Emerging Stock Markets and Performance of IPOs: An Application to the Regional Stock Exchange (RSES)

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Abstract. The goal is to assess the short-term profitability of IPOs as well as the middle/long-term evolution of this profitability. As a result, we evaluated short-term performance using both raw and adjusted beginning returns. Cumulative abnormal returns and buy-and-hold abnormal returns were used to calculate long-term performance, with abnormal returns adjusted for the market index and market model. We came to two primary findings by applying those methodologies to the eleven (11) IPOs that took place on the RSES between September 16th, 1998 and December 31st, 2011. To begin, our data demonstrate that RSES IPOs had a large initial undervaluation throughout this time, and that the modification of early market index returns had a negative influence on them. Then, in the medium/long run, holding these companies results in underperformance relative to the market portfolio. However, the long-term performance with buy-and-hold abnormal returns (BHARs) is less deteriorated than the one with cumulative abnormal returns (CARs). Those results imply that, buying IPOs at the offer price is profitable to investors in the short run and the holding of those stocks in the middle and long run must be done through the buy-and-hold investment strategy.

Keywords: IPOs, underperformance, sustainability, market.

INTRODUCTION

Study Context

Over the past two decades, Africa in general and Sub-Saharan Africa (SSA) in particular have experienced the proliferation of stock exchanges (Allen et al. 2011). Whereas before 1989 Africa had eight (08) stock exchanges [including five (05) in SSA and three (03) in North Africa] (Ordera, 2012), this number increased to nineteen (19) in 2007 (Yartey and Adjasi, 2007) and twenty-six (26) in 2008 (Afego, 2011). Kenny and Moss (1998) perceive the massive creation of stock exchanges in Africa as an equipment and a symptom of the process of economic reform underway on the African continent. According to them, functional financial markets are a channel for building confidence between businesses and investors and an indicator of the importance that the States attach to the private sector. Consequently, the financial markets enhance the functioning of the national financial system in general and that of the capital market in particular.

For Yartey and Adjasi (2007), the establishment of stock markets in Africa aims to move towards economic liberalization in the hope of increasing the quantity and quality of investment. They show, among other things, that the stock exchanges have contributed significantly to financing the growth of large companies in certain African countries such as Ghana, South Africa, Zimbabwe, and Mauritius. According to Bayala (2002), the proliferation of stock exchanges in Africa in recent years is far from being a fashion phenomenon because the economic issues that underlie it are real and relevant. In fact, according to him, states and communities see it as an adequate means of mobilizing and allocating savings on the one hand; companies
and investors find in the new stock exchanges a means of investment and financing in line with needs hitherto unmet on the other hand.

However Yartey and Adjasi (2007) note that the rapid expansion of stock markets in Africa does not mean that even the most developed African market is mature. In reality for Ordera (2012), the indicators of development of these markets show that the African stock exchanges are small; there are in particular some listed companies with a low market capitalization. He also notes that transactions in most of these markets are carried out on a few securities which represent the bulk of total market capitalization. Furthermore, according to him, the coordination and control exercised by the regulatory authorities are far from adequate; which leads among other things to serious information deficiencies. According to Afego (2011), the majority of the issues facing African stock markets stem from the multiplicity of issues confronting African economies in general:

- Illiquidity is maintained across the continent by investors who are mostly ill-informed and have a weak stock market culture; they view the holding of securities in the same way as land ownership (that is, as long-term investments); thus, they do not follow the market and do not trade regularly;
- The general public has very little awareness of how the market works and the procedures for participation;
- The ineffectiveness of the regulatory, informational and operational systems undermines the effectiveness of contract strengthening and the settlement of transactions;
- Despite the improved political and economic environment in most countries, popular perception is that it remains very volatile.

While it is true that the creation of the RSES was based on the need to overcome funding constraints, the observations of Asea (2004) are no less relevant. The dominance of commerce by Ivorian enterprises, according to him, is an issue with the RSES (companies from other member countries have not fully embraced trade). He believes that the creation of a regionally integrated stock exchange does not guarantee that it will be used efficiently or completely integrated into the markets. This conclusion is reinforced by the following two (02) observations: from September 16, 1998 until December 31, 2011,

- The number of companies listed on the RSES remained very low: it fluctuated between 36 (1 occurrence), 38 (4 occurrences), 39 (6 occurrences), 40 (1 occurrence) and 41 (1 occurrence);
- The RSES only registered eleven (11) new listed companies, including five (05) Ivorian companies.

Thus, the jagged development of the small number of listed companies and the small number of new IPOs on the RSES give rise to serious questioning about this first regional experience in general and particularly on the stock market behavior of new securities. Listed Hence the appropriateness of the investigations on the theme “Emerging Stock Markets and Performance of IPOs: an application to the Regional Stock Exchange (RSES)”.

**Research Issues**

The debate over IPOs has long crystallized around the determinants of the IPO decision. For Pagano et al. (1998) is one of the most important and least studied questions in corporate finance on the one hand. According to them, the finance writings are limited to describing the institutional aspects of the IPO decision without providing the essential factors that determine it on the other hand.

Furthermore, Bharath and Dittar (2006), in addition to considering the IPO as the most important event in the development of a business evolving in the private sphere, find this operation so complex that no single theory can integrate all its facets. Thus, according to them, the explanation of the listing decision can only be envisaged from the multitude of theories relating to this subject. They add in particular that this decision is based on a compromise between the benefits and the costs of the operation. That said, it obviously appears that a company will only launch an IPO as soon as the expected benefits exceed the expected costs. So far the debate seems much focused on the candidate company for the IPO when in reality it is not the only player at stake.

This is why Bayala (2002) is part of an approach to the IPO debate based on the actors of the process, namely the company and its shareholders, the financial, accounting, legal and stock market professions and investors. The shareholders aim to maximize the capital gains from the sale (through the total or partial sale of their shares); the presence on the coast gives the candidate company inexpensive financing opportunities and notoriety among others. The accounting and financial stock market professions, on the other hand, have a good reputation, large commissions and are prompting new IPOs. It appears that apart from the investors, the other actors in the process immediately get their satisfaction in the success of the IPO. Investors, on the other hand, wait for the post-IPO period to potentially benefit from their investments; still they need to get a significant amount of titles.

It therefore seems obvious that successfully completing the IPO is not an end in itself, but a precedent that fundamentally determines future IPOs and issues of company securities that would contribute to the sustainability of the market. The desire for success shared by the issuer and its various advisers would not be continually fulfilled in the absence of a large base of active investors. Said investors only permanently ask for the securities if the previous investments have borne fruit. It is therefore necessary to study the profitability of IPOs on the RSES. In other words,
it is a question of determining the capital gains (or losses) reaped by the investors of the IPOs on the RSES as well in the short as in the medium and long term. Thus, our problem comes down to the following main question:

✓ Do investors profit from their investments in IPOs on the RSES?

