%	(0,57)
23	30	-3,36%	(0,63)	0,00%	(1,00)	-7,47%	(0,36)	-2,60%	(0,57)
24	30	-2,24%	(0,74)	4,06%	(0,57)	-6,98%	(0,38)	-1,13%	(0,85)
25	30	-2,84%	(0,67)	1,01%	(0,09)***	-7,94%	(0,31)	-0,54%	(0,85)
26	30	-0,72%	(0,91)	3,02%	(0,57)	-6,28%	(0,42)	-2,09%	(0,57)
27	30	0,20%	(0,98)	6,01%	(0,09)***	-6,19%	(0,42)	0,00%	(1,00)
28	30	1,95%	(0,77)	6,43%	(0,18)	-4,72%	(0,54)	0,82%	(0,85)
29	30	3,32%	(0,62)	7,40%	(0,18)	-3,75%	(0,63)	1,55%	(0,57)
30	30	4,43%	(0,52)	9,30%	(0,34)	-2,51%	(0,76)	2,40%	(0,85)
31	30	6,07%	(0,40)	11,68%	(0,34)	-0,38%	(0,96)	4,73%	(0,57)
32	30	6,20%	(0,38)	11,48%	(0,09)***	-0,58%	(0,95)	1,95%	(0,85)
33	30	6,38%	(0,37)	7,75%	(0,18)	-0,38%	(0,96)	0,00%	(1,00)
34	30	8,10%	(0,28)	10,82%	(0,34)	1,99%	(0,83)	4,19%	(0,34)
35	30	9,76%	(0,19)	16,24%	(0,09)***	3,20%	(0,72)	5,30%	(0,57)
36	30	9,73%	(0,21)	17,32%	(0,04)**	3,64%	(0,70)	5,55%	(0,57)

* significant at 1%, ** significant at 5% and *** significant at 10%

Table 8: Mean and Median of CRRs and BHRRs for SPOs.
Source: own illustration based on sample data

On the other side, regarding SPOs, there's only supporting evidence for the CRRs to accept the alternative hypothesis of having a median different from zero for months 25, 27, 32, 35

with an α of 0,1 and in month 36 with an α of 0,05, thus proposing that the median is positive for half of the mentioned α, which explains the months where the cumulated raw returns start to become positive, as seen in Figure 32. Additionally, considering a cross-sectional angle, the BHRRs weren't able to give sufficient empirical evidence to demonstrate that the mean or the median were different from zero (in the same way as for IPOs), nevertheless, taking into account the whole time window (from month 1 to 36), the mean and the median of BHRRs can be contemplated as different from zero, therefore, the statistical significance states that the mean and the median are negative, hence, suggesting that in the long-run SPO investments with a long position produce a loss, even though there seems to be a positive trend after month 21(instead, for CRRs the p-values for the mean and the median were 0,44 and 0,24 respectively).

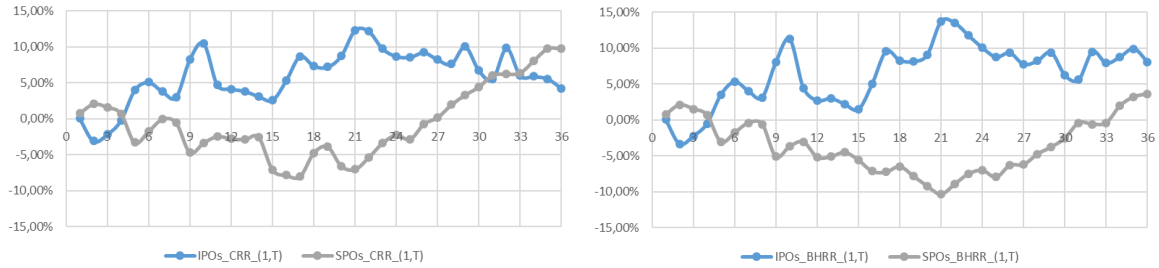

Figure 32: IPOs vs SPOs (both with CRRs and BHRRs).
Source: own illustration based on sample data

Finally, Figure 32 assists to perceive the difference of raw returns between IPOs and SPOs in the long-run (CRRs to the left and BHRRs to the right), where clearly IPOs outperform SPOs on the majority of months (considering a simple difference of every month mean gives an average of 6,62% for CRRs and 10,00% for BHRRs), for the first 4, for both of the methodologies considered, and for months 33-36 only for the CRRs, ergo reinforcing the results obtained that IPOs seem to perform better than SPOs (no statistical test was performed to prove this difference, presuming that IPOs and SPOs behave differently, thus have different variances).

