Chapter 2

A Review of IPO Literature
2.1 Introduction

Underpricing of IPOs is defined as the excess or abnormal return from offering to listing or first trading. It is measured by the return realized by an investor who invests in an IPO at the time of offering and sells it at the day of its first trading.

Underpricing of IPOs has been a well-documented phenomenon in the standard literature. In fact, the phenomenon of underpricing of IPOs is so pervasive that Loughran, Ritter and Rydqvist (1994) made the comment that it exists in “every country with a stock market”. The following table, reproduced from Loughran, Ritter and Rydqvist (1994), summarizes the international experience of underpricing.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Country</th>
<th>Comments</th>
<th>Sample size</th>
<th>Time period</th>
<th>Average initial return</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Australia</td>
<td></td>
<td>266</td>
<td>1976-89</td>
<td>11.9%</td>
</tr>
<tr>
<td>2</td>
<td>Belgium</td>
<td></td>
<td>28</td>
<td>1984-90</td>
<td>10.1%</td>
</tr>
<tr>
<td>3</td>
<td>Brazil</td>
<td></td>
<td>62</td>
<td>1979-90</td>
<td>78.5%</td>
</tr>
<tr>
<td>4</td>
<td>Canada</td>
<td></td>
<td>258</td>
<td>1971-92</td>
<td>5.4%</td>
</tr>
<tr>
<td>5</td>
<td>Chile</td>
<td></td>
<td>19</td>
<td>1982-90</td>
<td>16.3%</td>
</tr>
<tr>
<td>6</td>
<td>Finland</td>
<td></td>
<td>85</td>
<td>1984-92</td>
<td>9.6%</td>
</tr>
<tr>
<td>7</td>
<td>France</td>
<td></td>
<td>187</td>
<td>1983-92</td>
<td>4.2%</td>
</tr>
<tr>
<td>8</td>
<td>Germany</td>
<td></td>
<td>170</td>
<td>1978-92</td>
<td>10.9%</td>
</tr>
<tr>
<td>9</td>
<td>Hong Kong</td>
<td></td>
<td>80</td>
<td>1980-90</td>
<td>17.6%</td>
</tr>
<tr>
<td>10</td>
<td>Italy</td>
<td></td>
<td>75</td>
<td>1985-91</td>
<td>27.1%</td>
</tr>
<tr>
<td>11</td>
<td>Japan</td>
<td></td>
<td>472</td>
<td>1970-91</td>
<td>32.5%</td>
</tr>
<tr>
<td>12</td>
<td>Korea</td>
<td></td>
<td>347</td>
<td>1980-90</td>
<td>78.1%</td>
</tr>
<tr>
<td>13</td>
<td>Malaysia</td>
<td></td>
<td>132</td>
<td>1980-91</td>
<td>80.3%</td>
</tr>
<tr>
<td>14</td>
<td>Mexico</td>
<td></td>
<td>37</td>
<td>1987-90</td>
<td>33.0%</td>
</tr>
<tr>
<td>15</td>
<td>Netherlands</td>
<td></td>
<td>72</td>
<td>1982-91</td>
<td>7.2%</td>
</tr>
<tr>
<td>16</td>
<td>New Zealand</td>
<td></td>
<td>149</td>
<td>1979-91</td>
<td>28.8%</td>
</tr>
<tr>
<td>17</td>
<td>Portugal</td>
<td></td>
<td>62</td>
<td>1986-87</td>
<td>54.4%</td>
</tr>
<tr>
<td>18</td>
<td>Singapore</td>
<td></td>
<td>66</td>
<td>1973-87</td>
<td>27.0%</td>
</tr>
<tr>
<td>19</td>
<td>Spain</td>
<td></td>
<td>71</td>
<td>1985-90</td>
<td>35.0%</td>
</tr>
<tr>
<td>20</td>
<td>Sweden</td>
<td></td>
<td>213</td>
<td>1970-91</td>
<td>39.0%</td>
</tr>
<tr>
<td>21</td>
<td>Switzerland</td>
<td></td>
<td>42</td>
<td>1983-91</td>
<td>35.8%</td>
</tr>
<tr>
<td>22</td>
<td>Taiwan</td>
<td></td>
<td>168</td>
<td>1971-90</td>
<td>45.0%</td>
</tr>
<tr>
<td>23</td>
<td>Thailand</td>
<td></td>
<td>32</td>
<td>1988-89</td>
<td>58.1%</td>
</tr>
<tr>
<td>24</td>
<td>United Kingdom</td>
<td></td>
<td>2,133</td>
<td>1959-90</td>
<td>12.0%</td>
</tr>
<tr>
<td>25</td>
<td>United States</td>
<td></td>
<td>10,626</td>
<td>1960-92</td>
<td>15.3%</td>
</tr>
</tbody>
</table>

Source: Loughran, Ritter and Rydqvist (1994)
The market for IPOs is known to also exhibit two other characteristics – long-run underperformance and cycles. While IPOs are found to be underpriced on an average in the short-run, they exhibit poorer performance compared with various benchmarks (the market, firms from same industry and/or size) in the long run. The existence of underperformance of IPOs over longer-run had been known among the practitioners for some time, especially in the US market. But its existence, using a formal methodology to measure underperformance, was first confirmed in the academic literature by Ritter (1991). A slew of studies on long-run underperformance of IPOs followed this work in the context of US and many other countries including some of the emerging market economies. Available empirical evidence, mostly in the context of developed countries, suggests that the underperformance of IPOs tend to persist for three to five years.

Apart from short-run underpricing and long-run underperformance, researchers have documented a third anomaly in the context of IPOs. This relates to the existence of cyclical patterns in the number as well as average initial returns of IPOs. That is, periods of high volume (i.e. number of IPOs per month) are followed by periods of low volume; periods of high monthly average initial returns are followed by periods of low monthly average initial returns. The periods of exceptionally high returns on IPOs have been termed in the literature as “Hot Issues” markets. The existence of hot issues markets was first documented in the literature by Ibbotson and Jaffe (1975), and a formal academic analysis was first provided by Ritter (1991).
2.2 Short Run Underpricing

The phenomenon of short-run underpricing of new issues began to get considerable attention in the academia from the late 1960’s. For example, Reilly and Hatfield (1969), McDonald and Fisher (1972), Logue (1973), Ibbotson (1975), Reilly (1977) are among the early researchers who have documented this phenomenon. Loughran, Ritter & Rydqvist (1994) discusses the short-run and long-run performances of IPOs in several countries. A study of empirical research on IPOs in 25 countries leads them to conclude that the phenomenon of short-run underpricing of IPOs exists in “every country with a stock market”, although the extent of underpricing varies enormously across countries. However, the phenomenon remained admittedly unexplained during the 1970’s. Ibbotson (1975) even termed it as a ‘mystery’. It was only in the 1980’s that explanations and hypotheses for this phenomenon began to be offered. Since then a number of hypotheses has been offered to explain the phenomenon of short-run underpricing.

Three major strands of literature, not necessarily mutually exclusive, have evolved over time. One identifies underpricing as the manifestation of the existence of asymmetric information in the market – between issuers and investors, or between issuers and merchant bankers. This strand has three major subsets – one based on “Winners’ Curse” hypothesis, one based on signaling hypothesis, and the other based on information revelation hypothesis (book-building models). Another strand of literature is based on symmetric information hypothesis in the sense that no explicit assumption about the existence of information asymmetry is made. We can view several hypotheses like stabilization hypothesis, ownership dispersion hypothesis, market incompleteness hypothesis, legal liability hypothesis, regulatory constraints hypothesis, etc. as subsets of this strand. Yet a third strand of literature attempts to explain underpricing in terms of some kind of irrational behaviour on the part of the investors. The “cascades” effect
hypothesis, impresario hypothesis, divergence of opinion hypothesis, and “irrational exuberance” hypothesis are the major subsets belonging to this strand.

