CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

IPO Pricing Mechanism and Performance in Emerging Market: An Empirical Investigation of Short and Long Term Returns in Pakistan

by

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CERTIFICATE OF APPROVAL

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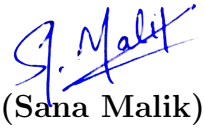

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(Sana Malik)

Abstract

The performance of initial public offerings (IPOs) in Pakistan is examined in this study, which also sheds light on how the fixed price approach and the book building method contribute to the explanation of return and volatility.

It further explores the connection between investor enthusiasm, underwriters, and issue size on returns and volatility across various investment horizons. The investment periods studied include first-day, first-week, first-month, a quarter, a half year, a year, and from the first day of trading to June 30, 2025. The study employs a cross-sectional regression analysis to examine 22 initial public offerings (IPOs) held in the Pakistan Stock Exchange between 2020 and 2024.

The findings show that when the book building method is employed to calculate the offer price, IPO returns are lower on the first day and first week. However, there is no discernible difference between the fixed pricing technique and the book building method's returns for the first month, first quarter, first half-year, and first year. In the case of the book-building method, it may be claimed that the offer price is initially higher and then reverses in the short term.

Investor enthusiasm measured through oversubscription has a positive impact on first-week and first-month returns of the IPOs. The issue size a significant impact on first-day and first-week returns only. However, no link is observed between oversubscription and returns on one-quarter, first-half year, first-year, and overall returns. Underwriters have no significant impact on IPO returns in the short run as well as the long run. The study could not find any evidence for the link between IPO method, IPO Size, Oversubscription and volatility of IPO returns. The IPO returns are not generally found to be different from the market return under assumptions of equal and unequal variance.

Based on signaling theory, offer pricing method, and investor enthusiasm can be used by investors for decision-making. The regular should monitor the pricing method as it has important implications for investment. Therefore, this study has important implications for resource allocation, portfolio management, and risk management.

Keywords: Initial Public Offerings (IPOs), Book Building, Fixed Price, Pakistan Stock Exchange (PSX), IPO size, price volatility, returns, underwriter performance, oversubscription.

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Abbreviations

BBM	Book Building Method
BHAR	Buy-and-Hold Abnormal Returns
DL	Public Direct listings and offerings
FPM	Fixed Price Method
GDP	Gross Domestic Product
IPO	Initial Public Offering
PSX	Pakistan Stock Exchange
SECP	Securities and Exchange Commission of Pakistan
SEO	seasoned equity offers

Chapter 1

Introduction

1.1 Theoretical Background

One of the most critical decisions faced by parties involved in the initial public offering (IPO) process namely, issuers and underwriters is the determination of the offer price. This price not only influences the amount of capital raised by the issuing firm but also plays a pivotal role in shaping investor perception and the stock's performance in the aftermarket. Every financial market has empirically demonstrated the first day of a typical positive return (underpricing) inside Initial Public Offerings (IPOs) Che-Yahya et al. (2018); Mohd-Rashid et al. (2018); Tutuncu (2020).

The three primary IPO methods fixed-price offerings, book building, and auctions demonstrate notable differences in how offering prices are determined and how shares are allocated to investors. Each method follows its own distinct set of rules and processes, which can significantly influence investor participation and issuer outcomes. Following an IPO, investors' responses and trading patterns are influenced by the unique incentives and information dynamics that each of these strategies offers. In the 1980s, a number of European nations, including France, Italy, the Netherlands, Portugal, Sweden, Switzerland, and the United Kingdom, introduced fixed-price offerings and discriminatory auctions. In the 1990s, countries like Japan, Malaysia, Singapore, Taiwan, and Turkey adopted similar systems, following a similar pattern in other parts of Asia.

According to the majority of empirical research, book building increases aftermarket volatility or underpricing Huang et al. (2017); Ljungqvist et al. (2003); Pettway et al. (2008); Derrien and Womack (2003).

In the fixed-price method, the offer price is set in advance by the underwriter, with no adjustment for market demand. This approach offers simplicity and predictability, but it does not incorporate investor feedback in determining the final price. Once the price is fixed, shares are typically distributed to investors on a pro-rata basis meaning that each investor receives a portion of the shares proportional to their request, regardless of demand intensity or strategic importance. In contrast, the book-building approach offers greater flexibility and is considered more market-responsive. Under this method, underwriters engage with potential investors before the IPO to collect informal expressions of interest, helping them assess the level of demand at various price points. This pre-market feedback allows for a more informed pricing decision and enables underwriters to tailor share allocations often favoring institutional investors or those deemed long-term partners. As noted by Sherman (2005), the ability to gather market intelligence and make discretionary allocations gives book building a significant advantage in managing both pricing risk and investor relationships.

Auction IPOs take a more decentralized, market-driven approach. In these offerings, the final IPO price is determined through investor bidding, where participants must place bids above a pre-announced minimum price set by the issuer or underwriter.

The behavior of initial public offerings (IPOs) over short and long time horizons has been a topic of much discussion among financial researchers. The tendency of underwriters to underprice initial public offerings (IPOs) in the near term, which results in significant initial returns for investors, is a well-established phenomenon in both developed and emerging markets. IPOs have been found to underperform benchmark indices over longer time horizons; therefore, this performance is frequently short-lived. In order to comprehend the fundamental causes of these pricing anomalies, theoretical models and empirical research have been conducted. It is commonly believed that issuers purposefully undervalue their shares in order

to foster goodwill among investors and make it easier for them to raise money in the future through seasoned equity issues.

The method selected for pricing has a substantial impact on the efficiency of price discovery, investor participation, and the ultimate success of the offering. As identified by Ritter et al. (1998), there are three principal pricing mechanisms employed in IPOs: the book-building process, auction methods, and fixed-price offerings. Each mechanism presents distinct advantages and limitations, thereby influencing the outcomes of the IPO in various ways.

In the context of Pakistan, similar patterns have been found on the Pakistan Stock Exchange (PSX). Empirical data from local studies suggest that IPOs in Pakistan exhibit considerable underpricing on the first day of trade, generally attributed to high investor demand, market sentiment, and underwriters' conservative pricing techniques. Limited IPO supply and speculative trading further amplify the short-term price spike. On the other hand, as initial investor euphoria gives way to more realistic appraisals of firm value, many Pakistani initial public offerings (IPOs) have a tendency to underperform over the long term. This underperformance is caused by a number of factors, including the prevalence of family-owned business structures, inadequate corporate governance, and restricted disclosure.

The following factors make the Pakistani initial public offering (IPO) market a fascinating place to research. The first reason has to do with the rules governing the pricing strategy in the Pakistani initial public offering (IPO) market. Two IPO pricing strategies the fixed-price strategy and the book-building strategy have been used in Pakistan. Before 2008, the Pakistani IPO market only employed the fixed-price approach; however, since then, both approaches have been permitted. 75% of an IPO's shares were made available to institutional investors through book building under the book-building mechanism, and 25% were made available to the general public through the fixed-price method. More significantly, compared to the period of 1992-1998, only 90 initial public offerings (IPOs) were conducted between 2000 and 2017.

The macroeconomic circumstances of Pakistan, such as political unrest, social security concerns, terrorist attacks, and sluggish industrial production development,

were the cause of this declining trend in IPOs Mehmood et al. (2020). According to Angelini and Foglia (2018), the number of first public offerings (IPOs) was influenced by industrial production, market volatility, interest rates, and initial return. Pakistan's IPO market constrained the expansion of both GDP and employment as a result of macroeconomic issues.

According to the signaling theory, the book-building mechanism reduces information asymmetry and signals the IPO firm's fair value by enabling underwriters to gather information from roadshows about investors' demand for additional shares. Alternatively, information asymmetry rises, investor demand is unknown, and the price is set in accordance with supply and demand dynamics since pre-investor demand is not established in the fixed-price process. According to signaling theory, companies undervalue initial public offerings (IPOs) to convey to investors their quality. Because they anticipate recovering these losses through improved terms in subsequent seasoned equity offers (SEOs), high-quality companies are willing to bear the short-term costs of underpricing. Classic models by Grinblatt and Hwang (1989); Allen and Faulhaber (1989); Welch (1989), support this.

In line with the predictions of signaling theory, empirical research demonstrates that companies with higher IPO underpricing are more likely to offer more shares, issue larger amounts, and do so sooner after the IPO. Information asymmetry in the market is necessary for signaling through underpricing to be successful. In emerging or segmented markets, where issuers and investors have greater information gaps, research finds stronger evidence for signaling

1.2 Gap Analysis

In the evolving landscape of Pakistan's capital market, Initial Public Offerings (IPOs) have increasingly adopted two major pricing mechanisms: The Fixed Price Method (FPM) and the Book Building Method (BBM). While global literature extensively discusses how these methods influence IPO performance, investor behavior, and price discovery, there exists a notable gap in the Pakistani context, particularly concerning how these mechanisms affect price volatility and post-listing returns. Although Mehmood et al. (2020) and Aslam and Ullah (2017)

focused on aspects like the pricing mechanism, premium, and first-day return of Pakistan's IPO market, which are of primary importance, little attention has been paid to the role of underwriter features and fluctuations in the market, considering these factors are well researched in the international context of IPOs.

The size, reputation, and experience of the underwriter are commonly acknowledged as important determinants of IPO quality and risk mitigation in developed markets. According to Goergen et al. (2019) and Titman and Trueman (1986) , trustworthy underwriters have a potent signaling impact that lowers information asymmetry and increases investor confidence. Underwriter-related factors like reputation, market share, prior performance, and certifying power are typically left out of Pakistani initial public offerings (IPO) studies.

Consequently, nothing is known about how underwriters moderate underpricing, investor engagement, and aftermarket success. Investor behavior and IPO pricing are significantly influenced by market volatility. According to research by Ritter and Welch (2002) and Ljungqvist (2007), significant market volatility raises IPO underpricing because of increased risk premiums and uncertainty.

In Pakistan, empirical IPO models hardly ever incorporate volatility as a variable, despite the market's historical volatility brought on by political unpredictability, macroeconomic fluctuations, and currency devaluation. This makes it more difficult to comprehend how the market's timing affects IPO pricing and success.

1.3 Problem Statement

The number of initial public offers (IPOs) in Pakistan's capital markets has increased, but there is still disagreement over the best way to carry out these offerings whether it should be through book building or fixed price offerings. In addition, problems with equitable investor allocation, underpricing, and aftermarket volatility are still common in Pakistani initial public offerings. Although both approaches are permitted under the existing regulatory framework, there is no thorough examination of which produces superior results in terms of pricing efficiency, volatility, and long-term performance.

The primary focus of this study is to examine, "Significant short-term underpricing and high early returns are common characteristics of initial public offerings (IPOs); these phenomena are well-documented in international markets but are not as well-studied in Pakistan. With an emphasis on underpricing, this study aims to objectively evaluate the short-term performance of initial public offerings (IPOs) in Pakistan and compare their long-term returns to industry standards. Along with investigating the root causes of underpricing, the effects of issuance mechanisms, and the role of underwriter valuation strategies in the book building process, the study also seeks to ascertain whether there are statistically significant differences between short- and long-term IPO performance."

1.4 Research Questions

This research will answer the following questions:

Research Question 1

How does IPOS perform in terms of underpricing and return in the short run and long run?