Two specific questions arise from this:
- What is the level of profitability of short-term IPOs on the RSES?
- How is this profitability evolving in the medium and long term?

Research Objectives
This study aims to study the profitability of IPOs on the RSES in the short as well as in the medium and long term. It will specifically deal with:

✓ Determine the profitability of IPOs during their first trading sessions on the BRVM;
✓ Determine the evolution of the profitability of IPOs in the medium and long term on the RSES.

Research Hypotheses
From the existing literature, the following hypotheses have been formulated.

- Investors make significant profits during the first IPO trading sessions on the RSES;
- Investors are experiencing a considerable deterioration in the profitability of IPOs in the medium and long term on the RSES.

LITERATURE REVIEW
Presentation of Some Theories Relating to the IPO
They are essentially based on the informational asymmetry between the parties involved. It is mainly about adverse selection, moral hazard and signaling, over-reaction, and pseudo timing of the market.

The Adverse Selection
This idea is developed by Akerlof (1970). The latter relies on the US auto market to link quality and uncertainty. For him, there are four types of cars: first-hand and used cars on the one hand and good and bad cars (known as “lemons” in the United States) on the other. A first-hand car may be good or bad, just like a used car. The buyer of a car does not immediately know whether it is of good or poor quality. Assuming that p is the proportion of good cars on the market, and q = 1 − p is that of bad cars, the buyer can get an idea a priori of the probability according to which his car can be good or bad quality respectively. Only using the car for a certain period of time will allow the owner to get a better idea of the quality of his vehicle. Thereafter the owner can assign new, more realistic probabilities of completion to each event (the car is good or not).

Moral Hazard and Signaling
According to Leland and Pyle (1977), information asymmetry is very pronounced in the financial market. In this context, insiders know the quality of the projects for which they are seeking funding, unlike outsiders, for whom it is very expensive or even impossible to verify the exact characteristics of said projects. As long as insiders can benefit from the dissemination of positive information about their projects, moral hazard prevents them from honestly transferring all information to other market players. The market value therefore reflects the average quality of the projects; if the market places and average value greater than the average project costs, the supply of mediocre projects will increase considerably.

Performance of IPOs: A Synthesis of Previous Work
Undervaluation of the Offer Price
✓ The finding of undervaluation

The pioneering work of Ibbotson (1975) explicitly points out that IPOs achieve positive initial returns due to undervaluation. Subsequent studies in the United States and in various countries around the world have revealed that these initial gains are not unique to the United States, but represent a phenomenon of international scope (Chaouani, 2009). This most well-known component of the IPO process is visible on all stock exchanges, albeit its scope varies by nation [Kiymaz (1999) and Ritter (1998)].

✓ Measures of undervaluation
- Gross initial returns

Undervaluation is defined as the difference between the offer price and the price at which the security is immediately traded on the market (Lungqvist, 2004) or the equilibrium price (Gajweski and Gresse, 2006).

\[ U = \frac{PE - PO}{PO} = \frac{PE}{PO} - 1 = \ln \left( \frac{PE}{PO} \right) \]

With:
PE exchange price or equilibrium price;
PO offer price.

For Lungqvist (2004), the extent of the undervaluation can be completely determined at the end of the 1st day of trading in established capital markets as well as in absence of restrictions on the extent of acceptable price movements.
But according to him, the equilibrium price generally takes a long time to establish itself in underdeveloped markets (or in the presence of restrictions on daily price volatility); in this case, it is preferable to measure the undervaluation over a relatively wider “time window”. According to him, this is even more necessary in markets where there is a time lag between the fixing of prices and the start of trade such as in Taiwan and Finland.

– Adjusted gross yields

Gajewski and Gresse (2006) identify three adjustment methods used in the literature:

✓ The initial yield adjusted to the yield of the market index:

\[
U_m = \frac{PE - PO}{PO} - \frac{I_1 - I_0}{I_0} = \frac{PE}{PO} - \frac{I_1}{I_0}
\]

\[
= \ln\left(\frac{PE}{PO}\right) - \ln\left(\frac{I_1}{I_0}\right) = U - \beta \ln\left(\frac{I_1}{I_0}\right)
\]

where \(I_1\) is the closing index for the market on the first day and \(I_0\) is the opening index for the same day (closing index for the previous day).

✓ Initial return adjusted for systematic risk:

\[
U_s = \frac{PE - PO}{PO} - \beta \frac{I_1 - I_0}{I_0} = U - \beta \ln\left(\frac{I_1}{I_0}\right)
\]

where \(\beta\) is the systematic risk of the security.

– The gross return adjusted to that of a benchmark portfolio:

\[
U_p = \frac{PE - PO}{PO} - R_p = U - R_p
\]

Where \(R_p\) is the performance of the benchmark portfolio.

Gajewski and Gresse (2006) review the empirical work on the undervaluation of IPOs in Europe, it emerges that:

✓ the most used measures are \(U\) and \(U_m\) and the calculations are made after one (1), five (5), seven (7) and thirty (30) day(s) or at equilibrium;

✓ assuming that market movements are too small to significantly influence returns, the majority of studies that gross first returns method, with the initial closing price serving as the equilibrium price;

✓ the most widely used adjusted returns method is \(U_m\) under the implicit assumption that the standardized systematic risk is one (01); however, adjusted yields are preferred when the period between the date of the first listing and the date of determination of the first equilibrium price is long (Perier, 1996);

✓ the limits of the second adjustment model (\(U_s\)) lie in the difficulty and bias of estimating the systematic beta risk (Kooli, 2000). Despite these limitations, this method can be interesting since the beta of the securities is in most cases different from that of the market portfolio. Therefore, the adjustment of the initial returns can also be done by the method of cumulative abnormal returns.

– Cumulative abnormal returns

Akctas et al. (2003), in a study conducted on the Istanbul stock market, determine the adjusted returns by the event study methodology. To identify short-term performance, they look at the cumulative abnormal returns of one (1), seven (7) and fifteen (15) day(s). This method will be used below among the long-term performance measures. The nuance is that here the periodicity is the day while lower it will be the month.

✓ Explanations for the undervaluation

• Hypothesis of the information superiority of certain investors over the issuing company

This theory is highlighted by Hanley (1993) in what she described as a phenomenon of partial price adjustment. For her, bookbuilding allows not only to extract information, but also to increase the offer price in return, although the price is expected to rise from the start of the trade. It notes in particular a positive correlation between the degree of price adjustment and the level of initial yields. The opinion of Benveniste and Spindt (1989) is confirmed by Hanley and Wilhelm (1995) and by Cornelli and Goldreich (2001) who note a strong institutional allocation of the most attractive IPOs.

Aggrawal et al. (2001) question this theory, because for them bookbuilding does not fully explain the excess returns garnered by institutional investors. Rajan (2004) for his part notes that institutional investors do not always capture post-IPO returns because of the rationing that they can also undergo.