It may be noted that the above scheme of classification of the literature is only indicative, and is one among many other alternative classifications that may be drawn. The objective of classifying the literature in this manner is to study the vast and rapidly expanding literature on IPO in a systematic manner. Any classification like the above one is justified to the extent it enables a systematic study of the literature.

2.2.1 Asymmetric Information Models

Some of the models attempting to explain underpricing assume that issuing companies (and the merchant bankers too in some models) possess superior information compared to the external investors. Underpricing is generated as an optimizing behaviour on the part of the merchant bankers/issuing companies as a response to this information asymmetry. In this section, we describe three major models based on asymmetric information.

2.2.1A Winners’ Curse Hypothesis

Rock (1986) builds his explanation on the basis of asymmetric information. He distinguishes between two types of investors – the informed investors and the uninformed investors. He assumes that whenever over-subscription occurs, it occurs because of large orders from the informed investors. The informed investors undertake investigations (and hence incur a cost) for acquiring the information about the true worth of a firm and the prospect of its offering. If the offer price is p, and the true value per share is v, the informed investors (who know v) would place their order whenever p<v. Since the uninformed investors do not have any prior
information about any issue, they cannot distinguish between good issues and bad issues. Hence the uninformed investors are assumed to place order for all issues.

While placing order for an IPO, the investors face an adverse selection problem: if the issue is overpriced ($p>v$), the informed investors will not submit any purchase order at all and only the uninformed investors would be submitting orders. As a result, uninformed investors would be allocated 100% of the issues which give negative return on listing. For underpriced issues ($p<v$), both informed and uninformed investors would be submitting purchasing orders, and the issues would be oversubscribed (since it is assumed that oversubscription occurs because of participation of the informed investors). Consequently, these oversubscribed issues would be rationed between the informed as well as uninformed investors.

In this situation, the investors face a “winners’ curse”: if the IPO is overpriced, the uninformed investors would be allocated 100% of the shares; but if the IPO is underpriced, they would be allocated only some of the shares. Thus, if an uninformed investor is allocated shares in an IPO, chances are higher than usual that the IPO will start trading at a discount. For an uninformed investor, therefore, the expected return conditional upon being allocated shares is less than the expected return conditional upon submitting a purchase order.

In this situation, the uninformed investors would participate in the market only if the expected return conditional upon being allocated shares is non-negative. And this can happen only if the issuers underprice the IPOs on average.

However, in a more fundamental sense, underpricing is the compensation to the informed investors for the costs of becoming informed (by doing security analysis etc.).
It may be noted that rationing by itself does not lead to underpricing in Rock’s model. It is the “winners curse” faced by the uninformed investors that cause underpricing. The class of uninformed investors is defined by the inability to judge the true value of an offer, which means that uninformed investors apply for all IPOs indiscriminately simply because they cannot judge which issue is overpriced and which one is underpriced. Uninformed investors are allocated all the shares applied for by them when the issue is overpriced because, in that case, informed investors would not apply for allocation. On the other hand, the uninformed investors would be allocated only a part of the quantity they desire for underpriced issues because informed investor would also apply for these issues leading to oversubscription and rationing. Thus, the realizable return (return conditional on being allocated shares) to the uninformed investors would be much less than the extent of underpricing for underpriced (and hence oversubscribed and hence rationed) issues, while the realizable return for overpriced issues would be negative. In this situation, the uninformed investors would only participate in the IPO market if, on the average, IPOs are underpriced.

In other words, underpriced issues must be underpriced to such an extent that the negative return to the uninformed investors caused by the overpriced issues is more than compensated by the underpriced issues. Otherwise the uninformed investors would not participate in the market for IPOs.

2.2.1B Signaling Hypothesis

In the models developed by Allen & Faulhaber (1989), Welch (1989) and Grinblatt & Hwang (1989), issuers have private information about their true value. They underprice their IPOs in order to ‘leave a good taste’ with investors, so that the issuers and insiders would be able to obtain a better price in future offerings than would otherwise be the case. Empirical evidence
regarding propensity to make further issues (i.e., SEOs) among the IPO issuers is mixed. While Welch (1989) find that about one-third of firms making IPOs come back to the market with a further issue in next few years, results reported by Garfinkel (1993), Jegadeesh, Weinstein and Welch (1993), and Michaely and Shaw (1994) does not support the existence of a relation between underpricing at the time of IPO and further offerings in the subsequent period.

2.2.1C Information Revelation Hypothesis (Book-Building Models)

In markets like the US where majority of the IPOs are sold to the investors through book-building process, underwriters have considerable latitude over allocation of IPOs to different classes of investors. In the book-building issues, the underwriters undertake significant information gathering activities and collect indications of interest from prospective investors which convey significant information about the market demand of such issues. As a result, underwriters of book-building issues possess substantial information about the pre-market demand of IPOs in the US. On the basis of the pre-market demand conditions, underwriters in the US frequently revise the offer price during the filing period\(^1\). Hanley (1993) finds that underpricing tends to be higher when underwriters revise the offer price upward from the original estimate contained in the preliminary prospectus. Thus, the average underpricing is 53% for IPOs for whose final offer price is revised upward from the estimated offer price indicated in the preliminary prospectus, compared with 12% for IPOs whose final offer price remains within the original file price range, and 3% for IPOs whose final offer prices are revised downwards. This extra underpricing is interpreted as compensation to investors for

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\(^1\) In the US, underwriters file a preliminary prospectus containing an indicative issue price to the SEC; then road shows are conducted, especially before the institutional investors, and indications of interest are obtained from prospective investors. This information is then used to determine the final offer price, which is usually set 24 hours before listing. The final offer price may be the same as the indicative offer price contained in the prospectus, or may exceed, or may even be less than the indicative offer price. However, once the final offer price is set, the underwriters cannot sell shares to anybody at prices exceeding this, although they may sell at prices lower than this.
revealing information about their high personal demand for IPOs. Lee, Taylor, and Walter (1999) and Cornelli and Goldreich (2001) find evidence that informed investors request and receive more allocations which is consistent with the information revelation theory of book-building.

2.2.2 Symmetric Information Models

Apart from the models of underpricing based on information asymmetry, another family of models attempts to explain underpricing in terms of (rational) behavioural or structural characteristics. These models do not make any explicit assumption about existence of information asymmetry. We describe five such models in this section.

2.2.2A Stabilization Hypothesis

Investment bankers in the US are known to provide price support to newly listed IPOs through purchase of large number of securities with the objective of preventing the prices from falling in the immediate aftermarket. Investment bankers in the US typically create a “naked short” by exercising the over-allotment option (allocating shares in excess of the actual amount on offer to the extent of 15%). They cover their short position in the immediate aftermarket if the demand for stocks after listing is weak through their stabilization activity. Benveniste, Busaba and Wilhelm (1996), and Benveniste, Erdal, and Wilhelm (1998) point out that although the SEC in US has recognized the existence of such a practice, but has not formally affirmed it.

Ruud (1993) argues that this practice adopted by the investment bankers, known as stabilization, results in substantial overestimation of initial returns. However, Miller and Reilly (1987), using a sample of 510 firm commitment offerings of 1982-83, find that the effect of stabilization activity is negligible – it can reduce the extent of average underpricing from a level
of 9.9% to 9% at the worst. Thus, Ruud’s hypothesis that average initial return after adjusting for underwriter support should be substantially less than what is observed in the market is not supported by the evidence.