Research Question 2

How do initial public offerings (IPOs) in Pakistan perform over time in relation to market return?

Research Question 3

Does Pakistan's short- and long-term IPO performance differ statistically significantly?

Research Question 4

Does the issue mechanism influence the short-run performance mechanism?

Research Question 5

Does issue size influence the IPO Return?

Research Question 6

Does the underwriter have a role in determining IPO return?

1.5 Objectives of the Study

Objectives of the study are as follows:

Research objective 1

To evaluate IPOs' short-term and long-term performance in the Pakistani stock market.

Research objective 2

To examine the link between IPO pricing process and the performance of the IPOs in terms of risk and return.

Research objective 3

To investigate the link between issue size and IPO return and Volatility.

Research objective 4

To investigate the influence of the underwriter's role in influencing IPO performance.

Research objective 5

To compare post-listing returns with the market across different time periods.

1.6 Significance of the Study

This study is important for both scholarly research and real-world implementation in Pakistan's capital markets. The following significant contributions are expected from the study's findings: A significant gap in the current body of knowledge about IPO pricing processes in emerging countries, namely in Pakistan, is filled by the study. The benefits of book building versus fixed-price techniques have been the subject of discussion in international literature, but there is little actual data specific to Pakistan.

This study provides context-specific insights into how IPO method selection affects underpricing, volatility, and investor outcomes by applying rigorous econometric methodologies to Pakistani IPO data. In emerging nations, where capital markets

are still in their infancy and investor protections are weaker, it also answers a larger academic desire for more empirical study.

The Pakistan Stock Exchange (PSX) and the Securities and Exchange Commission of Pakistan (SECP), two regulatory organizations in Pakistan, benefit greatly from the study's conclusions. This research can promote evidence-based discussions in IPO pricing by determining which IPO technique improves investor outcomes, lower aftermarket volatility, and offers more transparent pricing, especially for retail investors. Pakistan can use these lessons to update its own IPO structure, much like Indonesia did when it switched to an e-IPO system to increase transparency and allocation fairness.

The report may be used as a decision-making tool by underwriters who advise companies that intend to go public. Issuers can select a method that supports their strategic objectives by being aware of the trade-offs between fixed pricing and book building techniques, particularly with regard to cost of capital, post-listing volatility, and investor perception. Additionally, it assists underwriters in creating more efficient pricing and allocation plans that are suited to the investor environment in Pakistan.

The study promotes financial inclusion by illuminating the ways in which various IPO pricing strategies affect the allocation and return outcomes of retail investors. Understanding pricing transparency and allocation biases can help retail investors advocate for a more equal capital market and make smarter investment choices. Last but not least, this study will contribute to the expanding body of comparative research on IPO procedures in developing nations. The study offers more general insights that can be applied to other developing nations looking to revamp their IPO ecosystems by contrasting Pakistan's experience with that of Indonesia, another emerging market with a comparable regulatory trajectory.

1.7 Scheme of the Study

There are five chapters in this thesis. The research is introduced in Chapter 1, which also includes the problem description, theoretical underpinnings, questions,

and goals pertaining to IPO performance in Pakistan. In order to develop testable hypotheses, Chapter 2 examines the body of research on IPO pricing processes, underpricing, and volatility. It discusses relevant theories such as signaling theory and review empirical findings on fixed price and book building method, underwriters certification, IPO returns and volatility.

The quantitative technique, 2020–2024 data sample, and analysis regression models are described in depth in Chapter 3. The empirical findings on volatility, short- and long-term returns, and a comparison of market performance, comparison of IPO performance and market performance in Chapter 4. Chapter 5 ends with a summary of the main conclusions, a discussion of the ramifications, and suggestions for stakeholders.

Chapter 2

Literature Review

2.1 Literature

The literature on initial public offerings (IPOs) is vast and mostly focuses on IPO trends such as underpricing, long-term underperformance, and hot markets. Surprisingly, neither financial researchers nor practitioners have ever focused on first public offerings (IPOs). The early gains that freshly listed companies' stock prices record are the main focus of IPO research.

Finding an offering price that is in line with the issuing company's value is the primary problem of an initial public offering (IPO). The IPO's return distribution is often skewed positively to the tail because of the degree of uncertainty surrounding the IPO, which makes the investment riskier and volatile. Despite receiving comparatively little attention, pricing decisions and assessments of the firm's prospects are usually made in the main market. The factors influencing the relationship between IPO volume, return, and market conditions can be explained by a number of theoretical frameworks. The seemingly intangible subject of why businesses go public will never go away. There are three reasons why a company chooses to go public. The first option is for the owners of a company to sell some of their stock and investments. The second is the ease with which equity capital can be publicly accessed. Third, more business publicity and better product and trademark promotion are examples of further indirect benefits. Listing ownership of the company on an exchange, where institutions or individuals purchase shares

in exchange for funding, is an effective way for established businesses to raise finance. There are two primary options available to businesses when they decide to obtain outside funding: First Public Direct listings and offerings (DL).

Zheng (2021) asserts that the two fundraising tactics differ greatly from one another Zheng (2021). One significant distinction is that a DL does not always post additional shares to the market when it goes public. Another significant distinction is the support system for presenting the shares; DLs may just receive consulting (if necessary), but IPOs are supported throughout the process by underwriters or investment banks.

Companies frequently use initial public offerings (IPOs) as a means of raising capital, introducing early publicly traded shares to a group of investors Hull et al. (2018). Going public is a well-studied concept, and businesses must weigh the pros and downsides of both external funding and profit retention.

IPOs are now a common strategy used by businesses looking to expand or generate new holdings in their company. In essence, primary and secondary offerings are the two categories into which the initial services can be separated. The most popular term, "primary offering," describes the introduction of fresh shares to the market.

An IPO may involve both kinds of sales; however, the secondary offering occurs when stockholders are selling their current shares Hull et al. (2018). In addition to raising money through initial public offerings (IPOs), companies may also have other interests. For instance, venture capitalists may want to close their holdings or "allow more dispersion of ownership" in order to expand the overall windows of opportunity Brau (2012).

Three primary IPO pricing processes are typically identified in the literature: book building, auction-based techniques, and fixed-price offers Ritter et al. (1998). Because of its adaptable, investor-informed pricing process, book building has been the most popular technique among these in many developed and emerging economies. By holding roadshows and asking institutional investors for non-binding bids, underwriters can determine demand and adjust the offer price under the book-building process. By incorporating market data into pricing choices, this technique helps to bring the offer price closer to the firm's inherent value

Benveniste and Spindt (1989). The fixed-price approach, on the other hand, establishes an offer price in advance without consulting the market, which frequently results in pricing inefficiencies and increased volatility after listing. In the context of Pakistan, the IPO market offers a compelling case for investigation, primarily due to its evolving regulatory framework concerning IPO pricing mechanisms. Historically, the fixed-price method was the sole approach employed in Pakistan until 2008. However, post-2008, regulatory reforms permitted the adoption of both the fixed-price and book-building methods.

The primary distinction between the fixed price method and the book-building method lies in the process of information gathering during IPO pricing. In the fixed price method, the offer price is predetermined by the issuer without incorporating feedback or demand insights from investors. In cases of oversubscription, share allocation is typically done on a pro-rata basis, depending on the size of each investor's application. The fixed price method is used in the Rock model (1986), and underpricing is required to make up for the winner's curse issue.

The pricing effectiveness, investor involvement, and long-term performance of initial public offerings (IPOs) are all significantly impacted by the decision between the book-building and fixed-price method. The book-building approach, which is usually linked to institutional investor domination, enables dynamic price discovery through investor offers throughout the roadshow period.

The fixed-price approach, on the other hand, is more accessible to retail investors but is frequently criticized for its opacity and vulnerability to underpricing. It entails determining the IPO price in advance without prior demand feedback. Mehmood et al. (2020) claim that because of information asymmetry and a lack of pre-IPO demand signals, fixed-price initial public offerings (IPOs) in Pakistan saw higher levels of oversubscription and early underpricing. Similar results were seen in the Indian market, where fixed-price initial public offers (IPOs) showed far better first-day returns, with underpricing levels as high as 65%, compared to 23% for book-built offerings Hawaldar et al. (2018).

However, book-building has not always performed better over the long run, even though it may lessen initial underpricing by enabling more precise valuation.

Mixed outcomes have been observed in the long-term performance of initial public offerings (IPOs) under various pricing structures. According to Hawaldar et al. (2018), the CAARs for book-built IPOs decreased to -57 percent after five years, from about -19 percent after one year.

On the other hand, even while fixed-price initial public offerings (IPOs) had negative returns in the initial months, they turned around and produced positive returns, reaching up to 83% after a year and 77% after five, indicating a delayed but persistent long-term performance advantage. This pattern suggests that the fixed-price mechanism may be more attractive to long-term investors because of its positive performance following market changes, despite its less complex price discovery.

According to the Busaba and Chang (2010) model, both the fixed and book building method need underpricing. Underpricing is required in the fixed price technique to offset losses incurred by ignorant investors compared to knowledgeable ones. In the book building method higher underpricing is required for the building technique in order to stop ignorant traders from "cheating" (giving misleading information) in the IPO premarket.

According to their model, if underwriters are restricted to a small enough group of knowledgeable traders, underpricing using the fixed technique will be smaller than underpricing using the book building method in "normal" circumstances (and vice versa).

IPO valuation is a difficult and complex process. Underpricing is how knowledgeable merchants are paid for their expertise Sherman and Titman (2002). Underwriters seek knowledgeable traders to assess the value of initial public offerings (IPOs) and provide compensation through underpricing and IPO allocation. The ability to manage current and future IPO allocations is a critical component of compensation. Averaging IPO earnings utilizing both share allocation and underpricing over time can lead to less underpricing Sherman (2000).

Conversely, the book-building method involves a more dynamic pricing process, where underwriters actively engage with institutional and informed investors to gather market sentiment and valuation expectations. This collected information is

then used to determine an appropriate offer price, reflecting real-time demand and perceived firm value. In the book-building approach, higher levels of underpricing are often required to discourage uninformed investors from manipulating the pre-IPO demand by submitting inaccurate bids.

A distinctive setting for examining price processes in a signaling framework is provided by the Pakistani initial public offering (IPO) market. Before 2008, Pakistani initial public offerings (IPOs) were only priced using the fixed-price approach, which frequently led to significant underpricing and volatility after listing Mumtaz et al. (2016).

The Securities and Exchange Commission of Pakistan (SECP) required the adoption of the book-building process for larger capital issuance in 2015 after introducing regulatory revisions that allowed it due to these inefficiencies.

Anwar and Mohd-Rashid (2021) analyze 95 initial public offerings (IPOs) from 2000 to 2019 and present important empirical data from Pakistan. Their results show that, in contrast to fixed-price IPOs, book-building-priced IPOs are linked to more steady aftermarket performance and reduced return volatility. These findings are consistent with the signaling theory hypothesis, which holds that underwriters reduce uncertainty and serve as reliable middlemen between the issuer and the market by gathering and analyzing investor information during the book-building process.

Additionally, their research emphasizes how crucial the reputation of the underwriter is to raising the signal's believability. Reputable underwriters are in a better position to draw in knowledgeable investors, maintain pricing stability, and lower volatility, all of which strengthen the indication of a high-quality company.