• Assumption of information superiority of the issuer over investors

Here, insiders hold private information about the exact value of their business. In this situation, moral hazard exposes potential investors to a risk of adverse selection. It is then that insiders send signals to outsiders with large sums of money left on the table, because undervaluation leaves investors with “good taste” (Ritter, 1998). This allows issuers to follow a dynamic issuance strategy, selling the securities of subsequent issues at a relatively and abnormally higher price.

• Hypothesis of information asymmetry between the issuer and the banker: the agency model

Baron (1982) poses an agency problem between the advisory banker and the issuing company. The bank (agent) takes advantage of its informational advantage to exert less marketing efforts when its efforts are not observable and verifiable: the bank as the agent of the (principal) issuer is in a situation of moral hazard (Lungqvist, 2004). The banker takes advantage of his relatively consistent
understanding of market circumstances undervalue securities in order to provide less marketing attempts gain a good image with investors in general [Beatty and Ritter (1986) and Ritter (1998)] , and its own customers in particular (Cornelli and Goldreich, 2001). These advantages of the banker are mitigated by Boehmer and Fishe (2000) for whom the undervaluation benefits both the banker and the issuer because it promotes activity and liquidity in the post-IPO market.

Medium and long-term under performance

- The existence of medium and long-term underperformance

A common issue in IPO performance is the occurrence of unusually high yields in the near term and exceptionally low yields in the medium and long term (Ben Slimane, 2008); IPOs appear to be overpriced in the long run (Ritter, 1991). According to Espelaud et al. (1999), long-term underperformance has become a center of particular interest, especially since it is not unanimously accepted by the authors (Chaouani, 2009). While the phenomenon is well established in the American market, this is not necessarily the case in Europe (Gajeweki and Gresse, 2006). This perception is shared by Ritter (1998). This is illustrated in Table 1 below.

- Methods for determining medium/long-term profitability

In the literature, the event study methodology is used for determining long-term performance. This requires the calculation of the abnormal returns, the determination of the expected returns and the calculation of the Student’s t statistic for the significance tests on the abnormal returns.

- Calculation of abnormal yields

According to Barder and Lyon (1996), the convention in most studies on abnormal returns is the summation of daily or monthly returns over time. The abnormal return on security i in month t is then given by:

$$AR_{it} = R_{it} - E(R_{it})$$

With:

- $R_{it}$, the return on security i in month t; and
- $E(R_{it})$, the normal (or expected) return on security i in month t.

The accumulation of abnormal returns over T-month gives the Cumulative Abnormal Return (CAR) as follows:

$$CAR_{iT} = \sum_{t=1}^{T} AR_{it}$$

In addition, the difference between the purchase-conservation yield of security i on T-month and the expected (or expected) purchase-conservation yield of security i on T-month, gives the Abnormal Return Buy-and-Hold (BHAR) according to the following equation:

$$BHAR_{iT} = \prod_{t=1}^{T} [1 + R_{it}] - \prod_{t=1}^{T} [1 + E(R_{it})]$$

- Determination of abnormal yields based on expected return models

<table>
<thead>
<tr>
<th>Country</th>
<th>Author(s)</th>
<th>Number of IPOs</th>
<th>Years of Broadcasts</th>
<th>Yield Total Abnormal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Ljungqvist</td>
<td>145</td>
<td>1970–1990</td>
<td>-12,1%</td>
</tr>
<tr>
<td>England</td>
<td>Levis</td>
<td>712</td>
<td>1980–1988</td>
<td>-8,1%</td>
</tr>
<tr>
<td>Australia</td>
<td>Lee, Taylor et Walter</td>
<td>266</td>
<td>1976–1989</td>
<td>-46,5%</td>
</tr>
<tr>
<td>Austria</td>
<td>Aussenegg</td>
<td>57</td>
<td>1965–1993</td>
<td>-27,3%</td>
</tr>
<tr>
<td>Brazil</td>
<td>Aggrawal, Leal et Hernandez</td>
<td>62</td>
<td>1980–1990</td>
<td>-47,6%</td>
</tr>
<tr>
<td>Canada</td>
<td>Jog et Srivistava</td>
<td>216</td>
<td>1972–1993</td>
<td>-17,9%</td>
</tr>
<tr>
<td>Chile</td>
<td>Aggrawal, Leal et Hernandez</td>
<td>28</td>
<td>1982–1990</td>
<td>-23,7%</td>
</tr>
<tr>
<td>Korea</td>
<td>Kim, Krinsky et Lee</td>
<td>169</td>
<td>1985–1988</td>
<td>De +80,63% à +91,59%</td>
</tr>
<tr>
<td>United States</td>
<td>Loughran et Ritter</td>
<td>4753</td>
<td>1970–1990</td>
<td>-20,0%</td>
</tr>
<tr>
<td>Finland</td>
<td>Keloharju</td>
<td>79</td>
<td>1984–1989</td>
<td>-21,0%</td>
</tr>
<tr>
<td>Japan</td>
<td>Cai et Wei</td>
<td>172</td>
<td>1971–1990</td>
<td>-27,0%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Corhay, Stanley et Alireza</td>
<td>258</td>
<td>1992–1996</td>
<td>+41,71%</td>
</tr>
<tr>
<td>Singapore</td>
<td>Hin et Mahmood</td>
<td>45</td>
<td>1976–1984</td>
<td>-9,2%</td>
</tr>
<tr>
<td>Sweden</td>
<td>Loughran, Ritter et Rydqvist</td>
<td>162</td>
<td>1980–1990</td>
<td>+1,2%</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Bennaceur</td>
<td>16</td>
<td>1989–2006</td>
<td>-22%</td>
</tr>
<tr>
<td>WAEMU</td>
<td>Bayala</td>
<td>6</td>
<td>1998–2001</td>
<td>-31,17%</td>
</tr>
</tbody>
</table>

Source: Author.
Kothari and Warner (1997) give four models that are commonly used to predict anomalous returns on securities: Fama, market model, Capital Asset Pricing Model (CAPM), market index and French three-factor model (1993).

- Abnormal performance according to the Market-Adjusted Model

The abnormal return on security \( i \) in month \( t \) adjusted according to the market index is given by:

\[
MAR_{it} = R_{it} - R_{mt}
\]

With: \( R_{it} \), the return on security \( i \) in month \( t \); and \( R_{mt} \), the performance of a market index in month \( t \).

- Abnormal performance according to the Market Model

The abnormal return on security \( i \) in month \( t \) according to the market model is given by:

\[
MMAR_{it} = R_{it} - \alpha_i - \beta_i R_{mt}
\]

With \( \alpha_i \) and \( \beta_i \) the parameters estimated by regressing the monthly returns of security \( i \) on the monthly returns of a benchmark.

Abnormal performance following CAPM

The abnormal return on security \( i \) adjusted according to the CAPM in month \( t \) is:

\[
CAPMAR_{it} = R_{it} - R_{ft} - \beta_i [R_{mt} - R_{ft}]
\]

Avec \( \beta_i \) estimé à partir du CAPM [c’est-à-dire, de la régression de \( (R_{it} - R_{ft}) \) sur \( (R_{mt} - R_{ft}) \)].