### 2.2.2B Ownership Dispersion Hypothesis

Pricing decisions of firms making IPOs may be guided by the objective of attaining a dispersed ownership post-IPO. If IPOs are underpriced, excess demand would be generated due to a larger number of investors applying for shares, resulting into a more dispersed ownership than otherwise. Booth & Chua (1995, 1996) argue that investors would expect higher liquidity of IPOs having more dispersed ownership in the aftermarket. Therefore, aftermarket price, and hence underpricing, would depend on the extent of ownership dispersion. Brennan & Franks (1995), on the other hand, argue that owners of issuing firms would target a dispersed ownership in order to secure their controlling position, perhaps against a potential takeover threat.

### 2.2.2C Market Incompleteness Hypothesis

If the market for IPOs is segmented from the larger capital market, underpricing may be necessitated to compensate the investors for participating in the market for IPOs. Thus, according to this view, underpricing is the premium to investors to induce them to participate in an incomplete market characterized by segmentation. This market segmentation may arise due to a variety of reasons. For example, regulatory fixation of IPO offer prices as opposed to market-driven prices of listed stocks, delay in listing of IPOs as opposed to instantaneous liquidity of stocks already listed, restriction of ownership of new issues (as, for example, in China), etc. all lead to a market segmentation in respect of IPOs.
2.2.2D Legal Liability Hypothesis

Tinic (1988) hypothesizes that underpricing may serve as an implicit insurance for the investment banker and the issuer against potential losses arising out of legal liability and associated damages to their reputations in case an IPO (brought out/issued by them) performs poorly in the after-market. Securities laws in the US provide the purchaser of an IPO with the scope of suing each or all of the parties involved in the offering process (e.g., directors or partner of the issuing firm, accountant, engineer, appraiser, or other consultant, the investment banker, and so on) on account of false or inadequate information or omission of material facts. The maximum recoverable amount is limited to the offering price to the public. Tinic argues that since there is no benchmark standard for information disclosure (rendering the judgment regarding truth or adequacy or inclusion/omission of an information all the more subjective), there is always a probability that some piece of information may be missed in the registration statement. In such a scenario, underpricing would protect both the investment banker and the issuer in two respects. First, it will reduce the probability of a lawsuit being brought against them, and even if a lawsuit is brought, it will reduce the probability of an adverse judgment. Second, since the regulations limit the maximum amount of damage recoverable from the issuers and/or investment bankers to the public offer price, underpricing reduces their potential loss in case of an adverse judgment in a lawsuit brought against them. Hughes and Thakor (1992) refines Tinic’s argument by developing a model which specifies conditions under which there is equilibrium underpricing.

Existence of some law firms in the US which seems to specialize in suing IPOs that have dropped in value, as indicated by Welch and Ritter (2002), may lend credence to the legal liability hypothesis. However, the evidence reported by Drake and Vetsuypens (1993), of higher
underpricing in case of IPOs those were subsequently sued, do not support the legal liability hypothesis. But Lowry and Shu (2002) argue that this may be due to higher underpricing of IPOs which are more likely to be sued later. Welch and Ritter (2002) are of the opinion that even if underpricing helps issuers and/or underwriters to avoid subsequent law suits, it is a cost-ineffective way of doing so. However, that law-suit avoidance motive is not the primary determinant of IPO underpricing is established by the fact that IPOs are similarly underpriced in other countries including India where, for example, class action suits are unheard of.

2.2.2E Regulatory Constraint Hypothesis

In some countries, offer prices are set not by the market, but by the regulators. For example, offer prices were to be based on certain financial ratios of three comparable companies until 1989 in Japan. Although this argument is not applicable in the case of the US where the SEC is concerned more on disclosure than on fairness of value, it may be relevant to other countries where offer prices are fixed by regulators or by regulator-specified formulae. Ibbotson and Ritter (1995) argue that such regulatory fixation often leads to the offer prices being set lower than they otherwise would be, resulting into underpricing.

Regulatory fixation of offer prices was the norm in India until 1992 under the Controller of Capital Issues (CCI) regime. The CCI was abolished in May 1992, and SEBI was given the statutory powers, and the issuers were given the freedom to charge any offer price (subject to fulfillment of certain criteria) from May 1992 onwards. Under the CCI regime, which laid overwhelming importance on fairness of value, offer prices (premiums to be precise) were determined according to a fixed formula.²

² See Varma and Venkiteswaran (1990) for a description and critical appraisal of the CCI methodology of fixing offer price.
As we do not have access to any reliable source of data about pre-1991 IPOs, nor have we come across any study of IPOs during the pre-1991 period, it is not possible to draw any inference about whether the extent of underpricing has come down after regulatory fixation of offer prices has been withdrawn. But the extent of underpricing in the free-pricing era in India is remarkably high by global standard, even if we consider those countries with largest extent of underpricing. Thus, regulatory fixation of offer prices cannot explain underpricing in India.

2.2.3 Models Based on Irrational Investor Behaviour

These models attempt to explain the underpricing of IPOs by deviating from the assumption of investor rationality and assumes various forms of investor irrationality.

2.2.3A Cascades Effect Hypothesis

Welch (1992) develops a model to argue that potential investors to an IPO not only depend on their own information while making investment decision, they also observe whether others are purchasing or not. If an individual investor observes that nobody else is investing in an IPO, she also decides not to invest even when she should invest going by her private information. The issuer may underprice the IPO in order to induce first few investors, so that all other investors follow these initial set of investors in a cascade, and invest in the IPO irrespective of their private information.

Ibbotson and Ritter (1995) point out that information revelation hypothesis together with cascades effect hypothesis imply that a positively-sloped demand curve may result. However, this is applicable to book-building offerings, and not to the fixed-price offerings.
2.2.3B Impresario Hypothesis

Shiller (1990) argues that the market for IPOs is subject to fads and bandwagon effects, and investment bankers underprice IPOs in order to create the appearance of excess demand. Just like an impresario of a rock concert who acts to make it an event, investment bankers attempt to position the IPO before the investors as an ‘event’ and deliberate underpricing is an instrument in their hands to accomplish the task. An implication of this hypothesis is that IPOs with highest initial returns would be the worst performers in the long-run – a hypothesis in favour of which some empirical support is found in Ritter (1991).

2.2.4C Divergence of Opinion Hypothesis

Miller (1977) argues that opinions differ among potential investor about the prospect of an IPO, with one set of investors being highly optimistic about the IPO and the other being pessimistic. The extent of divergence of opinion is likely to be more for IPOs with greater uncertainty. The optimistic lot turns out to be the actual buyer of the IPO. In the market for IPOs characterized by restriction on short selling in the early aftermarket, the pessimistic investors who expect the IPO to be overvalued, do not (or cannot) participate by selling short. As a result, the early aftermarket prices of IPOs (including listing price) are determined by the valuation of the optimistic investors, leading to initial prices in the aftermarket being much higher than otherwise.

Over time, as short sale restrictions ease, and more information about the firm become available, the divergence of opinion dissipates away, and prices gradually move towards fundamental value. In other words, according to divergence of opinion hypothesis, underpricing is the result of short-run over-valuation by (optimistic) investors, which gets corrected in the long-run when the IPOs underperform on average.
In spite of the appeal, this model has not been tested empirically for a long time. To our knowledge, the only attempt to test this model empirically has been made by Houge, Loughran, Suchanek, and Yan (2001) (henceforth HLSY). HLSY point out that predictions of Miller’s hypothesis depend on the assumption of short sale. They argue that both regulation-induced and market-induced short sale constraints indeed exist in the IPO market in the US, especially for some time after listing. By using various proxies for uncertainty or divergence of opinion based on opening-day trading (percentage opening bid-ask spread, time of the first trade and flipping ratio), they provide evidence in favour of Miller’s hypothesis that greater uncertainty about an IPO corresponds to greater short-run underpricing and long-term underperformance. However, HLSY admit that alternative explanations cannot be ruled out.