Theoretical models suggest that, under typical conditions, underpricing tends to be lower in the fixed price method compared to book building, particularly when the number of informed investors involved in the process is relatively limited. Under the book-building mechanism, a dual allocation structure is implemented, wherein 75% of the IPO shares are allocated to institutional investors through a bidding process, while the remaining 25% are reserved for the general public via the fixed-price method.

This hybrid model reflects an effort to balance institutional price discovery with retail investor participation. In a significant regulatory development, the Securities and Exchange Commission of Pakistan (SECP) introduced revised guidelines for the book-building process in 2015, aimed at enhancing transparency, improving market efficiency, and aligning local practices with international standards. Studies conducted across different countries provide strong evidence of the consistent presence of initial returns in IPO markets, often characterized by significant fluctuations in early trading. This pattern, known as IPO underpricing, appears to be more severe in less developed or emerging financial markets.

As highlighted by Marcato et al. (2018), initial returns in these markets are generally higher than those observed in more mature, developed economies likely due to varying levels of market efficiency, investor awareness, and regulatory structures. In several developed markets, average IPO initial returns remain relatively modest—for instance, Sweden recorded an initial return of 7.68% Abrahamson and De Ridder (2015), while Norway and the United States showed returns around 12.00% Huang et al. (2017); Marcato et al. (2018).

In contrast, Pakistan has experienced significantly higher initial returns. According to Aslam and Ullah (2017), the average initial return in Pakistan stands at 46.00%. To address concerns surrounding such pronounced underpricing, the Securities and Exchange Commission of Pakistan (SECP) introduced the book building mechanism in 2009. This method was intended to improve price discovery by allowing institutional investors to participate in the pricing process.

However, due to limited access to firm-specific information, especially among less informed or retail investors, bidding often results in elevated offer prices. Sohail et al. (2018) Khalid and Farhat (2018) observed that countries like India and Sri Lanka experienced a decline in IPO underpricing following the adoption of book building. In contrast, Pakistan's IPO market continues to exhibit elevated and even rising levels of initial returns, suggesting that the pricing challenges remain unresolved. According to Huang et al. (2017), a major distinction between the book-building and fixed-price methods lies in the interaction between underwriters and investors. In the book-building process, underwriters conduct roadshows and

invite bids from investors, allowing them to gather valuable information about market demand before setting the offer price. This interaction enables a more informed and efficient pricing strategy. In contrast, the fixed-price method does not involve such pre-offering engagement. Instead, the price is predetermined without direct investor feedback, and the actual market value only becomes apparent after the shares begin trading. Supporters of the book-building approach argue that this method provides underwriters with greater flexibility and helps improve pricing accuracy.

By understanding investor interest during the roadshow phase, underwriters can reduce information asymmetry and signal a fairer valuation of the issuing firm. As a result, speculative trading and short-term selling, often referred to as flipping, are less likely to occur.

A significant amount of information asymmetry between issuers and investors is a characteristic of initial public offerings, or IPOs. Pricing inefficiencies and unpredictable aftermarket behavior are frequently the outcome of this asymmetry, which raises doubts about the firm's actual worth.

Spence (1978) first suggested signaling theory, which offers a helpful lens through which to view how businesses could legitimately communicate confidential information to lessen such disparities.

Scholars like Allen and Faulhaber (1989); Welch (1989); Grinblatt and Hwang (1989) expanded signaling theory to explain how corporate decisions, such pricing mechanisms or underwriter selection, might serve as reliable indicators of underlying firm quality in the context of initial public offerings (IPOs).

The empirical literature emphasizes how important underwriters are in determining the results of initial public offerings (IPOs), especially because of their capacity to attest to the quality of the organization. Research continuously demonstrates that trustworthy underwriters mitigate information asymmetry, which lowers underpricing and calms post-listing volatility. An Indonesian study by Bandi et al. (2020), for instance, discovered that IPOs with well-known underwriters had far reduced underpricing. Jadoon and Ali (2020) show that trustworthy underwriters

improve investor confidence and pricing accuracy, which improves IPO performance in the short and long term in emerging countries like Pakistan. This data demonstrates the certification value of underwriter engagement and is consistent with international findings from Malaysia, where offer prices that were closer to intrinsic valuations were linked to underwriter prestige. When the IPO is being pushed to the market, the underwriter is a crucial actor. The underwriter participates in the company's IPO process and plays a number of essential functions. By supporting and advising the business on the path to publication, they are in charge of enabling the IPO transaction.

Additionally, the underwriters are in charge of promoting the initial public offerings (IPOs) and helping the company with a number of mandatory disclosures and filings Berk and DeMarzo (2020). An investment bank often serves as the lead underwriter, and they collaborate with a group of underwriters known as the syndicate to sell the issue Berk and DeMarzo (2020).

Underwriters play a crucial role in determining the offer price and share distribution. Underwriters are essential in reducing the information asymmetry between issuers and investors in developing markets like Pakistan, in addition to managing the offering.

Anwar and Mohd-Rashid (2021) claim that underwriters' discretion during book building roadshows enables them to gauge the sentiment of institutional investors, which is subsequently utilized to more precisely calibrate IPO prices. When contrasted to fixed-price methods, this usually leads to more efficient pricing.

The same discretion, though, gives rise to questions of favoritism and agency issues. Hanafi (2021) observes that underwriters' latitude in distributing shares during book building frequently results in underpricing in Indonesia, indicating that their motivations do not necessarily coincide with the goals of the issuing company.

This underpricing has also been observed in Pakistan, however it was anticipated that the book building approach would lessen it. This paradox suggests that although underwriters may theoretically increase pricing accuracy, their function needs to be controlled to prevent unfair allocations and market manipulation. The

quality of the information signal sent to the market and the efficiency of the pricing mechanism are significantly influenced by underwriters.

Underwriters are in charge of both price discovery and share allocation in book-built initial public offerings (IPOs) in order to encourage sustained investor engagement. Underwriters can use their allocation discretion to give preference to institutional investors who are more likely to hold shares, which lowers aftermarket price volatility Bubna and Prabhala (2011); Sherman (2000).

However, underwriters' signaling strength is contingent upon their experience, reputation, and level of transparency. The signaling function may be compromised in markets with lax regulation of underwriter procedures, as is frequently the case in emerging countries, leading to uneven price results.

A crucial signaling role is played by the choice of pricing mechanism. Compared to fixed-price offerings, which lack investor feedback, mechanisms that entail investor engagement and institutional scrutiny, such as book building, may be viewed as more reliable signals.

According to this theory, companies with solid foundations are more inclined to use book building as a way to set themselves apart from inferior companies. Relationships within the underwriter-issuer network have become a key signaling variable, surpassing reputation. According to a U.S. study by Gao et al. (2013), companies that have personal relationships with their underwriters typically have underpricing that is 13 percentage points lower, most likely as a result of improved trust and information flow.

Furthermore, a Chinese study from 2022 established the idea of underwriter ratings, demonstrating that, as a result of improved risk management during initial public offerings (IPOs), highly rated underwriters not only lessen stock return volatility but also earnings volatility and financial restatements.

Combining research from around the world, underwriter quality whether measured by formal ratings, contacts, or reputation repeatedly shows up as a critical component in lowering underpricing, boosting price stability, and increasing IPOs' long-term performance. Although accurate quantification using recent data is still lacking, this tendency is still present in the Pakistani context, where underwriter

reputation improves IPO pricing and results in more consistent aftermarket outcomes. To better understand when underwriter signals most accurately predict IPO success, future studies could take regulatory implications and underwriter-issuer relationships into account. A common occurrence in initial public offerings (IPOs), especially in emerging economies, is underpricing, in which the offer price is set below the first-day market price.

According to the signaling theory Allen and Faulhaber (1989), companies may purposefully undervalue their stock to convey to unsuspecting investors that it is of excellent quality. Although underpricing occurs with both fixed price and book building strategies, empirical research varies on which approach has more noticeable consequences. In contrast to fixed price IPOs (mean 11%), book building IPOs resulted in much larger underpricing (mean 25%), according to a study conducted in Indonesia by Hanafi (2021). Given that theoretical models (e.g., Benveniste and Spindt (1989)) suggest that book building is an effective way to reduce underpricing because of its iterative demand-revealing process, these results were unexpected. In Pakistan, where mean underpricing is still considerable, especially under book building, the discrepancy is especially significant Anwar and Mohd-Rashid (2021). This can be the result of ineffective signaling systems or lax enforcement of regulations.

Furthermore, research indicates that the degree of underpricing can be strongly correlated with the firm's age and the underwriters' reputation. Higher ex-ante uncertainty is reflected in the underpricing of younger enterprises and those with less reliable underwriters.

IPO volatility is another important aspect of IPO pricing processes. According to theoretical frameworks, the book-building process should result in less volatility because of more informed pricing Sherman (2005). Nevertheless, actual findings from Indonesia Hanafi (2021) challenge this notion, demonstrating increased short- and medium-term volatility for book building IPOs. During the first five and thirty trading days, book-building IPOs experienced far more aftermarket volatility than fixed-price IPOs. Because of its consequences for investor behavior, market efficiency, and corporate valuation, the relationship between IPOs and price volatility

has been thoroughly examined in the financial literature. Significant price volatility is known to accompany initial public offerings (IPOs), particularly during the initial trading days. Information asymmetry, speculation, and the absence of previous pricing data for recently listed companies are the main causes of this increased volatility.

According to Hull et al. (2018), IPO firms have significantly more idiosyncratic volatility than established firms, especially within the first ninety days after the offering. The market's attempt to determine the firm's fair value in the lack of enough public information is frequently reflected in this increased volatility.

Furthermore, price volatility is closely related to IPO underpricing, a prevalent practice in which the offer price is set below the first trading price. A spike in first-day profits brought on by underpricing tends to encourage speculative trading, which raises short-term volatility.

Businesses with high pre-IPO risk, such as those with erratic cash flows or patchy financial records tend to show even more price swings after listing. According to Cox (2020), businesses with greater pre-IPO cash flow volatility experience more volatile price swings after listing in addition to higher levels of underpricing. This demonstrates the clear connection between stock price movement in the IPO aftermarket and financial risk.

The state of the market at the time of issue is another important element affecting the price volatility associated with initial public offerings (IPOs). Initial public offerings (IPOs) that take place during times of financial uncertainty or amid crises like the COVID-19 pandemic typically see higher volatility. In their examination of U.S. first public offerings (IPOs) from 2020 to 2022, Ahmed and Koy (2023) found that investor attitude during the pandemic and market-wide volatility exacerbated price swings, particularly during the first five trading days. These results highlight how external economic shocks exacerbate price instability associated with initial public offerings.

The degree of price volatility is also significantly influenced by the pricing strategy employed during the initial public offering. Prestigious underwriters are linked to lower volatility and better IPO outcomes, according to historical research (e.g.,

Carter and Manaster (1990); Beatty and Ritter (1986)). This is also true in emerging economies, where underwriters play an even more crucial role and information asymmetry is more noticeable.

Understanding IPO volatility has also benefited from behavioral finance in recent years, especially when seen through the prism of media influence and investor opinion. Offerings linked to more pre-IPO anticipation on sites like Twitter and StockTwits see noticeably higher first-day returns and increased volatility, according to Vamossy (2023) investigation into the influence of social media emotions in IPO pricing.