- Following the three-factor model of Fama and French

The abnormal return on security \( i \) at month \( t \) adjusted according to the tri-factorial model is:

\[
FFMAR_{it} = R_{it} - R_{ft} - \beta_{1i} [R_{mt} - R_{ft}] - \beta_{12} HML_t - \beta_{13} SMB_t
\]

Where \( \beta_{1i}, \beta_{12} \) and \( \beta_{13} \) are estimated by the regression of the excess monthly returns of the title \( i \) on the excess monthly returns of the market portfolio, the book-to-market (HML) and the size factor (SMB).

- Student’s conventional t-statistic

It is used both for CARs and for BHARs.

\[
t = \frac{AR_T}{\sigma(AR_T)/\sqrt{n}}
\]

With:

\( AR_T \) The average of the abnormal returns; and \( \sigma(AR_T) \) is their standard deviation for the n-titles of the sample.

- Skewness-adjusted t-statistics

Barber and Lyon (1997) note that the purchase-conservation yields are positively imbalanced and this positive imbalance biases the t-statistics. Hence the use of the adjusted t statistic when yields are based on the conservation purchase method.

\[
t_{sa} = \sqrt{n} \left( S + \frac{1}{3} \tilde{\gamma} S^2 + \frac{1}{6n} \tilde{\gamma} \right)
\]

\[S = \frac{\overline{AR_T}}{\sigma(AR_T)} \tilde{\gamma} = \frac{\sum_{i=1}^{n} (AR_{it} - \overline{AR_T})^3}{n\sigma(AR_T)^3}\]

With \( \tilde{\gamma} \) the coefficient of skewness estimator and \( \sqrt{n} S \) the conventional t-statistic.

**METHODOLOGICAL APPROACH**

**Description of Data**

The stock market prices and composite RSES index values utilized in this study are from the RSES database. Other details, such as the IPO dates, offer pricing, overall sum of shares offered & initial listed dates, is obtained from public announcements published by the candidate businesses (OPV in particular) for the IPO. On the stock market, either by the RSES or by the “CREPMF”. Determining the undervaluation rate, which requires the first prices and stated offer prices of the shares, presents two issues: the size of the computation window as well as the offer price to be utilized in instances where there is more than one. Indeed, Ndong rejects Fama’s (1970) notion of market information efficiency in the context of the RSES (2007). Consequently, the prices of the shares listed on this stock exchange would not quickly integrate all the information available. As a result, at the end of the first trading day, the values of freshly listed shares on the BRVM would not systematically adjust with all available information.

This imposes a somewhat narrow computation window for calculating starting yields. This option is bolstered by Lugqvist (2004), who observes that in established markets and in the absence of price fluctuation limits, the full level of underpricing may be determined by the conclusion of the first day of trading on securities. On the other hand, take longer to balance in growing markets and in the presence of price fluctuation regulations. This is why, in the context of this study, we employ a selection of 15 sessions since, at the conclusion of the 15th session, 06 of the 11 titles had recorded the same price across three consecutive sessions with exchanges, indicating a relative price stability. For each of the shares with more than one offer price (SONATEL, ONATEL and BOABF), the highest offer price is used. Furthermore, the reference price is utilised for ETIT rather than the offer price, which we could not have.

For the determination of long-term yields, the latest monthly prices are used; the actions selected for the study of long-term performance are those that have been at least five (05) years on the stock market [or sixty (60) months]. The titles concerned are SNTS, SIVC, PALC, ABJC, BOAB, NEIC, BOAN, and ETIT. The RSES Composite Index (RSES
Cp) values are also collected for each month over the study period. These stock prices and the RSES composite index are loaded into the Excel spreadsheet to calculate the 60 monthly returns for each share and the composite indicator’s 160 monthly returns.

**Determination of Short-term IPO Yields**

**Gross Initial Yields**

This process mentioned by Gajewski and Gresse (2006), and Ljungqvist (2004) is used in particular by Ikoku (1998) and Arosio et al. (2000). Here, the gross initial yield (Uit) of share i on day three after the IPO am given by the following equation:

\[ U_{it} = \frac{P_{it} - PO_i}{PO_i} = \frac{P_{it}}{PO_i} - 1 = \ln \left( \frac{P_{it}}{PO_i} \right) \]

With:

- \( U_{it} \): The gross initial yield of the action i on day t.
- \( P_{it} \): The listed share price i on day t.
- \( PO_i \): Share offer price i.

**Gross Returns Adjusted to the Market Index**

This method has the advantage of taking into account the normal return (a benchmark or a benchmark portfolio) in determining the rate of undervaluation of the securities. Thus, the gross returns of share i adjusted to the market index are determined by the following relationship:

\[ U_{ait} = \frac{P_{it} - PO_i}{PO_i} - \frac{I_t - I_{t-1}}{I_{t-1}} = \frac{P_{it}}{PO_i} - 1 - \frac{I_t}{I_{t-1}} \]

With:

- \( U_{ait} \): The gross return on equity i adjusted to the market index on day t.
- \( P_{it} \): Share price i on day t.
- \( PO_i \): The offer prices of the share i.
- \( I_0 \): The market opening index on the day of introduction.
- \( I_1 \): The market closing index on the day of introduction.

**Determination of Medium and Long Term Yields**

**The Cumulative Abnormal Returns**

The abnormal cumulative returns determined according to the market index will be distinguished from those determined according to the market model.

**Step 1: Calculating Gross Monthly Returns**

It’s about determining the gross monthly stock return as well as the market index.

- **Gross monthly returns on share i in month t (R_{it})**

Gross monthly stock returns are determined from the following relationship:

\[ R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \]

With:

- \( P_{it} \): The share price i at month t.
- \( P_{it-1} \): The share prices i in month t – 1;

- **Gross monthly returns of the market index (R_{mt})**

The gross monthly returns of the market index are determined from the following relationship:

\[ R_{mt} = \frac{I_t - I_{t-1}}{I_{t-1}} \]

With:

- \( I_t \): It is the market closing index for month t.
- \( I_{t-1} \): The market closing index for month t – 1.

**Step 2: Determination of Market-Adjusted Abnormal Returns (AR_{it})**

According to Kothari and Warner (1997), equity returns can be adjusted to the market index. Thus, the return adjusted to the stock market index i in month t is given as follows:

\[ AR_{it} = R_{it} - R_{mt} \]

With:

- \( R_{it} \): The gross return on share i in month t.
- \( R_{mt} \): The gross return of the market index in month t.