In India, arbitrage activity (and hence short selling) in the equity markets was banned during 1994-97. Even during the period when arbitrage activity was allowed, it used to have been concentrated at best in the top 200 or so highly liquid stocks (so called “forward group” of stocks on the Bombay Stock Exchange). Thus, there has been a regulatory ban on arbitraging on all new listings in India during the period under study. For a new issue to be included in the elite “forward group” of BSE, not only the firm had to be one with a fairly large capital base, it must have active trading record on the stock exchange for a considerable time. Thus, Miller’s hypothesis of divergence of opinion is well applicable to the Indian conditions in the 1990’s.

Following a similar line of argument as Miller (1977), Ljungqvist, Nanda, and Singh (2003) (henceforth LNS) develop a model in which the existence of a class of “irrationally exuberant” investors, who are prone to episodes of optimistic or pessimistic sentiment, leads to underpricing, hot issues market, and long-run underperformance. When these investors are overly optimistic about the prospects of IPOs from a particular industry, hot issues market...
result. LNS view these investors as infrequent traders, many of whom may not be active in the market at any particular time. Thus it is assumed that sentiment demand builds over time as additional sentiment investors arrive in the market. Arrival of additional sentiment investors continues so long as the hot issue market continues. There is also a class of rational investors who hold appropriate beliefs about the prospect of IPOs. Institutional investors, for instance, belong to this category. They are frequent investors in the IPO market, and enjoy some sort of relationship with investment bankers. During a hot issue market, all the shares will be allocated to the sentiment investors if the demand from them is sufficient. But that may not happen in a hot issue market probably because there are too many issuers trying to take advantage of the hot issue market. In that case, investment banker would allocate shares to the regular investors for resale in the aftermarket to sentiment investors as more of the latter arrive in the market place. The regular investor would be prevented from off-loading all the shares allocated to them in the very first day of trading due to possible punishment from the investment banker (e.g., by way of exclusion from future IPOs) for this excessive flipping. Thus, the regular investors would need to carry an inventory of shares for some time before they can sell these to the sentiment investors in the after-market. However, the hot issue market may end at any time, and as such, the regular investors face the risk of being unable to trade out of the stocks before hot issue market ends. This necessitates underpricing in order to cover the expected loss to the regular investors arising out of the possibility of being unable to sell shares before hot issue market ends. But for the existence of these rational investors, issuers would have been able to charge higher offer prices leading to lower or zero underpricing by cashing on the sentiment demand in hot issue market. In the LNS framework, the divergence of opinion between the irrationally exuberant investors and the rational investors is the reason for underpricing of IPOs.
2.2.4D Windows of Opportunity Hypothesis

If there are periods of high investor sentiment, leading to market wide misevaluation (overvaluation) attached by investors to listed companies, a transitory “windows of opportunity” is thrown open to firms, which then exploit this by issuing equities at higher than their intrinsic value. Ritter (1991) and Loughran and Ritter (1995) provide evidence in support of this hypothesis. Schultz (2003) provides evidence to argue that relatively unprofitable firms tend to go public during periods of good investor sentiment.

While this hypothesis holds market wide overvaluation (attached by investor) and subsequent opportunistic behaviour by firms to go public, some researchers have argued that overvaluation may not be market wide, but specific to particular industries. According to this view, during periods of high IPO activity, majority of IPOs come from certain specific industries that are characterized by extremely bullish investor sentiment. That is, such industries have more than proportionate representation in the sample. In other words, when market wide investor sentiment is particularly bullish about specific industries, the average first day return from the IPOs of these industries tend to be higher than average. Opportunistic behaviour by firm managers cause more firms from these industries to make IPO than others, and the sample of all IPOs tends to show underpricing on an average. Rajan and Servaes (2002) provide evidence that shows that industry-specific sentiment of investors still matters even after controlling for market wide sentiments.

The above phenomenon, reported by Ritter (1984), Helwege and Liang (2002), and Rajan and Servaes (2002) among others, is a manifestation of the “Hot Issue Market” phenomenon, leading to cycles in the IPO market. As Ritter (1998) notes, although some fluctuation in volume of IPOs may be expected due to fluctuation in normal business cycle, the actual extent
of fluctuation in volume and underpricing of IPOs (observed in US, for example, or in a number of other developing countries as cited in Loughran, Ritter & Rydqvist, 1994)) cannot wholly be explained by normal business cycles. This leads to the testable implication that firms going public in high volume period and from specific industries will have high initial return but poor long-run performance. In fact, there is considerable evidence in favour of this implication.

2.2.4E Irrational Exuberance Hypothesis

The role of investor sentiment has been emphasized in the literature on cyclical pattern of the extent of underpricing and volume of IPOs and the long-run underperformance (Ritter, 1984, 1991). The window of opportunity hypothesis propounded by Ritter (1991), Loughran, Ritter and Rydqvist (1994) and Loughran and Ritter (1995) predicts that issuers time their issues to exploit market wide or sector wide overvaluation caused by investor sentiment. Ljungqvist, Nanda, and Singh (2001) (henceforth LNS) argue that if issuers are rational enough to time their issues to exploit hot markets, why do not they choose a higher offer price leading to lower underpricing? In particular, given the existence of sentiment investors, it is possible to choose higher offer prices because these investors would subscribe to all the issues when the market is hot. Thus one needs to bring in some additional structure regarding assumptions and nature of economic environment to reconcile the simultaneous existence of short-run underpricing and long-run underperformance. LNS trace all the three anomalies related to IPOs – underpricing, hot issue markets and long-run underperformance – to a common source of inefficiency, viz., the existence of a class of irrationally exuberant investors. These sentiment investors are irrationally exuberant on occasions about the prospects of IPOs from a particular industry.

LNS start with the premise that some investors may, on occasion, be “irrationally exuberant” about the prospects of IPOs from a particular industry. These investors are called “sentiment
investors”. It is assumed that the number of the sentiment investors is not sufficient to absorb entirely the shares offered at the time of IPO. It is argued that it may be optimal for the merchant banker to underprice the IPO to maximize the benefits to the issuer by price discriminating between rational and exuberant (or sentiment) investors. However, price discrimination between sentiment investors and regular or rational (institutional) investors is not achieved by charging a different price to a different class of investors as such a practice is barred under the laws of the US (as well as of India). Instead, the price discrimination is achieved by allocating a larger proportion of shares to the regular or rational (institutional) investors who, in turn, sell a part of the IPO socks to the exuberant or sentiment investors in the aftermarket. LNS argue that underpricing is required in part to compensate the rational investors for the risk of the hot market ending suddenly leading to a situation where the rational investors are forced to liquidate their excess holding at a loss. These rational investors sell only a part of their holding (termed “excess” by LNS) and not the entire allocation in the immediate aftermarket for the fear of being denied any allocation or being allocated reduced quantities of shares in future IPOs.

This model throws open a number of testable implications, many of which are irrelevant in the present context of as all the IPOs under study were fixed price offerings marketed on a best effort basis. The implications relevant for the study are:

a) As investor sentiment grows, rupee size of IPOs increase, and increasingly lower quality firms go public, and more companies tend to raise money for non-investment purpose (like retiring debt or for augmenting working capital requirement).

b) Initial underpricing and long run underperformance are larger at both the beginning and end of a “hot issue” market.
c) Relation between initial underpricing and long-run performance is not necessarily monotonic – the relationship is negative only when the probability of the hot issue market coming to an end is small. Ritter (1991) reported a negative relation between initial underpricing and long-run performance, while Krigman, Shaw and Womack (1999) reported a positive relation.