These results cast doubt on the notion that more stable pricing results from knowledge aggregation in book building. In Indonesia, IPOs priced below market value typically show larger post-listing price swings, which may be caused by speculative trading and asymmetric knowledge among retail investors, according to the positive association between underpricing and volatility. Given the reduced level of institutional investor activity in the aftermarket, this might also be the case in Pakistan.

Despite the paucity of empirical studies on volatility, the pattern seems to be comparable in Pakistan. Despite the use of book building, Anwar and Mohd-Rashid (2021) found that initial public offerings (IPOs) had substantial price volatility in the early going, indicating a weak correlation between pricing strategy and post-listing price stability.

Studies on emerging markets add even more depth to this conversation. Macroeconomic factors including interest rates, inflation, GDP growth, and foreign direct investment, for example, have a big impact on IPO success and associated volatility, according to research on the Pakistani IPO market Mehmood et al. (2021). While high inflation and interest rates exacerbate uncertainty and post-IPO price volatility, market index expansion and foreign investment tend to stabilize IPO pricing.

Under both pricing strategies, IPOs have had comparatively poor long-term performance, as seen by stock returns in comparison to market indices. Regardless of the price technique, Hanafi (2021) found that Indonesian initial public offerings

(IPOs) underperform market benchmarks over the long term. But much worse underperformance was seen in book building IPOs, casting doubt on the idea that improved investor outcomes are a direct result of more effective starting pricing.

Even though there aren't many empirical studies in Pakistan, anecdotal evidence and initial return studies point to a similar trend of long-term underperformance, especially for initial public offerings (IPOs) that were significantly underpriced at launch. This emphasizes how important it is to consider IPO pricing methods in light of investor behavior, market depth, and regulatory strength rather than in isolation. There is currently little research on how the IPO technique affects long-term performance. The quality of IPO analysis and investor behavior are the two main ways that IPO methodologies may affect the long-term performance of IPOs. Informed investors perform IPO analysis in book building, while they are less involved in IPO analyses in the fixed method.

Individual Compared to the book building technique, investors could be more involved in the fixed method. We may make a number of predictions, including the following: underpricing and long-term performance will be positively correlated with the book building method and negatively correlated with the fixed price method. Compared to knowledgeable investors, individual investors are more prone to behavioral biases Agarwal et al. (2008). Long-term IPO performance is also impacted by investor behavior. Huang et al. (2017) demonstrate, using data from Taiwan, that initial public offerings (IPOs) result in both short-term positive returns and long-term price reversals. The best and most consistent long-term performance is maintained by hybrid book building initial public offerings. There are notable short-term overreactions and long-term reversals with both the fixed pricing and hybrid auction approaches.

According to these authors, the fixed price method's pricing effect of institutional herding and flipping behavior severely impairs IPO success over time. As a result, neither theoretically nor empirically, there is agreement on the most effective ways to provide IPOs. Recent research has repeatedly demonstrated that initial public offerings (IPOs) usually result in substantial initial gains, often known as underpricing, followed by a range of long-term performance, frequently falling

short of market standards. Numerous markets have examined this phenomenon, with Pakistan revealing unique findings. Numerous studies conducted worldwide have measured the correlation between initial public offerings (IPOs) and returns. Examining the impact of social media sentiment, Vamossy (2023) discovered that initial public offerings (IPOs) with strong pre-IPO enthusiasm produced remarkable first-day returns of about 30%, as opposed to roughly 18% for less hyped listings. Nevertheless, over time, these identical products performed poorly, with average industry-adjusted returns declining by about -8%.

The diverse drivers of initial public offerings (IPO) returns in evolving institutional environments were illustrated by Deng et al. (2023), who showed that regulatory reforms in China had distinct effects on short-run returns prior to and following policy changes. Studies conducted in developing nations like Pakistan between 2018 and 2024 add to the global findings. Among 92 Pakistani companies listed until 2022, Ghazi et al. (2024) discovered a substantial positive correlation between IPO and post-IPO returns and earnings-per-share (EPS), EPS growth, and book value. This finding highlights the significance of firm financial health in return outcomes. According to Mehmood et al. (2025), regulatory strength decreased return volatility, while sponsor ownership, pricing mechanism, and institutional quality all contributed to Pakistan's better first-day returns. Similar to this, Mehmood et al. (2023) pointed out that initial returns were higher in areas with weaker governance and regulatory frameworks, which was seen as a way to offset investors' perceived risk. IPO returns are also impacted by lock-up and sponsorship arrangements. larger sponsor pre-IPO ownership, firm size, and investor mood all had a favorable impact on IPO price, according to Nazir et al. (2024), suggesting that respectable and well-backed sponsors provide larger returns. Furthermore, Mehmood et al. (2020) showed how the decision between book-building and fixed-price approaches affected returns by affecting demand signaling and information transmission. However, Pakistan's long-term record is still less encouraging. Research indicates that buy-and-hold abnormal returns (BHAR) have consistently underperformed, with three-year BHARs falling as low as –49% Khan et al. (2018). Additionally, Mohd-Rashid et al. (2019) revealed an average underpricing of 32.85%, with cumulative anomalous returns over the next three

and five years averaging –24.6% and –29.4%, respectively. This suggests that initial profits are frequently reversed over time.

Overall, studies conducted in Pakistan between 2018 and 2024 show a consistent pattern: initial public offerings (IPOs) underperform over the long term, which is consistent with global patterns, but show strong short-term returns due to stable fundamentals, regulatory legitimacy, and pricing mechanisms.

These results highlight the need for a more thorough examination of the ways in which investor behavior, institutional pressures, and IPO pricing structures affect returns over various time periods.

2.2 Pricing Mechanism and IPO Anomalies

Underpricing, investor participation, and post-listing anomalies are all significantly influenced by the pricing method selected for an IPO. Compared to the fixed-price model, the book-building technique performs better in price discovery and anomaly mitigation, which has led to its rise to prominence. Benveniste and Spindt (1989) established the theoretical underpinnings of book-building by emphasizing that underwriters can satisfy the fundamental principles of information disclosure theory by using their bid signals to extract useful information from investors.

This theory has been empirically supported in a variety of markets: Chahine (2007) showed comparable results in France, and Ljungqvist et al. (2003) reported lower underpricing in U.S. book-built IPOs. This effectiveness is still supported by recent research. After re-examining the Indonesian market, Utami et al. (2022) found that, in contrast to fixed-price issues, book-built IPOs produce noticeably higher opening prices and less volatility. Lehmann and Weber (2023) found that book-building in Japan resulted in less underpricing than auction-based systems, proving resilient in a variety of institutional contexts. The capacity of underwriters to manage participation, choose bids, and modify allocations on the first trading day gives them an advantage in book-building. According to Sherman (2000), underwriter participation lessens information asymmetry by guaranteeing that only reliable investors are involved. According to Hanley and Hoberg (2010), underwriters and issuers make significant investments in bid gathering and investor

roadshows in order to fine-tune pricing, which leads to more precise issue prices and a decreased dependence on general investor assumptions. One of the main advantages of book-building is that it can cut ex-ante risk, which lowers investor risk premiums and flipping rates. This is supported by Neupane et al. (2017), who discovered that book-built initial public offerings (IPOs) in India had substantially lower flip rates than auction procedures because underwriters preferred long-term investors over short-term speculators. In contrast, the fixed-price approach has greater information asymmetry since issuers determine prices without assessing demand, which increases uncertainty and encourages speculation. Blind investors frequently flip shares in an attempt to make quick money, which drives up volatility. Book-building uses bids and investor roadshows to pick up pricing signals that fixed-price structures miss, as Huang et al. (2017) highlight.

Notably, book-building isn't infallible either. Zhang et al. (2015) demonstrate that underpricing under book-building can surpass that observed under fixed-price offerings when investor expectations are extremely varied. Furthermore, Deng et al. (2023) reported continuous IPO overreaction despite book-building in markets with strong investor sentiment, such as China's ChiNext and STAR boards. They attributed this to sentiment dynamics and regulatory changes. Textual uncertainty is another factor affecting IPO results. According to Loughran and McDonald (2013), IPO prospectuses with unclear language are associated with higher first-day returns and higher volatility 60 days after the IPO, suggesting that underwriters utilize textual clues to gauge risk. Investor attention is highlighted as a factor contributing to underpricing in more recent behavioral finance models.

2.3 Pakistan's Pricing Mechanism and IPO Anomalies

A useful empirical context for examining the effects of various IPO pricing methods on underpricing, volatility, and flipping behavior has been created in Pakistan by the adoption of the fixed-price technique prior to 2008 and the gradual introduction of the book-building method after that.

2.3.1 Reducing Underpricing and Book-Building

According to numerous studies, underpricing and volatility are comparatively lower in initial public offerings (IPOs) in Pakistan that use the book-building technique. Book-built IPOs showed substantially lower early excess returns than fixed-price and auction-based offerings, according to a key study by Mohd-Rashid et al. (2019), which is consistent with findings in other markets.

Another noteworthy study by Mehmood et al. (2020) showed that oversubscription and pricing mechanism were negatively correlated; book-built IPOs produced less oversubscription and indicated less information asymmetry. These findings provide credence to the idea that book-building lessens the uncertainty and hype associated with fixed-price offers by enabling underwriters to precisely determine pricing through bid signals and roadshows.

2.3.2 Information Asymmetry and Pricing Choices

Reducing information asymmetry is the main benefit of book-building in Pakistan. During roadshows, underwriters obtain real-time investor feedback, which helps them better match offer prices with market expectations.

Fixed-price initial public offerings, on the other hand, are more uncertain, have irrational price levels, and experience more flipping as a result of unadjusted, ignorant retail bids. Significant underpricing and flipping have occasionally occurred in even well-structured book-built initial public offerings (IPOs), indicating the existence of persistent informational frictions and strategic pricing by underwriters.

2.3.3 Market Signals and Oversubscription

Oversubscription is still a crucial indicator for figuring out IPO irregularities. Historically, average oversubscription rates for Pakistani book-built initial public offerings (IPOs) have exceeded 2×. Average subscription levels of 2.7× were noted by Mehmood et al. (2020); Mumtaz and Ahmed (2014), confirming the ongoing

impact of investor mood. Higher oversubscription for fixed-price initial public offerings (IPOs) was demonstrated by Mehmood et al. (2020), supporting the idea of information asymmetry and signaling by increased demand.

The vast amount of reviewed material emphasizes that market behavior, regulatory architecture, and information asymmetry continue to interact in a complicated way to determine IPO price. Although both book-building and fixed-price strategies have theoretical underpinnings and real-world uses, neither strategy has been able to definitively address the enduring problems of underpricing, post-listing volatility, or long-term underperformance, especially in developing nations like Pakistan.

Weak regulatory monitoring, a lack of depth among institutional investors, and underwriter discretion, all of which can lead to agency issues and partiality are partly to blame for this. The fixed-price approach, on the other hand, has more ex-ante risk, opaque pricing, and more initial underpricing because of ignorant demand, despite being easier to understand and more accessible to individual investors.

Paradoxically, however, some research has out that fixed-price initial public offerings (IPOs) in Pakistan and India have performed better over the long run, indicating that accessibility and ease of use may eventually produce more robust results. The crucial role that underwriters play in setting prices as well as serving as certifiers of firm quality is a recurrent issue in the literature.