**Step 3: Calculate Average Adjusted Monthly Returns**

The monthly stock returns are obtained by the simple arithmetic average of the adjusted monthly returns of the different stocks in the sample according to the following relationship:

\[ \bar{AR}_t = \frac{1}{n} \sum_{t=1}^{n} AR_{it} \]

With:

- \( \bar{AR}_t \): The average abnormal return of the n shares of the sample in month t.
- \( AR_{it} \): The abnormal returns of the action i at month t.
- \( n \): Represents the number of actions in the sample.

**Step 4: Determination of the Cumulative Monthly Abnormal Returns**

The cumulative abnormal profitability of the actions between month q and month s is given by the following relationship:

\[ CAR_{q,s} = \sum_{t=q}^{s} \bar{AR}_t \]
Thus, the abnormal cumulative profitability of the n actions in the sample between the first month and the Tenth month is given by the following relationship:

$$\text{CAR}_{1,T} = \sum_{t=1}^{T} \overline{AR}_t$$

### Step 5: Determination of Student’s t-statistic

The t statistic is calculated by dividing the average of the abnormal cumulative returns by the standard deviation of the average monthly abnormal returns, as indicated by the following relationship:

$$t_{\text{CAR}_{1,T}} = \frac{\text{CAR}_{1,T}}{\sigma(\overline{AR}_t) \sqrt{\overline{n}_t}}$$

With:
- $\text{CMAR}_{1,T}$, the cumulative abnormal average returns of the shares over the first T-months;
- $n_t$ The number of IPOs in month t;
- $\sigma(\overline{AR}_t)$ The standard error of the average abnormal monthly returns;
- $\overline{AR}_t$ for the n stocks in the sample.

In contrast to Warner and Kothari (1997), who advocates calculating standard deviations using pre-event data, Barber and Lyon (1997) believe that this approach exacerbates the bias of novel introduction. Furthermore, there is no pre-event stock market data in the context of IPOs. Thus, the statistic t will be computed using the formulas developed by Ritter (1991), Miloud (2002), and Kooli and Suret (2001):

$$t_{\text{CAR}_{1,T}} = \frac{\text{CAR}_{1,T} \cdot \sqrt{\overline{n}_t}}{\sqrt{\text{Var} + 2 \cdot (t + 1) \cdot \text{Cov}}}$$

With:
- Var the mean of the variances of $AR_{it}$ it over the period studied;
- Cov the first-order auto-covariance of $\overline{AR}_t$.

### Cumulative Market Model Abnormal Returns (CMARs)

The difference with CARs is in the calculation of normal yields, which also influences the determination of abnormal yields. Indeed, returns adjusted to the market index are predicated on the implicit assumption that assets’ systematic risk is the same as the benchmark’s. This hypothesis is relaxed by Kothari and Warner (1997) who propose, among other things, the use of the market model for the determination of abnormal returns.

### Step 1: Determine the Expected (Normal) Returns of the Securities

This step consists of regressing the gross returns of the market index on the gross returns of the securities following the market model proposed by Sharpe (1964). Thus, the return on share i in month t is given as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

With:
- $R_{it}$ The return on share i in month t;
- $R_{mt}$ The return on the market index in month t;
- $\alpha_i$ The autonomous performance of the security (regardless of the market index) i;
- $\beta_i$ The systematic risk (volatility) of security i relative to the market index;
- $\epsilon_{it}$ The error term related to title i for month t.

### Step 2: Determine Abnormal Yields

Abnormal returns are the residuals of the market model. According to Kothari and Warner (1997), the abnormal return on action i at month t is given by:

$$\text{MAR}_{it} = R_{it} - \hat{R}_{it} = \epsilon_{it}$$

With:
- $\text{MAR}_{it}$ The abnormal monthly return on action i in month t;
- $R_{it}$ The gross return on share i in month t;
- $\hat{R}_{it}$ The estimated yield of action i in month t.

### Step 3: Calculate Average Abnormal Monthly Returns

The monthly stock returns are obtained by the simple arithmetic mean of the abnormal monthly returns of the different stocks from the following relation:

$$\overline{\text{MAR}}_t = \frac{1}{n} \sum_{i=1}^{n} \text{MAR}_{it}$$

With:
- $\overline{\text{MAR}}_t$ The average abnormal return of the n shares of the sample in month t;
- $\text{MAR}_{it}$ Abnormal return on action i at month t;
- n Represents the number of actions in the sample.

### Step 4: Determine the Cumulative Abnormal Monthly Returns

The cumulative abnormal profitability of securities between month q and month s is given by the following relationship:

$$\text{CAR}_{q,s} = \sum_{t=q}^{s} \overline{AR}_t$$

Thus, the abnormal cumulative profitability of the securities between month 1 and month T is given by the following relation:

$$\text{CAR}_{1,T} = \sum_{t=1}^{T} \overline{AR}_t$$
Step 5: Determination of Student’s t-statistic
The null hypothesis assumes that the average abnormal cumulative returns are zero

\[ H_0: CAR_{1,T} = 0 \]

\[ t_{CAR_{1,T}} = \frac{CAR_{1,T}}{\sigma(AR_t) \sqrt{n_t}} \]

With:
- \( CMAR_{1,T} \): The abnormal returns accumulated over the first T-months;
- \( \sigma(MAR_t) \): The standard deviation of the average monthly abnormal returns of the n stocks in the sample.

Specifically, the Student t statistic is defined as follows:

\[ t_{CMAR_{1,T}} = \frac{CMAR_{1,T} \times \sqrt{n}}{\sqrt{T \times Var + 2 \times (t + 1) \times Cov}} \]

With:
- Var the average of the variances of \( MAR_{it} \) it over the period studied;
- Cov the first-order auto-covariance of \( MAR_t \).

Abnormal Securities Returns
The abnormal buy-keep returns for share i on T-month are given by the following equation:

\[ BHMAR_{iT} = R_{iT} - \hat{R}_{iT} \]

\[ BHMAR_{iT} = \left[ \prod_{t=1}^{T} (1 + R_{it}) - 1 \right] - \left[ \prod_{t=1}^{T} (1 + \hat{R}_{it}) - 1 \right] \]

With:
- \( R_{it} \): The gross monthly return on share i in month t;
- \( \hat{R}_{it} \): The estimated monthly return on share i in month t.

The following relative wealth measure of Ritter’s ratio (1991) is formulated as follows:

\[ WMR_i = \frac{\prod_{t=1}^{T} (1 + R_{it})}{\prod_{t=1}^{T} (1 + \hat{R}_{it})} \]

With:
- \( WMR_i \): Is the relative richness linked to the conservation of the action i over T months;
- \( R_{it} \): The return on share i in month t;
- \( \hat{R}_{it} \): The normal return on share i in month t.

The relative wealth linked to the IPO portfolio is given by:

\[ WR = \frac{1}{n} \sum_{i=1}^{n} WR_i \]

With n the number of sample IPOs.

