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# Serie Research Memoranda

## Initial Public Offerings in Mexico and Argentina 1991-1994

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# Research  Memorandum

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## 1. Introduction

This paper studies the secondary market price performance of initial public offerings (IPOs) in two Latin American stockmarkets, Mexico and Argentina. A previous study on the aftermarket performance of IPOs in Latin America by Aggarwal, Leal and Hernandez [2] reported initial one-day abnormal returns of 78.5%, 16.3%, and 2.8% for Brazil, Chile and Mexico. This study extends the analysis of new issue price performance in Mexico from the 1987 through 1990 period in the Aggarwal et al. study to 199 1 through 1994. In addition, the initial price performance of Argentinean IPOs during the same time period is studied.

## 2. The International Evidence on IPOs

The empirical anomaly of positive average initial returns on investments in initial public offerings has been well documented. Early research described the tendency of IPOs to provide abnormal returns to investors who purchased them at the initial offering (Merret, Howe and Newbould [9] and Ibbotson [7]). Many refinements and extensions followed, including efforts to explain the variation in abnormal returns across firms and underwriters.

One recurring observation is that investors operating in the new issue market require some form of premium on any initial investment in IPOs. According to Rock [10], positive initial returns are required to compensate and draw uninformed investors into the new issue market. In his model, informed investors impose a 'winner's curse' on uninformed investors by demanding larger allocations of (rationed) offerings identified as underpriced and smaller allocations of those identified as overpriced. Given this bias, Rock argues that new issues should, on average, be priced at some discount to their aftermarket price to compensate the uninformed investors so that they, on average, earn at least a riskless rate of return from their investments in new issue shares.

Benveniste and Spindt [3] note that changes in the offer price between the filing of the preliminary prospectus and the offer date are a product of information gathered by underwriters from informed investors during the pre-issue period. When good information is

revealed through high demand for the issue, the final offer price will exceed the expected offer price. Alternatively, bad information is revealed by low demand and results in a decrease in the offer price to below the expected value. In their model, investors are motivated to truthfully reveal the level of demand through a pricing and allocation schedule that maximizes the investors' total expected profit. Investors who truthfully reveal good information must expect greater profits than if they reveal bad information. Profits, in this case, are generated by a tradeoff between increased allocation and underpricing. As long as the allocations increase at a rate greater than the rate at which returns decrease, truth-telling will be induced.

The international evidence on IPOs finds strong underpricing, as summarized in Exhibit 1.

**Exhibit 1.** Summary of Levels of Reported Underpricing in Previous Studies[a]

| Market & Study | No. of issues | Study period | Ave. initial return |
|---|---|---|---|
| **North and South America:** | | | |
| *United States* | | | |
| 1. Logue (1973) | 250 | 1965-69 | 41.7 |
| 2. Ibbotson & Jaffe (1975) | 128 | 1960-70 | 16.8 |
| 3. Reilly (1977) | 486 | 1972-75 | 10.9 |
| 4. Ritter (1984) | 1028 | 1977-82 | 26.5 |
| 5. Tinic (1988) | 134 | 1966-71 | 11.1 |
| 6. Beatty (1989) | 2215 | 1975-84 | 22.1 |
| 7. Muscarella & Vetsuypens (1989) | 38 | 1970-87 | 7.1 |
| 8. Aggarwal & Rivoli (1990) | 1598 | 1977-87 | 10.7 |
| 9. Mauer & Senbet (1992) | 1002 | 1977-84 | 18.9 |
| *Canada* | | | |
| 1. Jog & Riding (1987) | 100 | 1971-83 | 11.0 |
| *Mexico* | | | |
| 1. Aggarwal, Leal & Hemandez (1993) | 44 | 1987-90 | 2.8 |
| *Brazil* | | | |
| 1. Aggarwal, Leal & Hemandez (1993) | 62 | 1980-90 | 78.5 |
| *Chile* | | | |
| 1. Aggarwal, Leal & Hemandez (1993) | 19 | 1982-90 | 16.3 |
| **Europe:** | | | |
| *United Kingdom* | | | |
| 1. Merrit, Howe & Newbould (1967) | 149 | 1959-63 | 13.7 |
| 2. Davis & Yeomans (1974) | 275 | 1965-71 | 10.6 |
| 3. Buckland, Herbert & Yeomans (1981) | 297 | 1965-75 | 9.7 |
| 4. Levis (1990) | 123 | 1985-88 | 8.6 |
| 5. Levis (1993) | 184 | 1980-88 | 11.5 |
| *France* | | | |
| 1. McDonald & Jacquillat (1974) | 31 | 1968-71 | 3.0 |
| 2. Husson & Jacquillat (1990) | 131 | 1983-86 | 4.0 |
| Germany | | | |
| 1. Dawson & Reiner (1988) | 51 | 1977-85 | 28.0 |
| 2. Schmidt e.a. (1988) | 32 | 1984-85 | 20.6 |
| 3. Uhlir (1989) | 97 | 1977-87 | 21.5 |