Although their efficacy is heavily reliant on market structure and regulatory restrictions, reputable underwriters boost market trust and lower uncertainty. In conclusion, although international literature offers insightful information, Pakistan's initial public offering (IPO) market has certain peculiarities that call for a localized comprehension of investor behavior, market dynamics, and regulatory enforcement.

The signaling theory, which is frequently used in IPO literature, emphasizes the value of reliable signals (such as investor participation or underwriter quality) in reducing information gaps, but it also highlights the practical limitations of the approach in less developed capital markets. Furthermore, the efficacy of present pricing techniques is called into doubt by the long-term underperformance of IPOs,

particularly in Pakistan. The dominance of behavioral biases, inadequate company quality screening, and speculative aftermarket activity is demonstrated by the frequent erosion of long-term investor value, even when short-term returns are still alluring due to underpricing and hype.

Beyond descriptive analysis, future research must create hybrid or adaptive models that overcome institutional flaws, encourage informed engagement, and match pricing strategies with long-term performance standards. To fully realize the promise of initial public offerings (IPO) marketplaces in emerging economies, effective regulation, increased transparency in underwriting processes, and the incorporation of behavioral finance insights are necessary.

2.4 Hypothesis

H1: IPO method has an impact on the returns of IPO

H2: IPO size has an impact on the returns of IPO

H3: The underwriters' spread influences the returns of IPO

H4: IPO method has an impact on the volatility of IPO

H5: IPO size has an impact on the volatility of IPO

H6: Underwriter IPO identity influences the volatility of IPO

Chapter 3

Research Methodology

3.1 Research Design

This study uses a quantitative, cross-sectional research approach to investigate the effects of various IPO pricing mechanisms on IPO performance in Pakistan, with a focus on the book building process and the fixed price strategy. In addition to assessing the impact of underwriters on IPO outcomes, the study looks into how different pricing strategies affect underpricing, initial returns, and price volatility.

3.2 Data Source and Sample

A cross sectional dataset of 22 initial public offerings (IPOs) that were listed on the Pakistan Stock Exchange (PSX) between 2020 and 2024 is used in the study. The information was gathered from Pakistan Stock Exchange (PSX) official sources, prospectuses for companies, market summaries, and financial reports.

A single observation in the dataset is represented by each IPO. Businesses from a variety of industries, including manufacturing, packaging, IT, and pharmaceuticals, are included in the sample Reports.

Table 3.1: IPO Data from 2020 to 2024

Name of the Firm	**Year**	**IPO Size**	**IPO Method**	**Amount Raised**	**Underwriter**
The Organic Meat	2020	40 million	book building	720 million	AKD
Agha Steel	2020	30 million	book building	3.84 billion	AHL
TPL Trakker	2020	58.3 million	fixed price	1.39 billion	AHL, AKD, HBL, ISL, BAHL, TSL, NCL
AIR LINK	2021	22.5 million	book building	6.4 billion	JGCS
Cite Pharma	2021	72,692,000	book building	2.32 billion	Topline
Octopus	2021	27.35 million	book building	1.11 billion	BMA
PABC	2021	4.6 billion	book building	4.6 billion	AHL
Panther Tires Ltd	2021	40 million	book building	2.63 billion	AHL
SGFT	2021	40,887,500	book building	2.175 billion	AHL
Pak Agro Packaging Ltd	2021	8,000,000	book building	198 million	AHL
Universal Network Systems Ltd	2021	6,857,000	fixed price	445.7 million	No underwriter was appointed
ALIFE	2022	25 million	book building	700 million	Next Capital

Table 3.1: (continued) IPO Data from 2020 to 2024

Name of the Firm	Year	IPO Size	IPO Method	Amount Raised	Underwriter
Supernet Limited (GEM-SPNL)	2022	21,111,121	book building	475 million	Topline
Globe Residency REIT (GRR)	2022	140 million	fixed price	140 million	AHL
Symmetry Group Ltd	2023	101,240,082	book building	435.33 million	Topline
Secure Logistics (SLGL)	2024	50 million	book building	600 million	Arif Habib Limited
TPL REIT Fund-I (TPLR1)	2024	22.94 million	fixed price	563 million	HBL
International Packaging (IPAK)	2024	70,105,455	book building	Rs 1.77 billion	AHL, AKD
BF Biosciences (BFBIO)	2024	25 million	book building	Rs 1.93 billion	AHL
Mughal Energy (GEM-MEL)	2024	19,411,000	fixed price	324.94 million	LSE Capital
Burj Clean Energy (GEM-BCEM)	2024	1 billion	fixed price	10 million	AKD and AHCL

3.3 Definition and Role of Variables in the IPO Analysis

TABLE 3.2: Definition and Role of Variables in the IPO Analysis

Variable	**Definition**	**Role in IPO Analysis**
IPO Method	Type of pricing method used: 0 = Fixed Price, 1 = Book Building	Independent variable: how pricing strategies affect the results of initial public offerings
Return (%)	(Day 1 Closing Price - Offer Price) / Offer Price $\times$ 100	Dependent variable: measures underpricing and market reaction
Price Volatility	Ln (High Price / Low Price) on Day 1, Day 1-5, or Day 1-30. To collect daily returns for volatility, we need daily stock price data. P_t = Price on the current day. P_{t-1} = Price on the previous day. Daily return(rt) = $P_t - P_{t-1}/P_{t-1} * 100$	Dependent variable: captures market uncertainty post-listing
Underwriter Performance	Based on prior IPOs managed and average performance	Independent variable: affects credibility, pricing accuracy, and investor trust
IPO Size	Total capital raised in the IPO (in PKR)	Independent variable: adjusts for size-related pricing and performance effects
Oversubscription Ratio	Total bids received / total shares offered	Independent variable: indicates investor demand and interest

3.4 Analytical Framework

Descriptive Analysis: Compute means, medians, and standard deviations for initial returns and volatility. Compare IPOs issued via book building and fixed price methods

3.5 Cross-Sectional Regression Models

Two primary regression models are developed:

3.5.1 Model 1: Determinants of Initial Return: Underpricing

$$\text{Return}_t = \beta_0 + \beta_1 \,\text{IPO Method}_i + \beta_2 \,\text{IPO Size}_i + \beta_3 \,\text{Underwriter}_i + \beta_4 \,\text{Oversubscription}_i + \varepsilon_i$$

Where t= 1 day,1 week, 1 month, quarter, half year and 1 year

1. This model looks at how investor interest, issue size, underwriter caliber, and IPO pricing strategy impact underpricing.
2. This model describes the elements that affect an IPO's initial return, such as the first-day gain or underpricing.
3. It examines whether other variables, book building, initial public offerings (IPOs) result in greater or lower underpricing than fixed price IPOs.
4. Assists in assessing investor sentiment and pricing effectiveness during IPO debut.
5. Examines whether, after adjusting for firm and issue characteristics, the IPO process has a statistically significant impact on initial return.

3.5.2 Model 2: Determinants of Price Volatility

$$\text{Volatility}_i = \alpha_0 + \alpha_1 \,\text{IPO Method}_i + \alpha_2 \,\text{Initial Return}_i + \alpha_3 \,\text{Underwriter}_i + v_i$$

This model represents

1. This model examines the potential correlation between increased post-listing price volatility and the IPO process and underpricing.

2. This model describes the factors that influence stock price volatility following an initial public offering (IPO), such as on Day 1 or throughout the first five or thirty days.

3. It determines if the first return, the IPO process, or the strength of the underwriters affects the stock's volatility throughout the early trading phase.

4. Employed to examine post-listing stability, investor speculation, and market uncertainty.

5. Assists in determining whether book building results in more volatile or stable pricing following listing.

Chapter 4

Results and Analysis

This chapter reports the results of cross-sectional regression analysis to examine the impact of pricing method on return and volatility of returns for IPOs in Pakistan. It also reports the difference in the Sharpe ratio of IPO returns and market returns.

4.1 IPO Patterns for the Year 2020 to 2024

4.1.1 IPO Return for the First Day

The following graph exhibits the returns of the first day of IPO estimated using the offer price and the closing price on the first day.

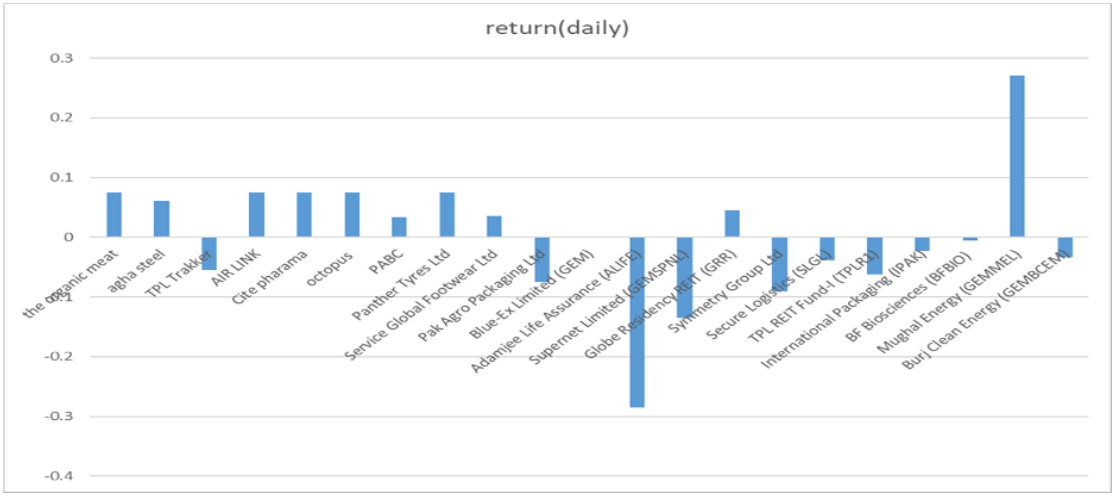

FIGURE 4.1: IPO return for the first day

This bar graph shows the daily return for a number of stocks or businesses, each of which is shown along the x-axis and whose daily return values are measured on the y-axis. A number of businesses have a positive daily return, which indicates that their stock prices have risen throughout the measured day.

"GEMAEEL," which shows a significant price increase in comparison to other companies, has the biggest positive daily return. Other businesses such as "the organic meat," "NPL steel," "TPL Trakker," and "PAK LINK" also show encouraging growth. Some businesses had negative daily returns, which meant that their stock prices dropped that day.

With a notable negative daily return of about -0.3, "Ghazi fabrics" stands out and indicates a severe decline in the stock's price While a few outliers exhibit greater rallies or sell-offs, the majority of daily returns cluster between -0.1 and +0.1, indicating small swings for the majority of equities. The wide variety of company names, which include equities from several industries (such as organic food, textiles, energy, and finance), illustrates how different market segments perform on a particular day.

4.1.2 IPO Return for the Week

The following graph exhibits the returns of the first day of IPO estimated using the offer price and the closing price on the first week.