Average Abnormal Buy-Keep Returns
The average abnormal buy-keep returns of the \( n_i \) stocks in the sample for T months are given as follows:

\[ BHMAR_T = \sum_{i=1}^{n} \frac{1}{n} BHMAR_{iT} \]

T Statistics
The null hypothesis stipulates that the BHMARs for all the companies in the sample over T-months are zero:

\[ H_0: BHMAR_T = 0 \]

The adjusted t-statistic of skewness proposed by Lyon et al. (1999) is given by:

\[ t_{sa} = \sqrt{n} \left( S + \frac{1}{3} \gamma S^2 + \frac{1}{6n} \hat{\gamma} \right) \]

\[ S = \frac{BHMAR_T}{\sigma(BHAR_T)}, \hat{\gamma} = \frac{\sum_{t=1}^{T} (BHMAR_{it} - BHMAR_T)^3}{n \sigma(BHAR_T)^3} \]

With \( \hat{\gamma} \) the skewness coefficient estimator and vn S the conventional t-statistic;
- T = 6, 12, 18, 24, 30, 36, 48, 54, 60 months;
- \( BHMAR_T \): The simple arithmetic mean of BHMAR\( _T \);
- \( \sigma(BHAR_T) \): The standard deviation of the BHMAR\( _T \) calculated according to the different values of T;
- \( n_i \): Number of IPO securities of the period.

PRESENTATION AND INTERPRETATION OF RESULTS

Short-term Performance Results
Gross initial yields
The price differences (compared to the offer prices) per session and per security shown in Table 2 give rise to various observations.

First of all, with regard to standard deviations, a greater disparity in rate differentials is noted between the different titles over the sessions (minimum 15.38% and maximum 33.86%) compared to the contrast observed of a session to another for the same title (minimum 2.10% and maximum 33.56%). This assessment remains valid with the averages.

The rate of undervaluation is very disparate from one action to another (minimum 6.95% and maximum 72.21%) while the gap between the different sessions is not as great (minimum 22.38% and maximum 28.41%).
Table 2. Evolution of price differences compared to the offer price from the first to the sixth trading session (in percentage).

<table>
<thead>
<tr>
<th>Meeting</th>
<th>SNTS</th>
<th>SIVC</th>
<th>PALC</th>
<th>ABJC</th>
<th>NEIC</th>
<th>BOAB</th>
<th>BOAN</th>
<th>ETIT</th>
<th>ONTBF</th>
<th>BOAC</th>
<th>BOABF</th>
<th>Moyenne</th>
<th>Ecart-Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1</td>
<td>12.82</td>
<td>66.58</td>
<td>33.33</td>
<td>14.29</td>
<td>15.38</td>
<td>7.23</td>
<td>21.24</td>
<td>20.48</td>
<td>6.44</td>
<td>24.20</td>
<td>24.20</td>
<td>22.38</td>
<td>15.88</td>
</tr>
<tr>
<td>Session 2</td>
<td>12.82</td>
<td>79.00</td>
<td>33.33</td>
<td>7.14</td>
<td>15.38</td>
<td>7.23</td>
<td>21.21</td>
<td>20.48</td>
<td>6.44</td>
<td>24.20</td>
<td>24.20</td>
<td>23.43</td>
<td>19.64</td>
</tr>
<tr>
<td>Session 3</td>
<td>17.95</td>
<td>92.42</td>
<td>33.33</td>
<td>7.14</td>
<td>15.38</td>
<td>10.71</td>
<td>21.21</td>
<td>38.55</td>
<td>6.44</td>
<td>24.20</td>
<td>24.20</td>
<td>27.07</td>
<td>22.97</td>
</tr>
<tr>
<td>Session 5</td>
<td>17.95</td>
<td>84.92</td>
<td>0.00</td>
<td>7.14</td>
<td>15.38</td>
<td>14.29</td>
<td>21.24</td>
<td>71.08</td>
<td>11.11</td>
<td>24.20</td>
<td>24.20</td>
<td>25.41</td>
<td>21.73</td>
</tr>
<tr>
<td>Session 6</td>
<td>17.95</td>
<td>46.50</td>
<td>0.17</td>
<td>7.14</td>
<td>7.69</td>
<td>14.29</td>
<td>21.21</td>
<td>38.55</td>
<td>11.11</td>
<td>24.20</td>
<td>24.20</td>
<td>25.41</td>
<td>21.73</td>
</tr>
<tr>
<td>Session 7</td>
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<td>58.33</td>
<td>0.00</td>
<td>7.14</td>
<td>7.69</td>
<td>14.29</td>
<td>21.24</td>
<td>38.55</td>
<td>11.11</td>
<td>24.20</td>
<td>24.20</td>
<td>25.41</td>
<td>21.73</td>
</tr>
<tr>
<td>Average</td>
<td>14.80</td>
<td>67.34</td>
<td>7.03</td>
<td>6.95</td>
<td>11.28</td>
<td>13.23</td>
<td>24.45</td>
<td>72.21</td>
<td>9.92</td>
<td>24.20</td>
<td>24.20</td>
<td>25.41</td>
<td>21.73</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.43</td>
<td>17.57</td>
<td>13.23</td>
<td>2.59</td>
<td>3.84</td>
<td>2.56</td>
<td>3.74</td>
<td>33.56</td>
<td>2.10</td>
<td>3.11</td>
<td>3.18</td>
<td>7.99</td>
<td>/</td>
</tr>
</tbody>
</table>

Source: Author’s construction from the BRVM database.

Average rate of undervaluation is significant (25.99%). This evidence is more marked in Table 2 by the immensity of the sums of money left on the table by issuing companies within the meaning of Ljungqvist (2004).

### Initial Returns Adjusted to the BRVM Composite Index

Some of the observations made with the initial gross yields remain valid. Indeed, the standard deviations make it possible to note a greater disparity in rates between the securities during the different sessions (minimum 15.49%; maximum 33.90%) compared to that observed from one session to another for the various securities (minimum 2.1% and maximum 33.56%). The observation of average rates leads to the same observation. The difference between the average rates of undervaluation is relatively very large from one security to another (minimum 6.88% and 72.18%). On the other hand, the variability of the average rates of undervaluation between sessions is relatively lowers (minimum 21.67% and maximum 27.71%).

The initial yield of the first session remains the lowest (21.67%); proof that the price adjustment is not complete on the first trading day the maximum rate is reached after the tenth session and remains high until the fifteenth session. The average rate of undervaluation remains significant even if it goes from 25.99% (with gross initial returns) to 25.28%. This 0.71% change in initial yields may seem small when in reality this is not the case. The shortfall recorded by the issuing companies is also pharaonic with regard to Table 4 below. However, the difference compared to the total amount of money left on the table observed in Table 4 (with the gross initial yields) is significant (918,507,395 FCFA). This proves that the adjustment of initial returns by the market index has a strong impact on them.

Table 3. Amounts of money left on the table from gross initial yields.