4.3.2. Abnormal Returns

Before analyzing the Cumulated benchmark-adjusted Abnormal Returns (CARs) and Buy-and-Hold benchmark-adjusted Abnormal Returns (BHARs), there will be an overview on the three previously described market benchmarks (IGBC, VWvtI and the EWvtI). To have an

overall idea of what effect provides having the three benchmarks proposed, only the cumulated benchmark-adjusted abnormal returns (CARs) of both IPOs and SPOs will be plotted, besides the behavior is very similar for BHARs, hence plotting it will be redundant.

Moreover, in Figure 33, it can be appreciated that the three curves behave more or less in the same way, therefore the only difference is regarding the magnitude of the returns taking into account that the CARs that consider the value-weighted volume traded index (VWvtI) are always below the other two curves, thus implying that the mentioned index would be the one with the highest performance. On the other hand, the CARs that deal with the IGBC and the equal-weighted volume traded index (EWvtI) oscillate between each other's.

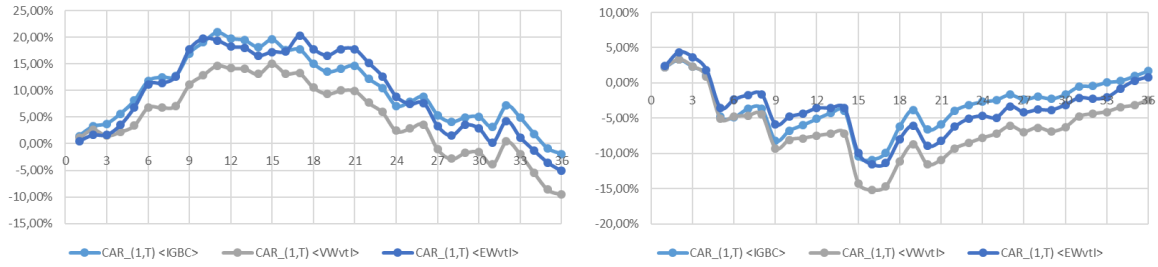

Figure 33: CARs of 3 different market benchmarks (left: IPOs, right: SPOs).
Source: own illustration based on sample data

Consequently, only one market will be considered hereafter in order to reduce the analysis' complexity, and the best decision should be the actual benchmark, given that EWvtI CARs can't be seen as a different curve from the IGBC CARs, therefore there's no contribution to the analysis, which is also explained by the fact that the benchmarks must be highly correlated, since the IGBC is the most representative stock exchange index created by the BVC, and the other is emulating an index considering the same overall firms (with equal weighting of the top 30 firms). Furthermore, although on average the VWvtI outperforms the IGBC, the emulated market was created considering the best volume traded stocks of every year, whereas the actual index didn't have future information to make this decision, thus the emulated index is considered unrealistic.

- Cumulated benchmark-adjusted Abnormal Returns (CARs)

Firstly, regarding the IPOs, it can be seen that the CARs, which incorporate the effect of the IGBC Index (market benchmark), have positive cumulated returns for almost every single month, except the last two, which implies that on average these CARs have a better

performance than that of the benchmark, as shown in Figure 34. Moreover, the chart exhibits a positive trend in the first 11 months regarding the CARs, connoting that the average of the abnormal returns (ARs) are positive, thus on average IPO returns are higher than the benchmark's, while since the first year until the end of the event time window the average tendency is negative, which means that the market outperformed the IPOs on average. Additionally, on average the CARs were of 10,15% plus their returns varied from -1,92% to 20,89%, which indicates that on average is better to invest in IPOs than on the Colombian's market index, but more specifically to go long in the first 11 months and following with a short position until the third anniversary of the offering.