2.3 IPO Market Cycles and “Hot Issues” Market

Not just underpricing, incidence of underpricing of systematically higher magnitude in some of the years and in some specific industries has also been documented. Ibbotson and Jaffe (1975) first documented the pattern for the 1960-70 period. They observed that average initial returns on IPOs have been extremely high during some of the years in the post-World War II period (e.g., 1950, 1951, 1961 and 1968). Such periods of systematically higher underpricing have been termed as the “hot issues” markets in the literature.

Ritter (1984) also reported the existence of cyclical pattern for the 1960-82 period. He finds an unusually high 48.4% average initial return during the “hot issue” market in 1980-1981 while reports a relatively low figure of 16.3% for the “cold issue” market in the remaining 1977-82 period. Ritter’s (1984) sample consists of 1028 IPOs (listed on NASDAQ) out of 1075 that were made during the six-year period 1977-1982. For each IPO, an initial return adjusted for market movement is computed using the closing bid price on the first day of aftermarket

3 In the US, the capital markets began to be regulated in a systematic manner in the 1930’s through the legislation of a number of Acts like the Glass-Stegal Act, 1933, Securities Act, 1933 etc. and the establishment of the capital market regulator, the Securities and Exchange Commission (SEC) before the onset of the World War II. All these changes were a direct fallout of the Great Depression and the market crash of early 1930’s. During the years of the World War II, the US capital markets remained subdued. It was only after the War that it began to flourish again.
trading. He computes a monthly average initial return for each month in the period (January 1977 – December 1982) by taking equally weighted average of 1-day initial returns of all the issues offered in a particular calendar month. She also includes a monthly time series of number of IPOs and monthly average initial returns for the period January 1960 – October 1970 from Ibbotson and Jaffe (1975)\(^5\), and computes the monthly average initial returns for the period November 1970 – December 1976 by the same procedure as Ibbotson and Jaffe (1975)\(^6\).

The important findings of Ritter (1984) are: i) for over 5000 IPOs during 1960–1982 constituting an almost exhaustive sample, the average underpricing (i.e., average initial return) is 18.8%; ii) the average initial return for the 15-month period commencing January 1980 is 48.4%, while for remainder of the 6-year period 1977-1982 it is 16.3%, compared to 18.8% during 1960-1982, which indicates the occurrence of ‘hot issues’ market (during that 15-month period).

One of the implications of the Rock’s model (1986) is that riskier firms should have higher average initial returns than firms, which are easier to evaluate. Ritter (1984) attempts to explain the occurrence of ‘hot issue’ markets with the help of this argument – a hot issue market would

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4 The first aftermarket bid price in the US is on the date of offering itself. For some securities, especially the best efforts offerings, the first trade is recorded several days after offering date. And the lag between offering and first trade is more than a week in case of only a few securities.

5 Ibbotson and Jaffe(1975) an average first month residual which is analogous to Ritter’s (1984) monthly average initial returns.

6 The reason for employing the Ibbotson and Jaffe (1975) methodology for the period November 1970 – December 1976, instead of the average initial returns methodology which is used for the period 1977-1982, in the words of Ritter(1984), is, “...that, until about 1976, many of the aftermarket price quotations were not sufficiently timely to justify ignoring market movements in constructing the initial performance measures”. [p. 218]
occur in a period when large proportion of IPOs are from high risk firms, and a cold issue market would occur when a large proportion of firms making IPOs are low risk ones.

In order to test the above implication of Rock’s model that riskier (i.e., harder to value) firms will be underpriced more than the less risky issues, Ritter uses two proxies as measures of risk – sales and variability of returns in the aftermarket, the former being an *ex ante* measure and the latter an *ex post* one. Ritter hypothesizes that smaller the size (sales) of a firm, the riskier it is. She divides her sample of 1028 firms (of the period 1977-1982) into three categories by size of sales. The result that lower the size (i.e., higher is the risk), higher is both the average initial returns and variations of the initial returns (measured by standard deviations of the average return) support the hypothesis that riskier issues are underpriced more. With age of firm as a proxy for *ex ante* risk instead of sales, Ritter has obtained qualitatively the same result as well.

However, Ritter did not find convincing evidence to support her explanation of the reason for occurrence of hot issue market. Instead, the reason for the substantially higher than average initial returns during the 15-month period commencing January 1980 was found, on a closer examination of the individual firms, to be the preponderance of small start-up natural resources firms in the sample during the period. The IPOs of these natural resources companies exhibited very high price jumps in the aftermarket. If these firms are excluded from the sample, the average initial returns during the 15-month period turns out to be 21.0%, and the ‘hot issue’ market effect is hardly perceptible.

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7 The natural resources firms were mostly engaged in the business of oil and gas exploration and development, oil and gas field services and refining, coal and mineral exploration. Some Denver-based underwriters took public a number of start-up firms (defined as firms with sales less than $500,000) during the hot issue market of 1980 often at a very low offer price. These issues recorded large returns on listing and continued to appreciate in price till the end of November 1980, when the oil sector’s market value peaked. During the following price decline of 1981 and 1982, many of those Denver-based underwriters had to fold up their business mostly under pressure from the SEC on charges of price manipulation and violations of net capital requirements.
Ibbotson, Sindelar and Ritter (1988) extended the sample period to 1960-87 and reconfirmed the phenomenon. They also found a clear relationship between the average initial return and the number of offerings: severe underpricing of IPOs appears to lead heavy volume periods of new offerings by approximately six to twelve months.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of years for which data available</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>32</td>
<td>0.24</td>
</tr>
<tr>
<td>UK</td>
<td>26</td>
<td>0.59</td>
</tr>
<tr>
<td>Germany</td>
<td>31</td>
<td>0.45</td>
</tr>
<tr>
<td>Finland</td>
<td>21</td>
<td>0.72</td>
</tr>
<tr>
<td>Italy</td>
<td>21</td>
<td>0.47</td>
</tr>
<tr>
<td>France</td>
<td>21</td>
<td>0.50</td>
</tr>
<tr>
<td>Switzerland</td>
<td>19</td>
<td>0.41</td>
</tr>
<tr>
<td>Sweden</td>
<td>21</td>
<td>0.38</td>
</tr>
<tr>
<td>Brazil</td>
<td>20</td>
<td>0.44</td>
</tr>
<tr>
<td>Taiwan</td>
<td>21</td>
<td>0.56</td>
</tr>
<tr>
<td>Japan</td>
<td>21</td>
<td>0.81</td>
</tr>
<tr>
<td>Australia</td>
<td>18</td>
<td>0.54</td>
</tr>
<tr>
<td>Singapore</td>
<td>21</td>
<td>-0.39</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>18</td>
<td>0.67</td>
</tr>
<tr>
<td>Korea</td>
<td>20</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Source: Constructed from Loughran, Ritter and Rydqvist (1994)

Loughran, Ritter and Rydqvist (1994) find strong correlation across countries between the annual volume of IPO and the performance of the secondary market as measured by inflation-adjusted level (index) of stock prices. As may be observed from the table below, the correlation is strongly positive for all the 14 countries, and is negative for Singapore. In case of the US, where lowest correlation coefficient (except Singapore) of 0.24 is found, the correlation of annual volume of IPO is much stronger with the level of small-capitalization stock prices than
with the S&P 500 index actually used by the authors to measure secondary market performance. In case of several other countries, the correlation between IPO volume and contemporaneous stock prices is weakened by regulation-induced lag between the decision to go public and the time of actual IPO.