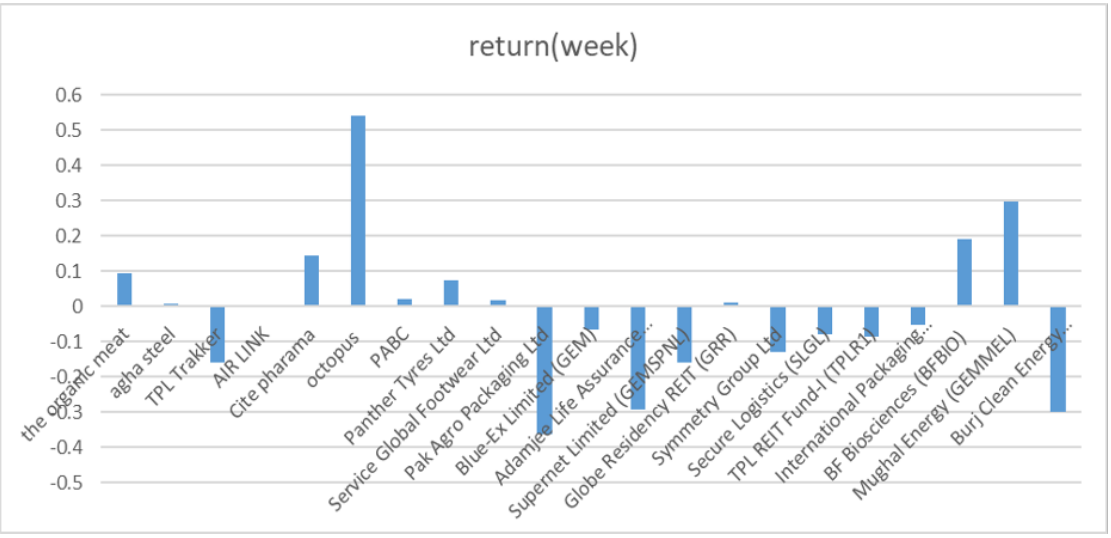

FIGURE 4.2: IPO Return for the Week

Weekly returns for different IPO companies are shown in the chart. Mughal Energy, BF Biosciences, and Octopus had the highest positive returns (over 0.5). The majority of businesses display returns that are close to zero, suggesting little weekly variation. Notable negative returns are reported by Adamjee Life, Blue-Ex, and TPL Trakker. The data shows a wide range of IPO performance, including both notable profits and losses.

4.1.3 IPO Return for the First Month

The following graph exhibits the returns of the first day of IPO estimated using the offer price and the closing price on the first month.

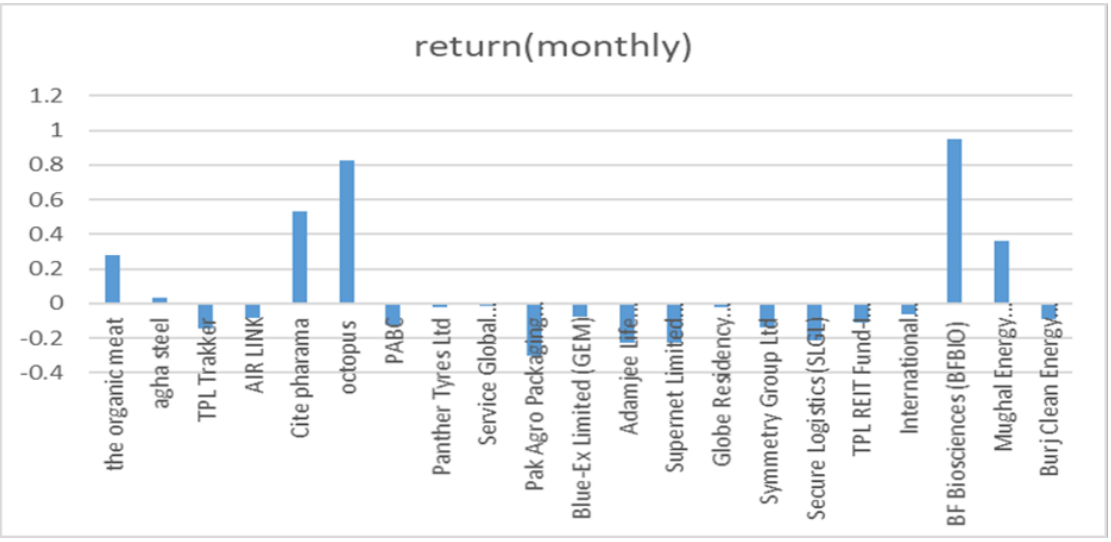

FIGURE 4.3: IPO Return for the First Month

The graph shows monthly returns of various companies with bars above zero representing positive returns and bars below zero representing negative returns. BF Biosciences (BFBIO), octopus, and Cite pharma have the highest positive returns. Companies like the organic meat and Mughal Energy also show positive but smaller returns.

Most other companies, including Buri Clean Energy and Panther Tyres, have negative returns. This means some companies gained value monthly, while others experienced losses. The graph helps quickly identify winners and losers in terms of monthly performance.

4.1.4 IPO Return for the First Quarter

The following graph exhibits the returns of the first day of IPO estimated using the offer price and the closing price on the first quarter.

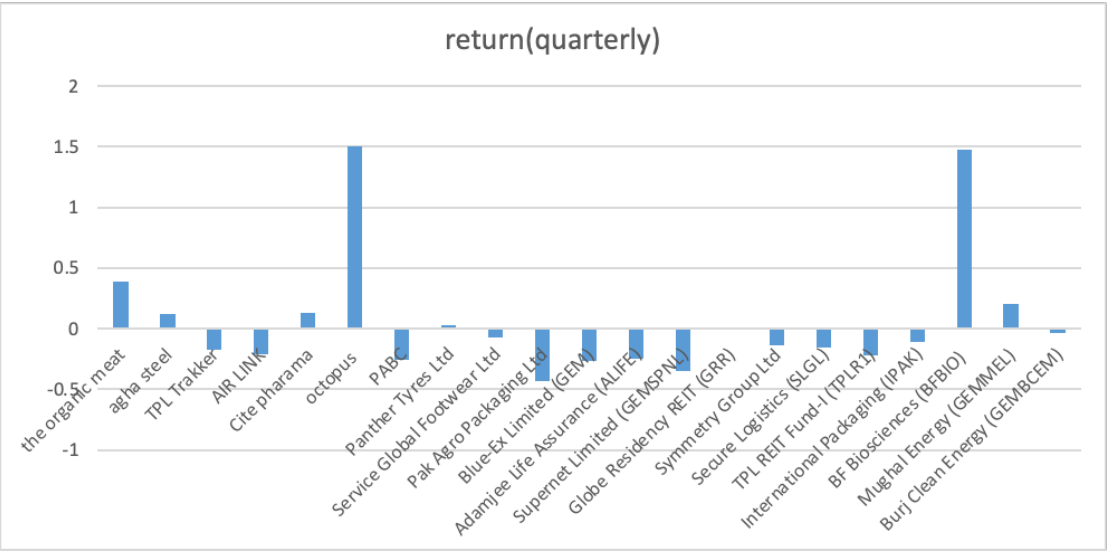

FIGURE 4.4: IPO Return for the First Quarter

The quarterly returns for several IPO businesses are displayed in the bar chart. With a quarterly return of almost 1.5, Octopus had the greatest return, closely followed by BF Biosciences. Though not as much, Mughal Energy and Organic Meat also reported profitable returns.

A number of businesses experienced notably poor quarterly results, including Adamjee Life, Blue-Ex, and TPL Trakker. The returns from most first public offerings (IPOs) are nearly zero, indicating little price movement throughout the quarter. The quarter's IPO performance was uneven overall, with some underperformers and a few notable winners.

4.1.5 IPO Return for the First Half Year

The following graph exhibits the returns of the first day of IPO estimated using the offer price and the closing price on the first half year.

This bar chart shows the overall returns of various IPO companies. BF Biosciences achieved the highest return (around 1.0), followed by Octopus and The

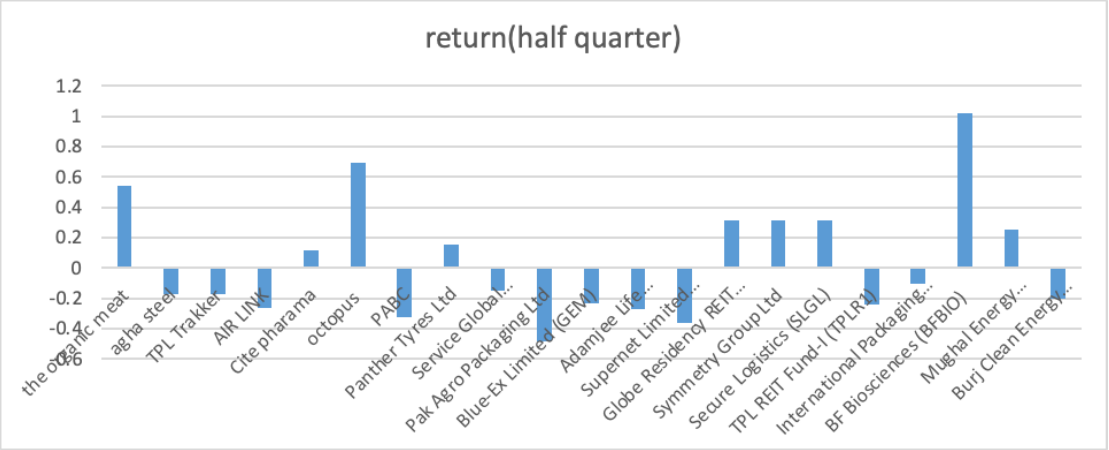

FIGURE 4.5: IPO Return for the First Half Year

Organic Meat. Several companies such as TPL Trakker, Blue-Ex, and adamjee Life recorded negative returns. A few IPOs, including Mughal Energy, Globe Residency, and Symmetry Group, posted moderate positive returns.

Most companies have returns close to zero, indicating minimal price change. Overall, IPO performance was mixed, with a few strong performers and several underperformers.

4.1.6 IPO Return for the Year

The following graph exhibits the returns of the year of IPO estimated using the offer price and the closing price on the first year.

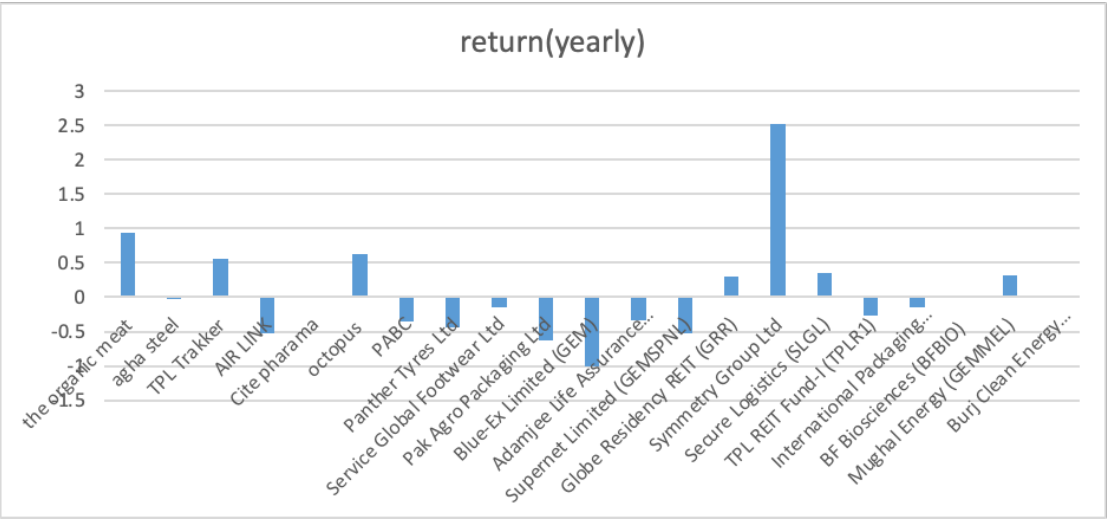

FIGURE 4.6: IPO Return for the Year

Each bar in this bar graph represents a distinct entity and displays the annual returns of several funds and companies. Bars primarily below or close to the zero-line show that the majority of companies had negative or barely marginally positive results.