| | | | |
|---|---|---|---|
| *Netherlands* | | | |
| 1. Wessels (1989) | 46 | 1982-87 | 5.1 |
| 2. Buijs & Eijgenhuijsen (1993) | 43 | 1982-91 | 12.0 |
| | | | |
| *Switzerland* | | | |
| 1. Kunz & Aggarwal | 42 | 1983-89 | 35.8 |
| | | | |
| *Finland* | | | |
| 1. Keloharju (1993) | 80 | 1984-89 | 8.7 |
| | | | |
| **Asia and Australia:** | | | |
| | | | |
| *Japan* | | | |
| 1. Dawson & Hiraki (1985) | 106 | 1979-84 | 51.9 |
| | | | |
| *Hong Kong* | | | |
| 1. Dawson & Hiraki (1985) | 31 | 1979-84 | 10.9 |
| 2. Dawson (1987) | 21 | 1987-83 | 13.8 |
| 3. McGuinness (1993) | 92 | 1980-90 | 16.6 |
| | | | |
| *Korea* | | | |
| 1. Kim & Lee (1990) | 41 | 1984-86 | 37.0 |
| 2. Krinsky, Kim & Lee (1992) | 275 | 1985-90 | 79.0 |
| | | | |
| *Malaysia* | | | |
| 1. Dawson (1987) | 21 | 1978-83 | 166.6 |
| | | | |
| *Singapore* | | | |
| 1. Dawson (1987) | 39 | 1978-83 | 39.4 |
| 2. Koh & Walter (1989) | 66 | 1973-87 | 27.2 |
| 3. Saunders & Lim (1990) | 17 | 1987-88 | 45.4 |
| 4. Dawson (1991) | 61 | 1978-90 | 41.0 |
| 5. Koh, Lim & Chin (1992) | 53 | 1975-87 | 37.6 |
| | | | |
| *Australia* | | | |
| 1. Finn & Higham (1988) | 93 | 1966-78 | 29.2 |
| 2. How&Low (1993) | 523 | 1979-89 | 16.1 |

Sources used: Dawson [5], Aggarwal, Leal, Hemandez [2], Keasey & McGuinness [8]

[a] The method of computation and the time period over which underpricing is calculated varies from study to study.

## 3. The Mexican and Argentinean Stockmarkets

At the end of 1994, a total of 194 companies were listed on the Bolsa de Valores of Mexico City. Its most important sectors are telecommunications, construction, retailing and consumer goods. The total market capitalization approximated US$125 billion at the end of 1994, with the 10 largest stocks amounting for a stake of around 35%. The 10 most liquid stocks generated around 45% of total trading volume. The average price-earnings ratio was 17 times.

The Buenos Aires Stock Exchange (BASE) was founded in 1854 and is the oldest stock exchange of Latin America. With energy and consumer goods as the most important sectors, a

total of 150 companies were listed at the end of 1994. Total market capitalization was in the order of US$35 billion with the top 10 stocks taking up around 80% of that amount. The average price-earnings ratio was 16 times.

## 4. Data and Methodology

Since market data is not as easily available as in more mature stock markets, data was collected from different sources to enable verification as much as possible. The data on Mexican new issues was collected from Afin Securities in New York and Bursamex in Mexico City. An Argentinean IPO calendar was collected from MBA in Buenos Aires and D.A. Campbell Research in Los Angeles. Aftermarket prices for both markets were collected from Datastream and Economatica.

The 1991-1994 period was chosen because this extends the analysis conducted by Aggarwal et al. in their study on underpricing and aftermarket performance in Mexico between 1987 and 1990. To our knowledge, no study has ever been conducted on the appearance of underpricing in the Argentinean market and we therefore decided to expand our study with data from this second largest country in South America.