LRR (1994) provide several hypotheses to explain the high correlation between the volume of IPO and the performance of secondary market. First, the number of IPOs in a year depend, among others, on how large a “stockpile” of firms that are in the waiting for the right time to go public. The stockpile is faster replenished in a high-growth economy than in a slow-growing one. Implicit in this of their hypothesis is an explanation for cycles in the IPO market. According to this hypothesis, a period of high volume of IPO would reduce the stockpile of firms desirous of making IPOs, and as a result, the volume of IPO would reduce in subsequent period. A period of poor secondary market performance would hold back firms from going public for anticipation of inadequate investor response, and in times of good secondary market performance, these firms would attempt to go public so that there would be a clustering of IPOs around times of high stock prices. If the above two effects are synchronized, the IPO cycle would be strengthened.

Second, both the volume of IPOs and secondary market performance are dependent to a large extent on the performance of the economy. Thus, in periods of good investment opportunities, the demand for external capital by firms, and hence volume of IPOs, would be higher; so also would be the performance of the secondary market, thus yielding a positive correlation between the two.

However, LRR (1994) admit that much of the correlation among IPO volume and stock prices remain unexplained after accounting for the above factors. For example, the East Asian
countries in their sample experienced very high growth for much of the thirty years (1960-91) under study, but the volume of IPOs in these countries remained concentrated around the time of exceptionally high stock prices. It is admittedly impossible to explain the extent of variation of stock prices in these countries without invoking “bubbles”.

According to Ritter (1984), the changing risk composition of firms making IPOs may be the reason for cycles. That is, the firm characteristics differ in hot and cold issue markets. Due to some technological innovation or positive productivity shock, a large number of firms from particular industries might come to the IPO market, leading to clustering. With rising stock prices and rising volume of IPO (resulting from say, a positive exogenous shock to the economy), more and more firms tend to get lured by possibility of raising easy and cheap capital. Over time, as the supply of good quality firms is limited, the quality of firms making IPOs decline. After a certain point of time, the investors realize the decline in quality of IPO firms, and the boom disappears. Thus, according to this hypothesis, changing risk composition of firms leading to adverse selection is responsible for cycles in IPO market. However, Helwege and Liang (2002) provided evidence to argue that firm characteristics and industry affiliation were no different in hot and cold markets. Loughran and Ritter (2004) provide evidence to show that variation of firm quality across time, although present in the sample, is insufficient to account for the swings in IPO volume.

Lowry (2003) investigates three hypotheses for explaining cycles – capital demands, adverse selection (resulting from information asymmetry) cost of issuing equity, and level of investor optimism or investor sentiment. Capital demand might be a factor for IPO market cycles as normal business fluctuations may cause firms’ demand for capital to vary in a cyclical manner. Information asymmetry might potentially cause cycles in the IPO market as time varying
uncertainty may open windows of opportunity wherein firms may sell overvalued equity to the public. Investor sentiments may also potentially cause cycles, as investors, led by sentiments, may at time be willing to buy more risky firms. She finds that all three factors are statistically significant, but investor sentiments (captured by discounts on close-ended funds) and capital demand are economically significant determinant of IPO volume. This is in line with the evidence provided by Pagano, Panetta, and Zingales (1998) who show that most IPO firms do not appear to have urgent funding needs, and by Baker and Wurgler (2002) who show that equity issuance decision of firms seem to be driven mainly by market timing attempts (Loughran and Ritter, 1995 also provide similar evidence). Helwege and Liang (2002) show that the growth prospects or future operating performance of hot market IPOs do not seem to differ much from those of cold market IPOs.

Some studies have focused on information spillovers as the main driver of the hot market phenomenon. They argue that initial information related problems affecting the valuation of a few pioneers get dissipated once these early IPOs get listed. This makes valuation of subsequent IPOs easier. Lowry and Schwert (2002) find that more firms go public after observing high initial returns for other firms. They also report the existence of serial correlation in underpricing, which they argue that is explained by clustering of similar firms going public at the same time. Benveniste, Ljungqvist, Wilhelm, and Yu (2003) provide similar evidence to show that IPO volume is highly sensitive to the outcomes of recent and contemporaneous offerings. Higher (lower) than expected value of underpricing in a particular month dramatically increases (reduces) the volume of IPOs in subsequent months. These works in general are consistent with the empirical observation that IPO market cycles are often caused by a more than proportionate representation of firms coming from the same industry making IPOs. However, the particular industry effect may be due to the managers’ attempt to exploit the industry wide mis-valuation as suggested in the windows of opportunity hypothesis or due to the valuation of the particular industry becoming easier than before (after the first few IPOs from the same industry) as suggested in the information spill over hypothesis.
Ghosh (2004), using a sample of 1842 Indian IPOs during 1990s, found in his sample that: (i) firms’ decision to go public is dependent on the number of IPOs listed in the previous month; (ii) there is no significant relation between IPO volume and initial return in hot and cold markets, and (iii) there is no significant influence of industry affiliation of IPOs during the boom period.

A few other work have attempted to model for explaining intertemporal clustering of IPOs. For example, Chemmanur and Fulghieri (1999) argue that occurrence of productivity shocks (that are correlated across firms). Maug (2001) argue that the first IPO from a new industry helps investors to develop a better understanding of that industry leading to improved acceptability among the investors of further IPOs from the same industry as costs of evaluating the later IPOs decline. This causes clustering of IPOs from that particular industry during a specific time period. In a related model, Stoughton, Wong, and Zechner (2001) argue that observed underpricing (or over pricing) of a firm (market clearing price) conveys information about future prospects of not only the particular firm but of the industry as well. Consequently, clustering will occur if the first IPO (or first few IPOs) from a particular industry conveys favourable information about the industry.

### 2.4 Long Run Underperformance of IPOs

The literature reports that IPOs exhibit poorer than expected performance in the long-run. In this context, “expected performance” is defined as the performance of the market (as captured by market indices) or by a portfolio of similar (by firm characteristics like size and/or book-to-
market ratio) firms. The concept of “long-run” includes anything between one to five years after listing of the IPO.

That IPOs underperform the market (and even the comparable non-IPO firms) in the long-run was first confirmed\(^8\) in the academic literature in Ritter (1991). Using a sample of 1526 US IPOs between 1975 and 1984, Ritter reported that IPOs generated three-year return of 34.47% compared to a sample of 1526 control firms (matched for industry and size) that generated three-year return of 61.86%. This amounted to underperformance of 27.39% over three-year period, or 7.04% per annum. That is, if investors, instead of investing in the IPOs, would have invested a certain amount of money in already listed companies of same size and industry as the IPOs, they would have realized a return that would have been 7.04% per annum more than if they would have invested in the IPOs over three-year period. Other studies using US IPOs over different (but somewhat overlapping) time periods and deploying different methodologies reached broadly similar conclusion of long-run underperformance. Loughran (1993), Brav & Gompers (1997), Gompers & Lerner (1999), Servaes & Rajan (1997), Teoh, Welch, and Wong (1998) among others obtained similar evidence supporting underperformance of US IPOs in the long run using different methodologies.

Evidence from other countries also confirmed long-run underperformance of IPOs. For example, Levis (1993) and Espenlaub, Gregory, and Tonks (2000) [United Kingdom], Uhlig (1988) [Germany], Finn and Higham (1988) and Lee, Taylor and Walter (1996) [Australia], Kunz and Aggarwal (1994) [Switzerland], Keloharju (1993) [Finland] all provided evidences

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\(^8\) Ritter (1991) admits that at least three academic papers and a series of articles in the *Forbes* magazine have studied long-run performance of IPOs in the US. However, all of them suffered from some limitation or other (e.g., small size of sample, inappropriate benchmark, etc). Ritter’s (1991) work is the first systematic study by academia based on a large sample (1526) of IPOs carried out with proper academic rigour.
that tended to confirm underperformance of IPOs in the long run. Experience of long run performance from countries across the world is summarized in Table-3.3, which shows that evidences in favour of long-run underperformance of IPOs were reported from even the emerging economies as well.