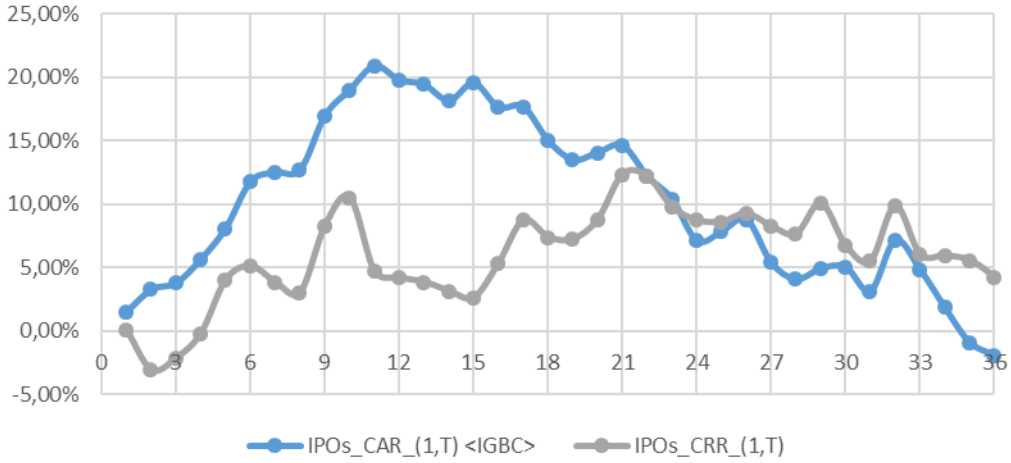

Figure 34: CARs vs CRRs of IPOs.
Source: own illustration based on sample data

On the other hand, the SPOs cumulated benchmark-adjusted abnormal returns are plotted in Figure 35 display almost the opposite behavior as IPOs, in fact in 77,77% of the occasions, between month 5 and month 32. They start with a positive slope until the uppermost of 3,29% of the second month, thereafter they go until it's bottom of -10,88% in month, therefore the market index gives sign of over performance with respect to these equity issuances. Afterwards, stunningly the trend reverses and recovers its losses by the end of the event time window where the cumulated returns hit back good news (1,71%). In addition, the average of the CARs is -3,22%, which implies that it's better to invest with a short position in SPOs for the first 16 months, whereas for the next 20 months on average it would be better to have a long position of the mentioned securities.

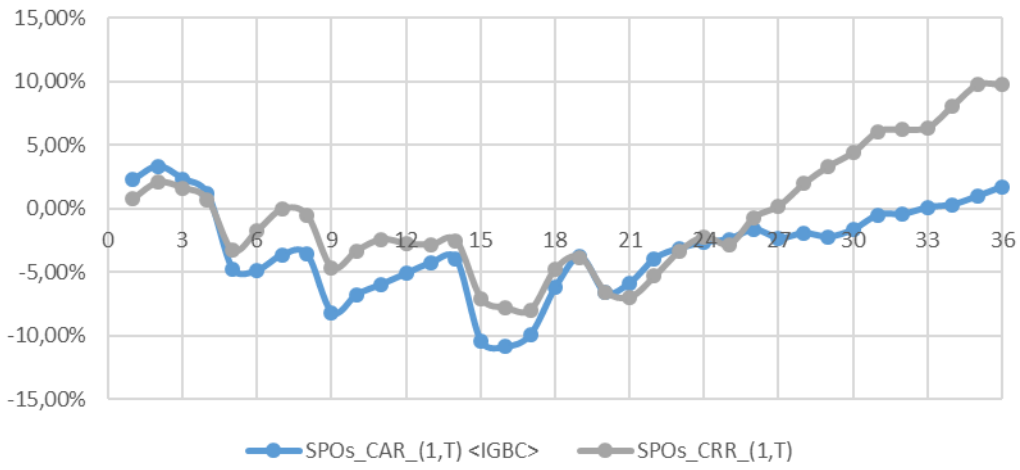

Figure 35: CARs vs CRRs of SPOs.
Source: own illustration based on sample data

Moreover, with a cross-sectional perspective, Table 9 reports, that for the first two months the SPOs CARs means are significantly different from zero, actually, positive with a skewness-adjusted p-value of 0,01 and 0,03 respectively, as well as their medians with 0,00 and 0,04 (considering that the tests are symmetrical). Afterwards, it can be proved with an alpha of 0,05 that the means of IPOs CARs are positive for months 6, 9-13 and 15, which includes the peak of 20,89% in month 11 and also are backed by the median's positive significance perceived in month 10. On the other hand, the SPOs have enough evidence to show that in the 9th month the average CARs are negative. Finally, from month 26-36 SPOs data reveals that the median is significantly positive with an alpha of 0,05, as it can be seen from Figure 35 in the positive trend.