Only a select few, including Symmetry Group Ltd, saw notable gains; Symmetry Group Ltd stood out due to its noticeably higher bar. The graph shows the year-over-year underperformance of the majority of listed organizations.

4.2 IPO Returns of the Day

Table 4.1: IPO Returns of the Day

Variables	**Coefficients**	**Standard Error**	**t-Stat**	**P-value**
Intercept	-0.239545037	0.139664564	-1.71514542	0.105617153
Method	-0.164912119	0.068508319	-2.407183833	0.028508602
Oversubscribed	0.004756402	0.003993352	1.191079931	0.250992616
LS	0.048633541	0.021614867	2.250004213	0.03887323
Issuers	0.024616218	0.024858301	0.990261465	0.336786612
Adjusted R Square		0.164165434		
F Statistics		1.982045017		

The daily returns regression shows an adjusted R-squared of around 0.164, indicating the model explains about 16.4% of the variation in initial returns on a daily basis. The intercept is negative but not statistically significant. The variable "return" has a negative coefficient (-0.1649) and is statistically significant (p=0.029), suggesting that higher returns are associated with lower initial underpricing in the short term.

"Oversubscribed" is positively and significantly associated with underpricing (coefficient 0.0486, p=0.039), implying that oversubscription tends to increase the

initial return. Other variables like "method" and "issuers" do not show significant effects in this daily return model. The model's F-statistic (1.98) indicates overall weak but potentially relevant explanatory power.

4.2.1 IPO Returns of the Week

TABLE 4.2: IPO Returns of the Week

Variables	**Coefficients**	**Standard Error**	**t Stat**	**P-value**
Intercept	-0.61283	0.1858	-3.2973	0.00454
Method	-0.22048	0.0911	-2.4184	0.02787
Oversubscribed	0.02403	0.0053	4.52340	0.00034
LS	0.09503	0.02876	3.30398	0.004481
Issuers	0.05425	0.0330	1.64018	0.12047
Adjusted R square		0.592483949		
F Statistics		8.269455361		

A stronger fit than daily returns is indicated by the weekly returns model, where the adjusted R-squared increases significantly to almost 0.592, indicating that the explanatory factors explain almost 59.2% of the variance in starting returns on a weekly scale. At the 0.005 level, the intercept is significant and negative.

The statistically significant and negative coefficient of "Method" (-0.220, p=0.028) shows that the method variable lowers beginning returns on a weekly basis.

The fact that oversubscription leads to underpricing is further supported by the fact that the "oversubscribed" variable is still positively significant (0.024,p=0.00034). Positive significance (0.095, p=0.0045) indicates that the variable "LS" likely a category or indicator variable—contributes to underpricing.

Despite not being statistically significant, "Issuers" is positive (p=0.12). The overall model significance is supported by the F-statistic (8.27).

4.2.2 IPO Returns of the Month

According to the model, the Intercept for monthly returns is negative (-0.46454), indicating a minor decline in monthly returns when all other parameters are set to zero. With a p-value of 0.30, this result is not statistically significant, nonetheless. The IPO pricing method has no discernible effect on monthly returns, as evidenced by the Method variable's negative coefficient of -0.1478 but again, it is not significant (p = 0.50). Remarkably, the Oversubscription variable has a p-value of 0.0176 and a positive, statistically significant coefficient of 0.03296.

TABLE 4.3: IPO Returns of the Month

Variables	**Coefficients**	**Standard Error**	**t-Stat**	**P-value**
Intercept	-0.464545	0.435726	-1.0661404	0.3021845
Method	-0.147807	0.213732	-0.6915515	0.4991316
Oversubscribed	0.032961	0.012458	2.64572089	0.0176223
LS	0.073005	0.0674342	1.0826112	0.2950275
Issuers	0.0373142	0.07755	0.48114483	0.6369274
Adjusted R Square		0.192482258		
F Statistics		2.191814421		

This implies that oversubscription is a major factor in raising monthly returns, i.e., when initial public offerings (IPOs) are oversubscribed, there is a greater chance of higher returns the next month. With a positive but insignificant correlation of 0.0373 (p = 0.64), the Issuer variable does not appear to be significantly correlated with monthly returns. A reasonable model fit is shown by the Adjusted R^2 of 0.19 and the F-statistics of 2.19, with oversubscription showing up as a significant factor influencing monthly returns.

4.2.3 IPO Returns of the Quarter

The adjusted R-squared for quarterly returns is moderate, at around 0.338, meaning that 33.8% of the variance is explained by the model. Additionally, "method,"

TABLE 4.4: IPO Returns of the Quarter

Variables	**Coefficients**	**Standard Error**	**t-Stat**	**P-value**
Intercept	-0.46903	0.5925128	-0.7916	0.44017145
Method	-0.03556	0.2906396	-0.12236	0.904136954
Oversubscribed	0.061180	0.0169413	3.611318	0.002342525
LS	0.047740	0.0916989	0.520624	0.609758471
Issuers	0.033899	0.1054588	0.321452	0.752028794
Adjusted R Square		0.338308483		
F Statistics		3.556391269		

"LS," and "issuers" do not significantly affect quarterly underpricing, and the intercept in this case is negative but not significant. Still, "oversubscribed" maintains its steady positive correlation with underpricing over time periods and is a very significant positive predictor (0.0612, p=0.0023). The F-statistic (3.56) for the quarterly model indicates a moderate level of overall explanatory power.

4.2.4 IPO Returns of the Half Year

A minor decrease in returns over the half-year period is shown by the half-quarter returns model's negative intercept (-0.03102), however this is not statistically significant (p = 0.96). Despite having a minor positive coefficient of 0.045073, the Method variable's p-value of 0.87 suggests that it has no discernible impact on returns.

With a coefficient of 0.02774, the Oversubscription variable exhibits a positive effect; however, its p-value of 0.10 indicates that the effect is only marginally significant and may be due to chance. With a coefficient of -0.02512, the Issuer variable has a negative impact on returns; nevertheless, this effect is also not statistically significant (p = 0.80). The model has nearly no explanatory power, as indicated by the Adjusted R^2 of -0.02 and the F-statistics of 0.89, which imply that the chosen variables are insufficient to explain half-quarter returns.

Table 4.5: IPO Returns of the Half Year

Variables	**Coefficients**	**Standard Error**	**t-Stat**	**P-value**
Intercept	-0.03102	0.55637	-0.05576	0.956223115
Method	0.045073	0.27291	0.165156	0.870889997
Oversubscribed	0.02774	0.015908	1.743836	0.100365968
LS	-0.00382	0.08610	-0.04445	0.965093537
Issuers	-0.02512	0.09902	-0.2537	0.802961214
Adjusted R Square		-0.022630406		
F Statistics		0.889351978		

4.2.5 IPO Returns of the Year

The yearly returns model shows a very poor fit with a negative adjusted R-squared (-0.071), indicating that the regression model does not explain the variation in initial returns on a yearly basis and may perform worse than a simple mean. None of the predictors, including "method," "oversubscribed," "LS," or "issuers," are statistically significant, nor is the intercept.

Table 4.6: IPO Returns of the Year

Variables	**Coefficients**	**Standard Error**	**t-Stat**	**P-value**
Intercept	0.79996	1.07095	0.74696789	0.465918936
Method	0.58265	0.52532	1.109139533	0.283763383
Oversubscribed	0.01854	0.03062	0.605554611	0.553304086
LS	-0.18633	0.16574	-1.1242261	0.277501426
Issuers	-0.02352	0.19061	-0.12342951	0.903304207
Adjusted R Square		-0.070714646		
F Statistics		0.66977828		

This suggests that these variables lack explanatory power for yearly underpricing. The F-statistic (0.67) further signals that the model is not useful in this case for explaining yearly initial returns.

The variable "oversubscribed" regularly demonstrates a positive and frequently statistically significant connection with initial return underpricing across a range of return frequencies, suggesting that more demand compared to supply leads to greater underpricing. Only at the weekly frequency does the "method" variable become significant and negative. "LS" and other parameters are only important once a week. The weekly level has the highest explanatory power, whereas the annual level has the lowest. The results suggest that factors influencing underpricing might be easier to spot and have a greater effect on short-term returns than on long-term annual returns.

4.3 Impact of IPO Method on the Volatility of Return

This section reports and discusses the link between the IPO method and volatility of returns across various time frames. It further reports the connection between IPO Suze, the underwriter, and investor interest and volatility of returns. Table 4.3.1 reports the results of the impact of IPO Method, IPO Size, Underwriter, and oversubscription on the volatility of return.

4.3.1 Impact of IPO Method, IPO Size, Underwriter and Oversubscription on Volatility of Return

The results of a regression analysis reveals how the IPO technique affects return volatility over various time periods (daily, weekly, monthly, quarterly, half-year, and annual) are shown in the attached table. Return, technique, oversubscribed, and issuers are among the variables, and for every time period, coefficients, standard errors, F statistics, and modified R-squared values are The intercept is positive and significant for daily returns (0.7880) and changes somewhat by interval, indicating a baseline level of volatility at the daily frequency.

TABLE 4.7: Impact of IPO Method, IPO Size, Underwriter, and Oversubscription on Volatility of Return

Variables	**Result**	**Daily**	**Weekly**	**Monthly**	**Quarterly**	**Half year**	**Yearly**
Intercept	Coefficient S. Error	0.7880 (0.1315)	0.0887 (0.0871)	0.0349 (0.0115)	0.0333 (0.0073)	0.0334 (0.0062)	0.0513 (0.0140)
Return	Coefficient S. Error	0.5675 (0.5232)	0.0098 (0.0904)	-0.0017 (0.0166)	0.0079 (0.0078)	0.0033 (0.0072)	-0.0034 (0.0080)
Method	Coefficient S. Error	0.0581 (0.1262)	-4.9429 (0.0385)	-0.0020 (0.0109)	-0.0006 (0.0068)	-0.0021 (0.0058)	-0.0177 (0.0131)
Oversubscription	Coefficient S. Error	-0.0003 (0.0098)	-0.0020 (0.0029)	0.0003 (0.0010)	-0.0002 (0.0007)	0.0001 (0.0005)	0.0001 (0.0010)
Issuers	Coefficient S. Error	-0.0122 (0.0421)	-0.0015 (0.0129)	0.0002 (0.0037)	-0.0012 (0.0023)	-0.0019 (0.0019)	-0.0064 (0.0045)
F statistics		0.41879	0.430364	0.035336	0.416271	0.405472	0.88189534
Adjusted R Square		-0.13152	0.125457	-0.23905	-0.13217	-0.1349520	-0.02419237

The intercepts are smaller but still positive over longer time periods. At the daily level, the return coefficients are positive (0.5675) but not statistically significant (huge standard error 0.5232). Coefficients are near zero (some negative) for longer periods, indicating that return has little consistent impact on volatility. Oversubscription has no discernible impact on volatility because the coefficients are close to 0 and negligible at all intervals.