Consistent with most prior research related to IPOs, underpricing is measured as the market-adjusted abnormal return using the first post-offering closing stock price of the newly listed shares. The market-adjusted abnormal return $AR_{it}$ for each IPO is computed as in Equation (1):

$$AR_{it} = \left[ \frac{P_{it} - P_{i0}}{P_{i0}} - \frac{I_{it} - I_{i0}}{I_{i0}} \right] x 100 \tag{1}$$

where:

$AR_{it}$ = market-adjusted abnormal return of stock i at time t;

$P_{it}$ = the closing price of stock i, t trading days after the initial offering;

$P_{i0}$ = the initial offering price of stock i;

$I_{it}$ = the value of the market index t days after the offering of stock i;

$I_{i0}$ = the value of the market index on the date of the offering of stock i.

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The market-capitalization weighted indices used in the calculations are the IPC index as the proxy for Mexico, and the Merval index for Argentina. In order to evaluate the performance of IPOs purchased in the aftermarket, prices for one, three, six and twelve months after the offer were collected. Market-adjusted abnormal returns are now calculated as in Equation (2):

$$AR_{it} = \left[ \frac{P_{it} - P_{i1}}{P_{i1}} - \frac{I_{it} - I_{i1}}{I_{i1}} \right] x100, \qquad (2)$$

where:

$AR_{it}$ = market-adjusted abnormal return of stock i at time t;

$P_{it}$   = the closing price of stock i, t trading days after the initial offering;

$P_{i1}$   = the closing price on the initial trading day of stock i;

$I_{it}$   = the value of the market index t days after the offering of stock i;

$I_{i1}$   = the value of the market index on the initial trading day of stock i.


Wealth relatives are also calculated as in Equation (3). A wealth relative above one implies that IPOs outperformed the market in that period. A wealth relative below one indicates underperformance.

$$WR_{it} = \frac{1 + \frac{1}{N} \sum_{i=1}^{N} R_{it}}{1 + \frac{1}{N} \sum_{i=1}^{N} R_{mt}} \qquad (3)$$

where:

$WR_{it}$ = wealth relative;

N     = the total number of IPOs in the sample;

$R_{it}$   = the return of stock i on day t from the offer day;

$R_{mt}$   = the market return on day t from the offer day.

## 5. Empirical Results

### Mexico

Exhibit 2 shows the results for the Mexican market. Statistically significant values at the α=5% level are marked with an asterisk sign. The sample for Mexico consisted of 51 new offerings. Consistent with previous international research, on average significant gains accrue to holders of unseasoned new issues on the first day of trading. Positive mean and median excess returns of 3.45% and 1.03% respectively, are found. The t-statistic of 4.60 is significant at the five percent level. Also consistent with virtually all prior research, the abnormal return distribution exhibits positive skewness so that median returns are less than mean returns, although the medians are still positive.

In no less than 3 1 new issues the level of underpricing did not exceed the 10% level. In six cases an initial abnormal return of over 10% was found. In the remaining 14 cases overpricing was observed, but in none of these the 10% level was exceeded. The underpricing results for the Mexican market presented in this study are in line with those found by Aggarwal et al. [2], although they are more robust because of the statistically significant t-value. For comparison purposes, the results between 1987-1990 as found by Aggarwal et al., are listed in Exhibit 3.

**Exhibit** 2. Underpricing and Aftermarket Performance of Mexican IPOs, 199 1- 1994

| Time | N | Mean | Median | S d | t-statistic | WR |
|------|---|------|--------|-----|-------------|-----|
| Day 1 | 51 | 3.45% | 1.03% | 5.35% | 4.60* | 1.03 |
| Month 1 | 38 | -5.81% | -3.57% | 23.87% | -1.50 | 0.94 |
| Month 3 | 51 | 2.94% | 1.56% | 32.50% | 0.65 | 1.03 |
| Month 6 | 51 | 6.01% | 3.81% | 39.27% | 1.09 | 1.05 |
| Year 1 | 51 | -5.38% | -4.02% | 44.71% | -0.86 | 0.95 |

\* Significant at 0.05 or less

**Exhibit** 3. Underpricing and Aftermarket Performance of Mexican IPOs, 1987-1990 (Aggarwal et al., 1993)

| Time | N | Mean | Median | S d | t-statistic | WR |
|------|---|------|--------|-----|-------------|-----|
| Day 1 | 44 | 2.80% | 0.70% | 14.30% | 1.29 | 1.03 |
| Month 1 | 37 | 21.60% | 1.10% | 88.50% | 1.49 | 1.22 |
| Month 2 | 35 | 18.40% | 2.30% | 84.70% | 1.28 | 1.20 |
| Month 3 | 30 | 10.00% | -2.10% | 44.10% | 1.24 | 1.05 |
| Year 1 | 38 | -19.60% | -38.90% | 72.50% | -1.67 | 0.81 |