T	N	IPOs				N	SPOs			
		CAR		Median			CAR		Median	
1	11	1,48%	(0,72)	-3,61%	(0,55)	33	2,25%	(0,02)**	3,26%	(0,00)*
2	11	3,25%	(0,52)	0,69%	(1,00)	33	3,29%	(0,06)***	3,82%	(0,08)***
3	11	3,76%	(0,47)	0,41%	(1,00)	33	2,31%	(0,22)	2,71%	(0,49)
4	11	5,65%	(0,28)	-2,39%	(1,00)	33	1,13%	(0,62)	2,52%	(0,73)
5	11	8,09%	(0,14)	-1,83%	(1,00)	33	-4,74%	(0,16)	1,86%	(0,73)
6	11	11,76%	(0,09)***	5,11%	(1,00)	33	-4,86%	(0,14)	-2,43%	(0,73)
7	11	12,49%	(0,14)	10,93%	(0,23)	33	-3,66%	(0,25)	1,11%	(0,49)
8	11	12,69%	(0,19)	12,79%	(0,23)	31	-3,62%	(0,35)	-0,22%	(1,00)
9	11	16,97%	(0,09)***	14,68%	(0,23)	31	-8,17%	(0,09)***	-2,93%	(1,00)
10	11	19,00%	(0,05)**	10,06%	(0,07)***	31	-6,78%	(0,17)	-3,82%	(0,72)
11	11	20,89%	(0,06)***	14,36%	(0,23)	31	-5,97%	(0,24)	1,13%	(1,00)
12	11	19,78%	(0,07)***	11,33%	(0,23)	31	-5,10%	(0,29)	-2,44%	(0,28)
13	11	19,42%	(0,07)***	11,46%	(0,55)	31	-4,28%	(0,38)	-2,77%	(0,72)
14	11	18,15%	(0,10)	12,55%	(0,55)	30	-3,96%	(0,48)	-5,87%	(0,86)
15	11	19,55%	(0,10)***	10,29%	(0,55)	30	-10,43%	(0,15)	-1,58%	(0,86)
16	11	17,63%	(0,13)	7,55%	(1,00)	30	-10,88%	(0,12)	1,79%	(1,00)
17	11	17,68%	(0,13)	8,23%	(1,00)	30	-9,90%	(0,19)	3,71%	(0,86)
18	11	15,01%	(0,21)	0,78%	(1,00)	30	-6,20%	(0,38)	6,36%	(0,58)
19	11	13,49%	(0,27)	1,46%	(1,00)	30	-3,82%	(0,54)	6,16%	(0,58)
20	11	14,06%	(0,23)	2,70%	(1,00)	30	-6,62%	(0,33)	4,23%	(0,36)
21	11	14,62%	(0,23)	5,65%	(1,00)	30	-5,85%	(0,38)	7,15%	(0,58)
22	11	12,18%	(0,35)	8,87%	(1,00)	30	-3,94%	(0,54)	8,47%	(0,36)
23	11	10,40%	(0,45)	-1,98%	(1,00)	30	-3,13%	(0,63)	10,67%	(0,20)
24	11	7,10%	(0,61)	3,28%	(1,00)	30	-2,68%	(0,68)	10,55%	(0,20)
25	11	7,83%	(0,55)	2,10%	(1,00)	30	-2,41%	(0,72)	11,58%	(0,20)
26	11	8,79%	(0,52)	8,08%	(1,00)	30	-1,66%	(0,79)	13,13%	(0,10)***
27	11	5,37%	(0,71)	7,16%	(1,00)	30	-2,35%	(0,72)	9,37%	(0,10)***
28	11	4,07%	(0,79)	9,63%	(1,00)	30	-1,95%	(0,75)	12,29%	(0,10)***
29	11	4,91%	(0,73)	18,14%	(1,00)	30	-2,24%	(0,73)	13,20%	(0,10)***
30	11	5,03%	(0,72)	23,92%	(1,00)	30	-1,65%	(0,80)	15,23%	(0,10)***
31	11	3,13%	(0,82)	21,79%	(1,00)	30	-0,51%	(0,91)	14,87%	(0,10)***
32	11	7,14%	(0,60)	20,58%	(1,00)	30	-0,44%	(0,91)	13,57%	(0,10)***
33	11	4,85%	(0,78)	21,60%	(1,00)	30	0,07%	(0,96)	15,05%	(0,10)***
34	11	1,85%	(0,94)	15,82%	(1,00)	30	0,30%	(0,99)	17,02%	(0,10)***
35	11	-0,91%	(0,92)	19,24%	(1,00)	30	0,96%	(0,95)	21,03%	(0,10)***
36	11	-1,92%	(0,86)	19,36%	(1,00)	30	1,71%	(0,88)	20,70%	(0,10)***

* significant at 1%, ** significant at 5% and *** significant at 10%

Table 9: Mean and Median of CARs for IPOs and SPOs.
Source: own illustration based on sample data