A few studies in the context of emerging economies are worth mentioning. For example Aggarwal, Leal, and Hernandez (1993) reported that IPOs tended to underperform their comparable benchmarks in the long-run in Brazil, Mexico and Chile. Dawson (1987) reported negative one-year performance of IPOs relative to market indices in Hong Kong and Singapore but found none of them statistically significant, but reported that Malaysian IPOs overperformed the market index (statistically significant) which they added that was perhaps because the Malaysian market index was one of industrial companies and not a market-wide index. Using a large dataset of 2056 Indian IPOs between 1991 and 1995, Shah (1995) reports that IPOs underperform the market over the first 200 trading days (roughly nine months) after listing and then begin to exhibit underperformance which, after 400 trading days (or one and half year), gets removed.

Although Ritter (1991) reported underperformance of US IPOs for a three-year period following listing, there are evidences in the literature that lead us to believe that long-run underperformance of IPOs persists for five years. Yi (1992), using the same IPO sample as in Ritter, finds that the underperformance continues until six years after going public. Loughran (1993) finds underperformance for the five calendar years following the year of the IPO for 3,656 Nasdaq-listed IPOs from 1967 to 1988. Loughran and Ritter (1995) use a larger sample of IPOs (4,753 issues between 1970 and 1990) and find that the poor stock performance extends to five years after issue, with no further underperformance in the sixth year. Loughran
and Ritter (1995) also cite the work of Seyhun (1992), which reports underperformance for about six years after going public for a sample of 2,298 US IPOs from 1975 to 1988. Levis (1993) finds that IPOs in the UK underperform for a period beyond three years.

Table 3.3: Extent of Long-run Performance of IPOs Across the World

<table>
<thead>
<tr>
<th>Country</th>
<th>Study</th>
<th>Sample Period</th>
<th>Sample Size</th>
<th>Window (years)</th>
<th>Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Ljungqvist (1997)</td>
<td>1970-90</td>
<td>145</td>
<td>3</td>
<td>-12.1</td>
</tr>
<tr>
<td>Australia</td>
<td>Lee et al (1994)</td>
<td>1976-89</td>
<td>266</td>
<td>3</td>
<td>-51.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>Aggarwal et al. (1993)</td>
<td>1980-90</td>
<td>62</td>
<td>3</td>
<td>-47.0</td>
</tr>
<tr>
<td>Canada</td>
<td>Shaw (1971)</td>
<td>1956-63</td>
<td>105</td>
<td>5</td>
<td>-32.3</td>
</tr>
<tr>
<td>Chile</td>
<td>Aggarwal et al. (1993)</td>
<td>1982-90</td>
<td>28</td>
<td>3</td>
<td>-23.7</td>
</tr>
<tr>
<td>Korea</td>
<td>Kim et al. (1995)</td>
<td>1985-88</td>
<td>99</td>
<td>3</td>
<td>+91.6</td>
</tr>
<tr>
<td>United States</td>
<td>Simon (1989)</td>
<td>1926-33</td>
<td>35</td>
<td>5</td>
<td>-39.0</td>
</tr>
<tr>
<td>United States</td>
<td>Simon (1989)</td>
<td>1934-40</td>
<td>20</td>
<td>5</td>
<td>+6.2</td>
</tr>
<tr>
<td>United States</td>
<td>Stigler (1964 a, b)</td>
<td>1949-55</td>
<td>46</td>
<td>5</td>
<td>-25.1</td>
</tr>
<tr>
<td>United States</td>
<td>Cusatis et al. (1993)</td>
<td>1965-88</td>
<td>146</td>
<td>3</td>
<td>+33.6</td>
</tr>
<tr>
<td>United States</td>
<td>Loughran (1993)</td>
<td>1967-87</td>
<td>3,656</td>
<td>6</td>
<td>-33.3</td>
</tr>
<tr>
<td>United States</td>
<td>Ritter (1991)</td>
<td>1975-84</td>
<td>1,526</td>
<td>3</td>
<td>-29.1</td>
</tr>
<tr>
<td>Finland</td>
<td>Keloharju (1993)</td>
<td>1984-89</td>
<td>79</td>
<td>3</td>
<td>-21.1</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>McGuinness (1993)</td>
<td>1980-90</td>
<td>72</td>
<td>2</td>
<td>-18.3</td>
</tr>
<tr>
<td>Japan</td>
<td>Cai &amp; Wei (1997)</td>
<td>1971-90</td>
<td>172</td>
<td>3</td>
<td>-27.0</td>
</tr>
<tr>
<td>Sweden</td>
<td>Loughran et al. (1994)</td>
<td>1980-90</td>
<td>162</td>
<td>3</td>
<td>+1.2</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Kunz &amp; Aggarwal (1994)</td>
<td>1983-89</td>
<td>34</td>
<td>3</td>
<td>-6.1</td>
</tr>
</tbody>
</table>

Note: Window is the number of years over which aftermarket returns are computed. Returns are annualized, exclude initial returns, and are generally market adjusted but are not risk adjusted. When more than one benchmark is used, a representative result is shown.

Source: Loughran, Ritter & Rydqvist (1994). References quoted in this table may be found in the source paper.

Unlike the initial underpricing of IPOs for which a number of hypotheses have been offered, the explanations for observed long-run underperformance of IPOs have been rather limited. Nevertheless, we can identify at least three major hypotheses in the literature that seek to
explain long-run underperformance. The first is the divergence of opinion hypothesis offered by Miller (1977). It may be noted long-run underperformance of IPOs was not yet documented in the academic literature when Miller’s paper was published. Miller’s hypothesis was originally provided to explain short-run underpricing of IPOs, and incidentally the model also predicted underperformance of the IPOs in the long-run. According to this hypothesis, IPO investors differ in their opinion about IPOs with some being optimistic and others pessimistic. It is the optimistic investors who attach more value to the IPOs than the pessimistic investors and prop up the values of the IPOs in the early days of trading, thus causing underpricing. Over time, as more information arrives, the excess optimism of optimistic investors fed away, and the opinions of both groups of investors tend to converge. As a result, the value of IPOs tends to come down over time, giving rise to underperformance in the long-run.

Another hypothesis that predicted long-run performance was the one of imopressario hypothesis offered by Shiller (1990). Like Miller, Shiller offered the hypothesis to explain short-run underpricing, and a prediction of the model was long-run underperformance. According to this hypothesis, IPO markets are subject to fads, and investment bankers act as “impresarios” promoting the issues. Investment bankers underprice IPOs intentionally to create a false impression of excess demand to attract investors. Consequently, price correction takes place in the aftermarket, and the IPOs exhibit underperformance in the long run. The hypothesis also predicts that the size of long-run underperformance should be related positively to the size of initial underpricing. Although Ritter (1991) finds some evidence in favour of the predicted relationship between initial underpricing and long-run underperformance, Yi (2001) reports that initial return is generally not a significant factor in explaining long-run underperformance.
The “windows of opportunity” hypothesis is the third major one that has been offered by Ritter (1991) and Loughran and Ritter (1995) to explain the long run underperformance of IPOs. They propose that investor sentiments vary over time, and when investor sentiments are high, thereby leading to a situation where investors are especially optimistic about the growth potential of IPOs and thus are willing to overpay for such issues (i.e., companies are valued by investors at a level higher than their true value), an windows of opportunity is thrown open. Corporate managers time their issues to take advantage of such windows of opportunity in order to sell their stock at higher than their true value. As the investor optimism dies down over time, price correction takes place in the aftermarket causing the IPOs to underperform in the long run. The evidence that Loughran and Ritter (1995) provide is interesting. They find that long-run underperformance occurs for seasoned equity offerings (SEOs) as well, not only for IPOs. They study a large sample of IPOs (4753 firms) and SEOs (3702 firms) between 1970 and 1990 and compute mean buy-and-hold returns for three years and five years.