\* Significant at 0.05 or less

If the IPOs are bought in the aftermarket on day 1 and held for one, three, six or twelve months, then none of the abnormal returns are significantly different from zero. The corresponding mean excess returns are -5.8 1%, 2.94%, 6.01%, and -5.38% respectively. The

volatile pattern of abnormal returns in the aftermarket is difficult to explain, and very different from that in the 1987- 1990 time period. According to Aggarwal, the sharp drop in excess returns during month 3 in her results was influenced by the October 1987 crash and the bear market that followed.

The observed standard deviation values are considerably lower than those found by Aggarwal. An explanation could be that as emerging markets mature, their share price volatility often diminishes. The higher standard deviations in the Aggarwal study could on the other hand again also be influenced by the 1987 crash.

**Argentina**

In the case of Argentina, 20 initial offerings were studied. The results can be seen in Exhibit 4. If an investor had purchased each IPO at the offering date and price and held the investments for one day, the rate of return earned would be 4.42 percentage points higher than from similarly timed investments in the Merval index. Surprisingly, although with no less than 9 of the 20 IPOs overpricing was observed, the mean abnormal return is still different from zero at conventional levels of significance. The median initial excess return is 2.36%, which again points to positive skewness in the distribution.

The mean abnormal returns for purchasers who buy at the closing price on day 1 and hold for one, three, six or twelve months are negative, and with the exception of the twelve months holding period also significant. IPO prices decline sharply during the first month of trading, after which their behavior starts to approximate the general market. Investors buying the initial offerings 3 or 6 months after they started trading earned non significant abnormal returns of - 8.98% (t=-1.03) and -7.70% (t=-0.93) respectively.

**Exhibit 4.** Underpricing and Aftermarket Performance of Argentinean IPOs, 199 1- 1994

| Time | N | Mean | Median | Sd | t-statistic | WR |
|------|---|------|--------|-----|-------------|-----|
| Day 1 | 20 | 4.42% | 2.36% | 9.11% | 2.17* | 1.04 |
| Month 1 | 17 | -11.04% | - 15.42% | 9.32% | -4.88* | 0.89 |
| Month 3 | 20 | -8.74% | -15.93% | 17.57% | -2.22* | 0.91 |
| Month 6 | 20 | -11.67% | -8.57% | 21.89% | -2.38* | 0.87 |
| Year 1 | 20 | -14.48% | -13.65% | 32.28% | -2.01 | 0.84 |

* Significant at 0.05 or less

The abnormal returns accruing to IPO investors may only be interpreted as evidence of underpricing by underwriters if it is shown or assumed that the aftermarket for IPOs is efficient. Temporary overvaluation caused by over-optimism on the part of IPO investors for example, may cause the aftermarket not to be immediately efficient in valuing newly issued securities. Although early abnormal returns of Argentinean IPOs are significantly positive, prices decline substantially in the first month following the initial offering.

The rapid decline in secondary market prices indicates that the initial price rise was overstated and underpricing by investment bankers was not as large as it appeared, or that the IPOs were not priced below their intrinsic values at all. To examine this last possibility we measure the amount by which the price appreciation of the IPOs exceeds that of the Merval index for a purchase at the offering date and price and sale one year following the offering.

**Exhibit** 5. Abnormal Returns Argentinean IPOs from Offering Date to One Year Following

| Time | N | Mean | Median | Sd | t-statistic | WR |
|------|---|------|--------|-----|-------------|-----|
| Year 1 | 20 | -9.93% | -9.73% | 37.44% | -1.19 | 0.89 |

\* Significant at 0.05 or less

As can be seen in Exhibit 5, both the median and mean returns for an investor able to purchase each IPO at the offering date and price and hold for one year, are less than the return to similarly timed investments in the index. Gains from early price appreciation are more than lost in subsequent price declines. The sample underperforms the market by 9.93 percentage points, but this result is not significant at conventional levels.

## 6. Conclusions

Initial one day returns of 3.45% and 4.42% are found for Mexico and Argentina respectively. Both results are statistically significant at conventional levels and consistent with previous research.

Market adjusted returns after one year of -5.38% in Mexico and -14.48% in Argentina indicate long run underperformance of new issues. In the case of Argentina, most of the under-performance took place during the first month of trading and these declines more than offset the earlier price appreciations.

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