Now, considering a whole-time window point of view, there's considerable evidence to reject the null hypothesis of having a mean and a median equal to 0% of CARs for both IPOs and SPOs. On the one hand, IPOs CARs mean and median are positive with an α of 0,05, therefore on average investing in IPOs in a long position will give positive welfare when comparing it to the main benchmark and more specifically until the first 11^{th} month (complementing with the graphic results). On the other hand, the CARs of SPOs mean and median give sufficient proof to accept the alternative hypothesis of these being entirely negative (p-value 0,00). Hence, the behavior its almost the opposite as the IPOs CARs', which would imply that the best decision was to be jointly investing as previously mentioned

for IPOs, incorporating a long investment of SPOs until the second month, followed by a short stake until month 16 and then reverse it once again until the third year.

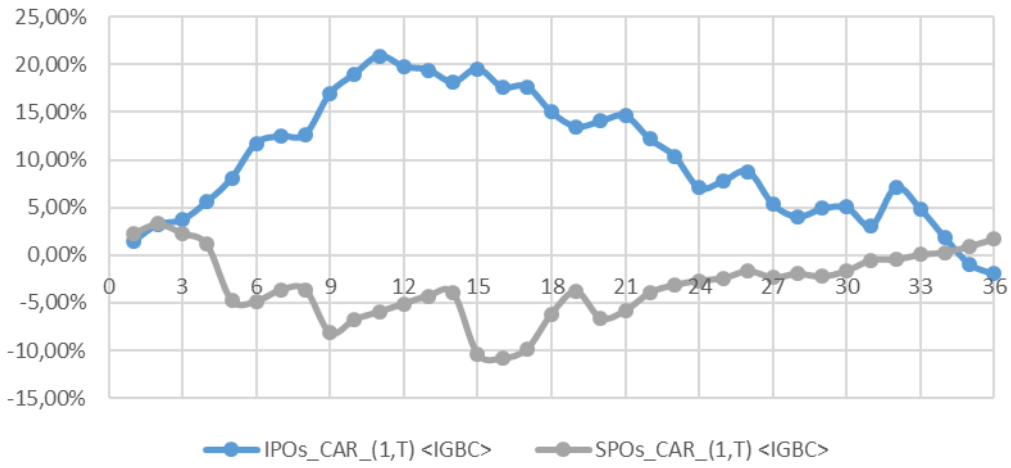

Figure 36: IPOs vs SPOs (CARs).
Source: own illustration based on sample data

Lastly, just to have an impression of the behavior of IPOs and SPOs together, it is seen in Figure 36 that clearly IPOs outperform SPOs with a detectable spread from the third month until month 34, consequently, investing in IPOs would be preferred to SPOs, however, considering that an investor can apply a short or a long position on the security, it should be considered a portfolio of both IPOs and SPOs.

- Buy-and-Hold benchmark-adjusted Abnormal Returns (BHARs)

Now, considering the BHARs for IPOs, it can be appreciated that there is more or less the same pattern that was exposed for CARs (Figure 34), Figure 37 shows on average a constant steep increment until the 10th month, but in this case there is seen a stationary behavior between months 11-17 and subsequently a more gradual negative trend until its lowest (0,35%).