First, they report underperformance of both IPOs and SEOs over three- as well as five-year period vis-à-vis matching firms, which did not issue stock in the preceding five years. Then they also report underperformance of both IPOs and SEOs (again over three and five-year periods) vis-à-vis market indices. They use five different indices for the purpose. While magnitude of underperformance of individual firms varied depending upon the index used, they under performed all the indices.

Many of the SEOs in the sample of Loughran and Ritter (1995) conducted IPOs within the five years preceding the seasoned issues. Since IPOs are known to underperform for about five years after the year of the IPO, underperformance of SEOs may be another manifestation of underperformance of IPOs. To test this proposition, they divide the sample of SEOs into two
categories – one included the SEOs which did not make any IPO within five years prior to their seasoned issues, and the other included the SEOs which did. Interestingly, they report similar magnitude of underperformance vis-à-vis their matching firms for both the categories of SEOs. Thus, long-run underperformance of SEOs is not another manifestation of long-run underperformance of IPOs.

Next, they test the proposition whether long-run underperformance of SEOs is due to return reversal or not. It is observed that issuers of SEOs exhibit a substantial run-up in their prices (72% on an average) in the year just preceding their seasoned issues. Thus, the subsequent underperformance of SEOs may be due to long-term mean reversion. To examine whether this is really the case, Loughran and Ritter (1995) select only those SEOs which were “extreme winners” during the price run-up before their seasoned issues. That is, first they identify all those firms which outperformed the market index by at least 50% in a calendar year. Then they identify the firms which conducted an SEO during the 18-month from the beginning of the calendar year in which they outperformed the market. In this manner they arrive at a sample of 896 SEOs. They find that shares of these firms have a five-year buy-and-hold return of 26.4% compared to 98.3% appreciation of the non-issuers – underperformance by the SEOs to the extent of 72% in five years. Thus they conclude, “what matters for future returns is not the previous year’s return, but whether or not a firm has issued stock”. That is, long-run underperformance of SEOs is not a manifestation of long-term return reversals.

Since many of the firms going public are growth stocks and most firms conducting SEOs had a substantial price run-up during the prior year, they tend to have relatively low post-issue book value to market value ratio. Firms with low book-to-market ratio tend to have lower returns. Thus book-to-market factor may be a reason of the long-run underperformance of new issues
(SEOs and IPOs). Again, while studying underperformance of new issues (SEOs and IPOs) vis-à-vis non-issuers, the non-issuers were selected through size-matching. That is, the firm with next bigger size (by market capitalization) compared to a new issue is taken as its matching firm. One may ask whether size-matched firms are appropriate benchmark for studying underperformance.

In order to take care of these concerns, Loughran and Ritter (1995) run cross-section and time series regressions by controlling for both book-to-market and size factors. The result they find is that less than 25% of underperformance of new issues can be attributed to size and book-to-market factors. They conclude that such underperformance is only partly a manifestation of the more general tendency for firms with low book-to-market ratio to have low returns.

The major hypothesis they offer is that firms take advantage of “transitory windows of opportunity” by issuing equity when, on average, they are substantially over-valued by outsiders.

Apart from the extent of average performance of IPOs in the long run, a few studies have attempted to study the relationship between IPO firm characteristics and the cross-sectional variation of long run performance of IPOs. Ritter (1991) reports that younger firms and firms that went public in the high volume years had the most serious underperformance, and that older firms going public in low-volume years did not exhibit underperformance. Teoh, Wong and Rao (1995) find that IPO firms that had high discretionary accounting accruals were associated with the largest negative abnormal stock returns. Brav and Gompers (1997) find that venture capital-backed IPOs outperform non-venture capital-backed IPOs when returns are computed on an equal-weighted basis, but that the difference in returns is largely due to severe underperformance of small firms. Carter, Dark and Singh (1998) provide evidence to show that
IPOs underwritten by reputed investment banks do not under perform the market index (NASDAQ), but IPOs underwritten by less prestigious underwriters severely under perform the index during the first three years after issue. Beatty and Vetsuypens (1995) find evidence that the investment banks are penalized for underwriting the IPOs that had poor long-run performance.

In more recent years, especially since the mid-1990s, the academic debate regarding long-run performance of IPOs has focused on the methodological issues. This stream of literature raises question on the very basic issue of measurement of performance of IPOs in the long run and suitability of various benchmarks used to mimic the normal or expected performance against which IPO performance is judged. This literature will be surveyed in the section on “Methodology and Measurement Issues” in Chapter 5.

2.5 Comments

The market for IPOs displays three anomalies – underpricing of IPOs in the short run, cyclical pattern of volume and underpricing, and underperformance in the long run. In this chapter, we focus on the models related to short run underpricing of IPOs.

Underpricing of IPOs is defined as the positive excess return over the market index from the offer price to listing price (usually closing price on the first day of trading). Initially underpricing of IPOs was reported in the US markets, but soon evidences poured in to show that underpricing of IPOs is observed in any country with a stock exchange. Various hypotheses have been offered to explain this phenomenon. Most of these hypotheses tended to explain
underpricing in terms of information asymmetry between the issuers and/or investment bankers on the one hand and the investors on the other. Another set of models, while retaining the assumption of investor rationality, seeks to explain underpricing with the help of behavioural or structural factors related to the IPO market. Yet another set of models attempts to explain underpricing with the help of investor irrationality.

It has also been noted in the literature that the volume of IPOs and the extent of underpricing is subject to cyclical pattern. In this case as well, the evidence was first reported in the context of the US market, but was found to occur subsequently in a large number of other markets (developing and developed) as well. While it is not very clearly understood why IPO markets are subject to cycles, partly it might be because of normal business cycle driving the demand for capital by firms to become procyclical as well. But normal business cycle is unable to explain the extent of cyclical fluctuations in the IPO market. The market timing attempts by firms (to issue when markets are characterized by high degree of investor optimism) and information spillover effect (first few successful IPOs leading to a deluge of further IPOs) may also be important.

While IPOs are found to be underpriced on average in the short run, they are found to underperform the benchmark in the longer run horizon of three to five years. The benchmark could be a market index, or a control firm selected on firm characteristics (like size and/or book-to-market ratio) or a portfolio of control firms selected on firm characteristics. Empirical evidence in favour of long run underperformance has also been reported from across the countries. The major hypotheses advanced to explain this phenomenon include the divergence of opinion among investors (more optimistic investors driving the prices in the early market, and their excess optimism getting reduced over time with further flow of information),
impresario hypothesis (investment bankers underpricing IPOs in order to create an appearance of excess demand at the time listing, and such artificial excess demand getting shrinking in the aftermarket leading to price correction) or the windows of opportunity hypothesis (issuers timing their issues to exploit the opportunity thrown open by temporary mis-valuation of the market or a specific industry and such mis-valuation getting corrected in the long-run leading to underperformance). A few studies also attempted to explain underperformance by exploring the association of long run performance with firm characteristics prior to or at the time of the IPO. However, in more recent years, the focus in the literature shifted towards measurement and methodological issues.

References