<table>
<thead>
<tr>
<th>Actions</th>
<th>Offer Price</th>
<th>Number of Shares</th>
<th>Undervaluation Rate</th>
<th>Amounts of Money Left on the Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNTS</td>
<td>195000</td>
<td>2766000</td>
<td>14.80%</td>
<td>798267600</td>
</tr>
<tr>
<td>SIVC</td>
<td>6000</td>
<td>184879</td>
<td>67.34%</td>
<td>746985111.6</td>
</tr>
<tr>
<td>PALC</td>
<td>6000</td>
<td>/</td>
<td>7.03%</td>
<td>/</td>
</tr>
<tr>
<td>ABJC</td>
<td>7000</td>
<td>117504</td>
<td>6.95%</td>
<td>57165696</td>
</tr>
<tr>
<td>NEIC</td>
<td>6500</td>
<td>67000</td>
<td>11.28%</td>
<td>49124400</td>
</tr>
<tr>
<td>BOAB</td>
<td>28000</td>
<td>6000</td>
<td>13.23%</td>
<td>22226400</td>
</tr>
<tr>
<td>BOAN</td>
<td>16500</td>
<td>20970</td>
<td>24.45%</td>
<td>84598222.5</td>
</tr>
<tr>
<td>ETIT</td>
<td>1245</td>
<td>156020773</td>
<td>72.21%</td>
<td>1,40265E+11</td>
</tr>
<tr>
<td>ONTBF</td>
<td>45000</td>
<td>680000</td>
<td>9.92%</td>
<td>3035520000</td>
</tr>
<tr>
<td>BOAC</td>
<td>23000</td>
<td>117826</td>
<td>27.11%</td>
<td>734680457.8</td>
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<tr>
<td>BOAF</td>
<td>23000</td>
<td>100000</td>
<td>31.55%</td>
<td>725650000</td>
</tr>
<tr>
<td>Total</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>1,53704E+11</td>
</tr>
</tbody>
</table>

Source: Author.

On the other hand, the variability of the average rates of undervaluation between sessions is relatively lowers (minimum 21.67% and maximum 27.71%).

The initial yield of the first session remains the lowest (21.67%); proof that the price adjustment is not complete on the first trading day the maximum rate is reached after the tenth session and remains high until the fifteenth session. The average rate of undervaluation remains significant even if it goes from 25.99% (with gross initial returns) to 25.28%. This 0.71% change in initial yields may seem small when in reality this is not the case. The shortfall recorded by the issuing companies is also pharaonic with regard to Table 4 below. However, the difference compared to the total amount of money left on the table observed in Table 4 (with the gross initial yields) is significant (918,507,395 FCFA). This proves that the adjustment of initial returns by the market index has a strong impact on them.
Table 4. Evolution of share price spreads on the offer price adjusted to the RSES composite index.

<table>
<thead>
<tr>
<th>Meeting</th>
<th>SNTS</th>
<th>SIVC</th>
<th>PALC</th>
<th>ABJC</th>
<th>NEIC</th>
<th>BOAB</th>
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<th>BOABF</th>
<th>Moyenne</th>
<th>Ecart-Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session1</td>
<td>11,37</td>
<td>64,44</td>
<td>33,19</td>
<td>14,23</td>
<td>15,64</td>
<td>6,70</td>
<td>18,42</td>
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<td>6,36</td>
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<td>6,36</td>
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<td>30,30</td>
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<td>10,18</td>
<td>18,39</td>
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<td>10,18</td>
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<td>13,75</td>
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<td>6,36</td>
<td>23,58</td>
<td>29,43</td>
<td>23,32</td>
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<tr>
<td>Session15</td>
<td>11,37</td>
<td>64,44</td>
<td>33,19</td>
<td>7,08</td>
<td>15,64</td>
<td>13,75</td>
<td>18,39</td>
<td>38,52</td>
<td>6,36</td>
<td>23,58</td>
<td>30,30</td>
<td>25,51</td>
<td>21,37</td>
</tr>
<tr>
<td>Average</td>
<td>13,35</td>
<td>65,19</td>
<td>6,88</td>
<td>6,89</td>
<td>11,54</td>
<td>12,63</td>
<td>21,63</td>
<td>72,18</td>
<td>9,84</td>
<td>26,49</td>
<td>31,42</td>
<td>25,28</td>
<td>21,85</td>
</tr>
</tbody>
</table>

Source: Author’s construction from the RSES database.

Table 5. Money left on the table from adjusted initial returns.

<table>
<thead>
<tr>
<th>Actions</th>
<th>Prix d’Offre</th>
<th>Nombre d’Actions</th>
<th>Taux de Sous-évaluation</th>
<th>Sommes d’Argent Laissées sur la Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNTS</td>
<td>19500</td>
<td>2766000</td>
<td>13,35%</td>
<td>720058950</td>
</tr>
<tr>
<td>SIVC</td>
<td>6000</td>
<td>184879</td>
<td>65,19%</td>
<td>723135720,6</td>
</tr>
<tr>
<td>PALC</td>
<td>6000</td>
<td>/</td>
<td>6,88%</td>
<td>/</td>
</tr>
<tr>
<td>ABJC</td>
<td>7000</td>
<td>117504</td>
<td>6,89%</td>
<td>56672179,2</td>
</tr>
<tr>
<td>NEIC</td>
<td>6500</td>
<td>67000</td>
<td>11,54%</td>
<td>50256700</td>
</tr>
<tr>
<td>BOAB</td>
<td>28000</td>
<td>6000</td>
<td>12,69%</td>
<td>21319200</td>
</tr>
<tr>
<td>BOAN</td>
<td>16500</td>
<td>20970</td>
<td>21,63%</td>
<td>74840881,5</td>
</tr>
<tr>
<td>ETIT</td>
<td>1245</td>
<td>156020773</td>
<td>72,18%</td>
<td>1,40207E+11</td>
</tr>
<tr>
<td>ONTFB</td>
<td>45000</td>
<td>680000</td>
<td>9,84%</td>
<td>3011040000</td>
</tr>
<tr>
<td>BOAC</td>
<td>23000</td>
<td>117826</td>
<td>26,49%</td>
<td>717878470,2</td>
</tr>
<tr>
<td>BOAF</td>
<td>23000</td>
<td>100000</td>
<td>31,42%</td>
<td>722660000</td>
</tr>
<tr>
<td>Total</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>1,52785E+11</td>
</tr>
</tbody>
</table>

Source: Author.

Interpretation of the Initial Undervaluation of IPOs on the RSES

The major characteristics of OPVs and the birth context of the RSES make it possible to envisage two complementary and non-exclusive explanations for undervaluation: the hypothesis of undervaluation as a political instrument and the hypothesis of the aversion of the risk of failure.

❖ Assumption of undervaluation as a political instrument

This explanation is based on the fact that the desire to create the RSES was born on the political field (even if later it is reinforced by the financing constraints of companies and local authorities in the WAEMU zone). In addition, this idea is reinforced by the process of economic liberalization initiated by the WAEMU States to tie in with the global movement of the world economy.