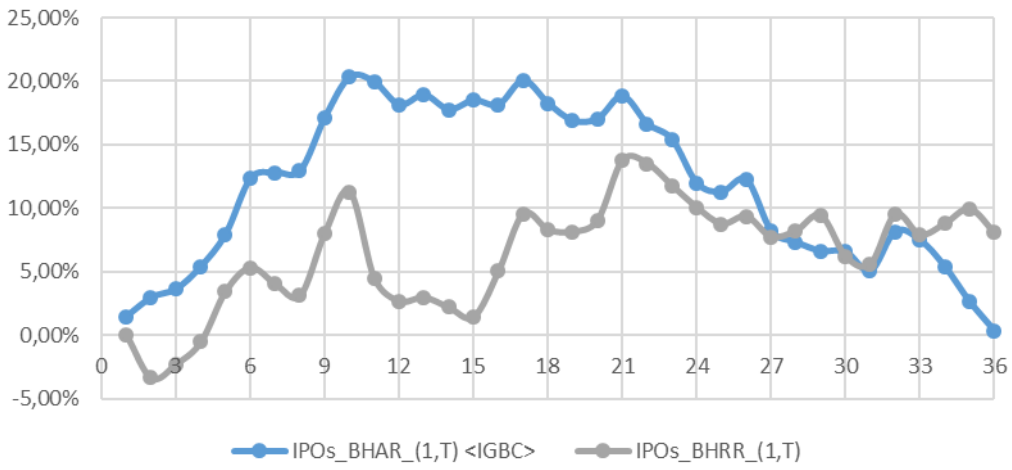

Figure 37: BHARs vs BHRRs of IPOs.
Source: own illustration based on sample data

Now, taking into consideration the buy-and-hold benchmark-adjusted abnormal returns, it can be noticed in Figure 38 that although the negative trend until month 16 resembles the one detected in the CARs analysis (see Figure 35), in the first chart the negative trend roughly ends by month 29, which can show graphically a wider difference to proof that SPOs underperform the benchmark market.

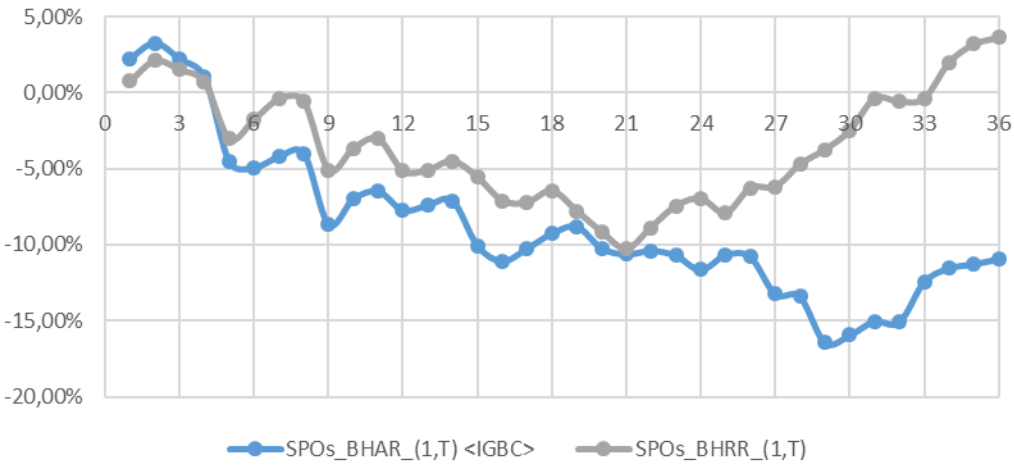

Figure 38: BHARs vs BHRRs of SPOs.
Source: own illustration based on sample data

Furthermore, it would be expected in tests for BHARs to detect abnormal returns with a greater degree than CARs, therefore the supplementary info that manifests with respect to the tests of CARs in Table 9 is the fact that it discards the significance of several months. For instance, on average IPO BHARs do not consider the mean to be positive for the 15th month, neither a median for the 10th month, as reported in Table 10. Likewise, for SPOs there's not

enough evidence to proof that the medians of the BHAR were positive for months 2, 26-28 and 32-33, while for the CARs the tests asserted the opposite.

T	N	IPOs				N	SPOs			
		BHAR		Median			BHAR		Median	
1	11	1,48%	(0,72)	-3,61%	(0,55)	33	2,25%	(0,02)**	3,26%	(0,00)*
2	11	2,96%	(0,54)	1,17%	(1,00)	33	3,26%	(0,07)***	3,63%	(0,16)
3	11	3,63%	(0,47)	0,48%	(1,00)	33	2,20%	(0,23)	2,80%	(0,49)
4	11	5,41%	(0,29)	-2,15%	(1,00)	33	1,02%	(0,64)	1,58%	(0,49)
5	11	7,96%	(0,16)	-2,09%	(1,00)	33	-4,56%	(0,16)	0,18%	(1,00)
6	11	12,34%	(0,10)***	3,70%	(1,00)	33	-4,93%	(0,14)	-2,77%	(0,49)
7	11	12,79%	(0,12)	9,49%	(0,23)	33	-4,21%	(0,19)	0,70%	(0,30)
8	11	12,92%	(0,18)	11,52%	(0,23)	31	-3,99%	(0,33)	-0,85%	(1,00)
9	11	17,12%	(0,10)***	13,87%	(0,23)	31	-8,65%	(0,08)***	-4,73%	(1,00)
10	11	20,30%	(0,04)**	8,85%	(0,23)	31	-6,98%	(0,18)	-2,11%	(1,00)
11	11	19,91%	(0,06)***	13,22%	(0,55)	31	-6,48%	(0,21)	1,15%	(1,00)
12	11	18,12%	(0,08)***	13,56%	(0,55)	31	-7,73%	(0,15)	-2,98%	(0,28)
13	11	18,90%	(0,07)***	13,09%	(0,55)	31	-7,39%	(0,18)	-4,43%	(0,72)
14	11	17,75%	(0,10)	14,79%	(0,55)	30	-7,11%	(0,27)	-4,85%	(0,86)
15	11	18,48%	(0,10)	12,26%	(0,55)	30	-10,05%	(0,17)	-2,51%	(0,86)
16	11	18,14%	(0,13)	7,81%	(1,00)	30	-11,07%	(0,12)	-2,42%	(0,86)
17	11	20,04%	(0,12)	6,92%	(1,00)	30	-10,24%	(0,19)	0,78%	(0,86)
18	11	18,24%	(0,16)	-0,35%	(1,00)	30	-9,26%	(0,26)	5,01%	(0,86)
19	11	16,89%	(0,19)	2,00%	(1,00)	30	-8,80%	(0,25)	4,02%	(0,36)
20	11	17,03%	(0,17)	3,45%	(1,00)	30	-10,22%	(0,20)	2,82%	(0,86)
21	11	18,81%	(0,16)	6,18%	(1,00)	30	-10,62%	(0,18)	6,26%	(0,86)
22	11	16,63%	(0,25)	6,40%	(1,00)	30	-10,39%	(0,22)	5,09%	(0,86)
23	11	15,40%	(0,30)	-2,73%	(1,00)	30	-10,71%	(0,23)	8,03%	(0,36)
24	11	11,96%	(0,39)	1,39%	(1,00)	30	-11,65%	(0,21)	8,14%	(0,20)
25	11	11,28%	(0,41)	0,28%	(1,00)	30	-10,67%	(0,26)	10,60%	(0,36)
26	11	12,22%	(0,37)	5,64%	(1,00)	30	-10,79%	(0,26)	9,63%	(0,20)
27	11	8,21%	(0,55)	8,21%	(1,00)	30	-13,23%	(0,19)	8,07%	(0,20)
28	11	7,31%	(0,61)	10,97%	(1,00)	30	-13,40%	(0,17)	9,82%	(0,20)
29	11	6,62%	(0,65)	20,00%	(1,00)	30	-16,42%	(0,14)	12,96%	(0,10)***
30	11	6,57%	(0,66)	25,41%	(1,00)	30	-15,94%	(0,17)	12,74%	(0,10)***
31	11	5,06%	(0,75)	22,37%	(1,00)	30	-15,02%	(0,20)	14,84%	(0,10)***
32	11	8,17%	(0,61)	20,96%	(1,00)	30	-15,09%	(0,22)	13,56%	(0,20)
33	11	7,48%	(0,63)	20,92%	(1,00)	30	-12,46%	(0,28)	14,22%	(0,20)
34	11	5,40%	(0,73)	16,61%	(1,00)	30	-11,54%	(0,31)	16,90%	(0,10)***
35	11	2,65%	(0,89)	20,25%	(1,00)	30	-11,27%	(0,33)	16,75%	(0,10)***
36	11	0,35%	(0,99)	9,95%	(1,00)	30	-10,93%	(0,36)	18,93%	(0,10)***

* significant at 1%, ** significant at 5% and *** significant at 10%

Table 10: Mean and Median of BHARs for IPOs and SPOs.
Source: own illustration based on sample data

Lastly, just to have an impression of the behavior of IPOs and SPOs together, it is seen in Figure 36 that clearly IPOs outperform SPOs with a detectable spread from the third month until month 34, consequently, investing in IPOs would be preferred to SPOs. However, considering that an investor can apply a short or a long position on the security, it should be considered a portfolio of both IPOs and SPOs.

In addition, comparing charts of Figure 36 and Figure 39, the sole discrepancy is seen in the last months, as the curves of the BHARs remain to be separated from each other, whereas

SPOs' CARs slightly over performed those of IPOs in the latest periods of the event time window.