Consequently, in the context of the WAEMU marked by a weak active base of investors and a weak stock market culture, certain States (notably Senegal, Ivory Coast, Benin, and Burkina Faso) would have used of undervaluation to give real content to political decisions on the integration of financial markets and economic liberalization. Thus, by leaving large sums of money on the table by the issuing companies, the political actors wanted, among other things, to gain popular support and the emergence of national shareholding in certain cases (notably for SONATEL and ONATEL actions). This idea is further reinforced by the following observations:

- six (06) of the eleven (11) IPOs on the RSES five (05) were made by privatization of parastatal companies;
- the first five (05) IPOs were the culmination of the privatization processes of parastatals;
Bayala (2002) notes that during initial public offerings on the RSES, individual investors were subjected to less severe demand rationing than institutional investors and that foreign investors were the biggest victims of this discrimination. This hypothesis is also supplemented by the second.

**Risk aversion failure hypothesis**

Faced with the preconditions imposed on the RSES in terms of minimum market capitalization and minimum proportion of capital to be released to the public, the companies applying for the IPO would have considerably reduced the price of shares to reduce the probability of ‘failure.

**Medium/Long Term Performance Results**

The Cumulative Abnormal Returns

The development of the abnormal return on investment (adjusted according to the market indexes and models) is given in Table 6 which follows. It turns out that the cumulative abnormal returns are all negative and increase over time. In addition, conventional t-statistics reveal the significance of these abnormal cumulative returns (CARs and CMARs) at 30, 36, 42, 48, 54 and 60 months. The corrected heteroskedasticity t-statistic shows that the cumulative abnormal returns adjusted according to the market model are significantly different from zero at 24, 30, 36, 42, 48, 54 and 60 months. Consequently, the null hypothesis is rejected: the profitability of the shares newly listed on the RSES is significantly degraded compared to all the stocks in the market portfolio.

Abnormal buy-keep returns

Table 7 below shows that the indicators of relative wealth are all lower than one (01) and that the abnormal returns of purchase-conservation are all negative whatever the mode of adjustment (with the market index or the market model) used, which implies a deterioration in the profitability of the IPOs compared to the market portfolio. This underperformance of newly listed shares compared to the market index is certified by conventional t-statistics and skewness-adjusted t-statistics at 6, 12, 18, 24, 36, 42, 48, 54 and 60 months. Hence the rejection of the null hypothesis stipulating the nullity of abnormal buy-keep returns.

It should also be noted that the medium and long term profitability of these securities is less degraded with the abnormal returns of purchase-conservation compared to that determined with the abnormal cumulative returns; this is illustrated by Figures 3 and 4 below.

**Interpretation of the medium and long-term underperformance of IPOs**

The results on the medium and long term performance are summarized in Table 8 which follows.

The summary in Table 8 reveals the medium and long-term underperformance of IPOs (compared to the composite RSES index) across all the methods (CARs, CMARs, BHARs, BHMARs) and statistics used (statistics $t_{conv}$, $t_{corr}$, $t_{sa}$). In fact, the abnormal returns are negative and statistically significant. The deterioration in profitability in the medium and long term can potentially be explained by the hypothesis of a rapid race towards liquidity in a context of illiquid.

Indeed, the high rate of initial undervaluation of newly listed stocks has led to a rapid rise in prices, accentuated by the euphoric demand from investors attracted by the significant initial returns. This euphoria aroused an ardent desire for liquidity among investors tempted by the “good flavor” left by abnormally high yields in the short term. Thus, the massive and rapid rush of investors towards liquidity has given rise to increasingly increasing sell orders leading to a supply of securities far above demand. This superior supply over demand has gradually made IPO titles illiquid. Said illiquidity of securities added to the general illiquidity of the market has led investors wishing to get rid of these titles (which have become increasingly undesirable) to throw more fuel on the fire. In turn, a movement in the opposite direction followed the euphoria of the first trading sessions caused by the rapid rise in prices.

The subsequent drop in share prices whose returns became abnormally negative at the end of the first month of listing. This can be seen in Figures 1 and 2 above.

In addition, the more marked deterioration in profitability with the abnormal cumulative returns compared to that obtained with the abnormal buy-keep returns seems quite logical in a context characterized by the illiquidity of newly listed securities and the market. Indeed, illiquidity has forced the most active investors (prone to frequent
CONCLUSION AND RECOMMENDATIONS

Conclusion

The Phillips-Perron test concluded that all of the yield series were stationary. It was preferred to the Dickey-Fuller augmented test because of its robustness. The Jarque-Bera normality test showed that apart from the SIVC share return series, all the other series of returns used in the medium/long term were abnormally distributed. In addition, the heteroskedasticity tests were positive for three (03) titles (SNTS, BOAB and BOAN). Note that the heteroskedasticity of the BOAB and BOAN stocks is relative to the autocorrelation of the residuals while that of SNTS is caused by a relationship between the residuals (yields determined by market model) and the yields of the market index. Faced with this anomaly (heteroskedasticity) the conditional variances of the residuals of the returns on these stocks were estimated by the GARCH type models.

Subsequently the hypotheses were put to the test of the facts. The results obtained show that investments in IPOs on the RSES between September 16, 1998 and December 31, 2011 allowed investors to record initially high returns and significantly negative abnormal returns in the medium and long term. Indeed the rate of undervaluation and the sums of money left on the table proved to be important according 

changes in the composition of their portfolios) to suffer more severe losses than passive investors (having adopted the passive strategy of pure investment or buying strategy) conservation).
to the two methods used. In other words, investors would have benefited greatly from the price appreciation during the first fifteen (15) sessions after the IPOs. However, the values ??of these indicators recorded with the gross initial returns method were larger than those calculated using the adjusted initial returns method. This shows that the adjustment by the market index strongly influenced the short-term profitability of IPOs on the RSES.

The three variants of the t-statistic used proved that in the medium and long term, the BRO’s IPOs were less profitable than the market portfolio. This underperformance is verified with the CARs, the CMARs, the BHARs and the BHMARs. However, it is more intense with the method of cumulative abnormal returns. In other words, investors who adopted an active investment strategy suffered heavier losses than those who opted for the passive pure investment or buy-hold strategy.

Recommendations

Following the above results, some suggestions should be made to researchers and investors of IPOs. Researchers should use the widest assortment of procedures possible in profitability studies of IPOs to better understand their stock market behavior. This suggestion is justified by the diversity of results observed from one method to another (Welch and Ritter, 2002) and the advantages and disadvantages relating to each method (Kooli and Suret, 2001).

For IPO investors, it will be:

- Firstly to learn more about the functioning of the market in general and to follow its evolution in order to adopt a more rational behavior;
- Secondly, they must buy the IPOs at the offer price in order to benefit from the price appreciations following the first listing and to suffer relatively less losses by keeping them for the long term. In addition, the holding of IPOs in the medium and long term must be done according to the passive strategy of pure investment (or purchase conservation).

REFERENCES


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