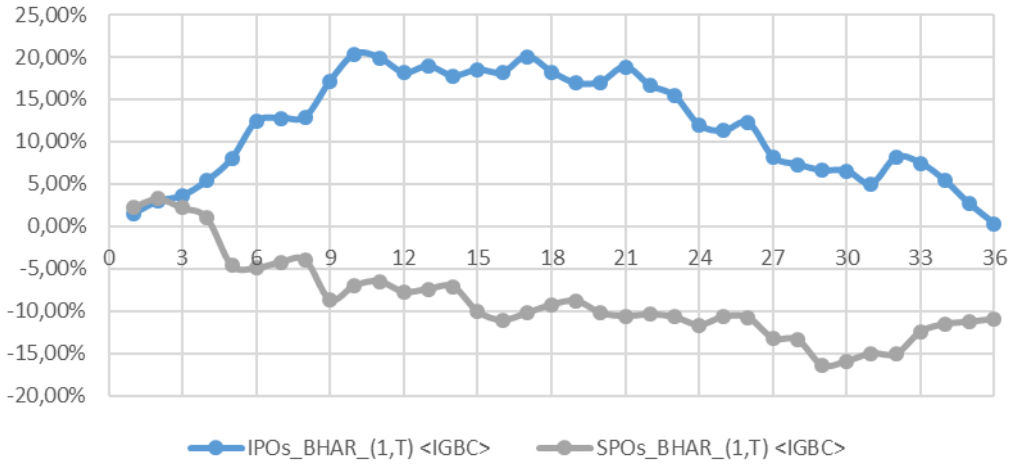

Figure 39: IPOs vs SPOs (BHARs).
Source: own illustration based on sample data

5. Conclusions & Future Improvements

The paper examined the equity issuances of IPOs and SPOs in the Colombian stock exchange during the period 2001 to 2018. Regarding the descriptive results of equity issuances, it can be concluded a set of facts, for example that there has been a lack of equity issuances for around two decades where the most appealing investments are spotted in the financial and the industrial sectors. In addition, the strategy for a firm to select the book building method give at least a 100% of subscription to the offerings, therefore success in a company's point of view. Also, the average ownership given was of 16,6% which was not evidenced a perceptible difference between IPOs and SPOs, as well as for the offer sizes, which were on average of 443 Mn USD for the first and 452 Mn USD for the latter equity issuances. Moreover, although the Equity Colombian market regarding IPOs and SPOs is undoubtedly inferior compared globally, there's a silver lining for the upcoming future, as Bloomberg noticed in 2018 an on-demand delivery startup operating in 7 Latin-American countries, "Rappi", reached the unicorn status within only three years since founded (Bloomberg, 2018).

The initial returns on the first trading day (Underpricing) for IPOs have averaged 9,5% while for SPOs considering outliers was lower, 9,19%, however, without outliers it averaged just 2,34%. Regarding the probability of not obtaining a loss in a single random issue offering, SPOs exceeded IPOs, with a 71,43% vs a lower 63,64% (first-day returns ≥ 0). In addition, in the last three years of IPO offerings (2010-2012), there was a reduction on the average first-day returns (from 27,07% to 5,83% and then to -2,84%) that may have affected investors behavior, therefore making firms uncertain to propose new IPOs, which can be explained by the next 6 years' offering's absence. On the other hand, SPOs since 2007 have shown a steady average of 2,11% on the Underpricing. In addition, it was evidenced positive Underpricing and Discounting for Already Listed SPOs, whereas the Offer-day Returns turned out to be negative, which may be related to behavioral finance or inaccurate security valuations.

Furthermore, to consider both, a professional and a retail investor point of view, the long-run examined a relationship with and without a market performance benchmark. Concerning the

benchmarks taken into account, the study demonstrated that there was a negligible added effect on considering emulated indexes, mainly due to the high correlation to the other market benchmark (IGBC). Moreover, the results of all the different approaches (considering variables of CRRs, BHRRs, CARs and BHARs) reasonably gave similar outcomes which were that there is not a clear trend of underperformance of IPOs nor for SPOs by the end of the third year, however, the study reveals that in the track to arrive to the long-run, there is evidence that shows that IPOs are over performing the market and having positive returns without considering a market benchmark specifically for the first 11 months, and for the case of SPOs the behavior is positive for the first two months, then becomes negative until month 16 and then reverses one more time until the end of the event time window.

For future considerations regarding Initial Public Offerings and Seasoned Public Offerings in the Colombian market, it would improve the power of the statistical tests to take into account a larger sample, for instance contemplating 30 or more issuances for each subgroup. Moreover, considering the exclusion of two and three extreme performers as documented by Drobetz et al. (Drobetz, Kammermann, & Wälchli, 2005), would improve results regarding a cross-sectional test over the event time window, however, this was not implemented taking into account the limited sample size. Also, the consideration of other Latin-American companies that could resemble in an index the Colombian market size markets would be suitable to discuss whether the analysis over one benchmark isn't biased.

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