The number of issuers appears to have little impact on return volatility, as seen by the largely negative but negligible coefficients across all intervals. The impact of the IPO approach is captured by Method. The coefficient is modest and statistically insignificant at daily frequency (0.0581, SE 0.1262). Weekly, however, the coefficient is statistically significant and big negative (−4.9429, SE 0.0385), suggesting a high negative correlation between volatility and the IPO process. Effects are negligible and near zero at other intervals.

The F-statistic is low at all intervals (0.4 or less), suggesting that the model is unable to account for a significant amount of volatility fluctuation. The model's no or low explanatory power is confirmed by the adjusted R-squared, which is negative or almost 0 for all periods. A model that fits poorly than a horizontal line (mean) model is shown by negative values.

4.3.1.1 Daily Frequency

Although positive, the return and technique factors are not statistically significant. This suggests that there is insufficient proof that the IPO process or return influences daily volatility.

4.3.1.2 Weekly Frequency

The technique's significant negative coefficient (-4.9429) indicates that the choice of IPO method has a significant impact at the weekly horizon. Other factors don't matter.

4.3.1.3 Monthly to Annual Frequency

For the majority of variables, regression coefficients are nearly zero with sizable standard errors. The IPO process, returns, oversubscription, and issuers have no discernible impact on volatility. The explanatory power of the model is really low.

Overall conclusion is that the IPO method's impact on the volatility of return is mostly negligible or insignificant except at the weekly level, where it negatively affects volatility. Return, oversubscription, and number of issuers do not significantly explain volatility at any time horizon. The regression models have very low explanatory power (negative or near-zero Adjusted R2), suggesting other factors outside these variables are likely more important in explaining IPO return volatility. This analysis implies that while the IPO method momentarily influences volatility weekly, broader or longer-term volatility determinants require additional variables or different modeling approaches to be properly understood and predicted. The provided regression results should be interpreted with caution due to the overall weak-fit models.

4.4 Comparison of IPO Performance and Market Performance

Sharpe Ratio Formula: The Sharpe ratio is calculated as:

$$\textbf{Sharpe Ratio} = \frac{R_p - R_f}{\sigma_p}$$

Where:

- Rp = Average return of the portfolio (IPO stock in this case)
- Rf = Risk-free rate of return
- p = Standard deviation of the portfolio returns (a measure of risk or volatility)

In this study, the risk-adjusted performance of initial public offerings (IPOs) in relation to the market index over various time periods is measured using the Sharpe ratio. Raw returns by themselves are insufficient to evaluate performance because initial public offerings (IPOs) in developing markets like Pakistan frequently experience significant volatility and price swings.

The Sharpe ratio offers a more realistic assessment of whether initial public offerings (IPOs) give investors with better compensation for the amount of risk they assume by adjusting returns for risk.

When evaluating the effectiveness of IPO pricing strategies like book-building and fixed price, this is especially crucial because IPOs that routinely exhibit greater Sharpe ratios than the market would suggest underpricing benefits or unusual profits. Conversely, if the difference is statistically insignificant, it supports the hypothesis that IPOs do not outperform the market after adjusting for risk, reflecting a more efficient pricing environment.

4.4.1 Comparison of The Daily Sharpe Ratio

The share ratios of IPO return and Market returns are compared using assumptions of equal variances and unequal variances. Table 4.8 reports the results of the two-sample T test under assumption of equal variances.

4.4.1.1 t-Test: Two-Sample Assuming Equal Variances

TABLE 4.8: t-Test: Two-Sample Assuming Equal Variances

	Stock Sharpe ratio	**Market Index Sharpe Ratio**
Mean	-0.021750435	0.001730742
Variance	0.03612426	9.66232E-05
Observations	21	21
Pooled Variance	0.018110441	
Hypothesized Mean Difference	0	
df	40	
t Stat	-0.56539242	
P(T¡=t) one-tail	0.287482381	
t Critical one-tail	1.683851013	
P(T¡=t) two-tail	0.574964763	
t Critical two-tail	2.02107539	

The mean of IPO is -0.0217 and market is 0. 0017.The above results highlight that the means of the two return series are not significantly different. A t-statistic of -0.565 was produced by the t-test for daily Sharpe ratios under the equal variance assumption. The negative figure shows that IPO stocks' daily Sharpe ratio is often lower than the market index's. But the amount of this difference is quite tiny.

The resultant p-values are significantly higher than the standard 0.05 significance level (0.287 for one-tail and 0.575 for two- tail). This suggests that there is no statistical significance in the observed difference. Therefore, we are unable to reject the null hypothesis and come to the conclusion that, on a daily risk-adjusted basis, IPOs do not perform any differently from the market.

4.4.1.2 t-Test: Two-Sample Assuming Unequal Variances

Table 4.9: t-Test: Two-Sample Assuming Unequal Variances

	Stock Sharpe Ratio	**Market Index Sharpe Ratio**
Mean	-0.021750435	0.001730742
Variance	0.03612426	9.66232E-05
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	-0.56539242	
P(T¡=t) one-tail	0.28904758	
t Critical one-tail	1.724718243	
P(T¡=t) two-tail	0.57809516	
t Critical two-tail	2.085963447	

The mean of IPO is -0.0217 and market is 0. 0017.The above results highlight that the means of the two return series are not significantly different.

With a t-statistic of -0.565 and p-values (0.289 for one-tail and 0.578 for two-tail) that are still significantly greater than 0.05, the results hold true even when the

assumption of equal variances is relaxed. These results demonstrate that, even when any variance differences are taken into account, the difference between the market and IPO Sharpe ratios is negligible. Therefore, when compared to the benchmark market index, IPOs do not exhibit any unusual daily performance.

4.4.2 Comparison of The Weekly Sharpe Ratio

The share ratios of IPO return and Market returns are compared using assumptions of equal variances and unequal variances. Table 4.10 reports the results of the two-sample T test under assumption of equal variances.

4.4.2.1 t-Test: Two-Sample Assuming Equal Variances

TABLE 4.10: t-Test: Two-Sample Assuming Equal Variances

	Stock Sharpe Ratio	**Marker Index Sharpe Ratio**
Mean	408.5195727	-0.535998289
Variance	3592376.857	1.249821624
Observations	21	21
Pooled Variance	1796189.054	
Hypothesized Mean Difference	0	
df	40	
T stat	0.989010582	
P(T¡=t) one-tail	0.164301561	
t Critical one-tail	1.683851013	
P(T¡=t) two-tail	0.328603121	
t Critical two-tail	2.02107539	

The mean of IPO is 408.51 and market is -0. 535.The above results highlight that the means of the two return appears high, but the difference is not statistically significant. The t-test yields a t-statistic of 0.989 for the weekly data, suggesting that initial public offerings (IPOs) exhibit marginally higher Sharpe ratios than

the market index. The p-values (0.164 one-tail and 0.329 two-tail) are higher than 0.05, indicating that the result is not statistically significant, even with this positive difference.

Therefore, it is not possible to reject the null hypothesis. This result suggests that weekly initial public offerings (IPOs) do not produce better or worse risk- adjusted returns than the overall market.

4.4.2.2 t-Test: Two-Sample Assuming Unequal Variances

TABLE 4.11: t-Test: Two-Sample Assuming Unequal Variances

	Stock Sharpe Ratio	**Marker Index Sharpe Ratio**
Mean	429.2458295	-0.535998289
Variance	3771953.395	1.249821624
Observations	20	21
Hypothesized Mean Difference	0	
df	19	
t Stat	0.989645875	
P(T¡=t) one-tail	0.167391929	
t Critical one-tail	1.729132812	
P(T¡=t) two-tail	0.334783857	
t Critical two-tail	2.093024054	

The mean of IPO is 429.24 and market is -0. 535.The above results highlight that the means of the two return appears high, but the difference is not statistically significant. With unequal variances assumed, the test yields the same t-statistic of 0.989 and similar p-values (0.167 one-tail and 0.335 two-tail). This consistency suggests robustness in the findings.

This consistency shows that the results are solid. It supports the finding that, when evaluated on a weekly basis, initial public offerings (IPOs) do not exhibit appreciable variations in Sharpe ratios as compared to the market index, hence reaffirming the lack of anomalous returns.

4.4.3 Comparison of The Monthly Sharpe Ratio

The share ratios of IPO return and Market returns are compared using assumptions of equal variances and unequal variances. Table 4.12 reports the results of the two-sample T test under assumption of equal variances

4.4.3.1 t-Test: Two-Sample Assuming Equal Variances

Table **??** reports the results of the two-sample T test under assumption of equal variances.

TABLE 4.12: t-Test: Two-Sample Assuming Equal Variances

	Stock (Sharpe Ratio)	**Market Index Sharpe Ratio**
Mean	0.642488111	0.005900001
Variance	77.56593349	1.2744442
Observations	21	21
Pooled Variance	39.42018885	
Hypothesized Mean Difference	0	
df	40	
t Stat	0.328544213	
P(T¡=t) one-tail	0.372107036	
t Critical one-tail	1.683851013	
P(T¡=t) two-tail	0.744214072	
t Critical two-tail	2.02107539	

The mean of IPO is 0.642 and market is -0. 0059.The above results highlight that the means of the two return show better performance, but the difference is not statistically significant. The average Sharpe ratios of initial public offerings (IPOs) and the market index have a very slight positive difference, as indicated

by the t-test's t-statistic of 0.329 at the monthly level. However, the difference is not statistically significant, as seen by the p-values (0.744 two-tail and 0.372 one-tail), which are significantly over the 0.05 cutoff. This shows that there is no indication of better or worse performance, and that IPOs perform quite similarly to the market over monthly periods in terms of risk-adjusted returns.

4.4.3.2 t-Test: Two-Sample Assuming Unequal Variances

The mean of IPO is 0.642 and market is -0. 0059.The above results highlight that the means of the two return show better performance, but the difference is not statistically significant.

TABLE 4.13: t-Test: Two-Sample Assuming Unequal Variances

	Stock (Sharpe Ratio)	**Market Index Sharpe Ratio**
Mean	0.642488111	0.005900001
Variance	77.56593349	1.2744442
Observations	21	21
Hypothesized Mean Difference	0	
df	21	
t Stat	0.328544213	
P(T¡=t) one-tail	0.372876932	
t Critical one-tail	1.720742903	
P(T¡=t) two-tail	0.745753863	
t Critical two-tail	2.079613845	

With a t-statistic of 0.329 and p-values (0.372 one-tail, 0.744 two-tail) that are still negligible, the results under unequal variances are identical to those from the equal variance assumption. This demonstrates that the result holds up well under all statistical hypotheses: There is no discernible difference between IPOs and the risk-adjusted monthly returns of the market.

4.4.4 Comparison of The Quarterly Sharpe Ratio

The share ratios of IPO return and Market returns are compared using assumptions of equal variances and unequal variances. Table 4.14 reports the results of the two-sample T test under assumption of equal variances.

4.4.4.1 t-Test: Two-Sample Assuming Equal Variances

TABLE 4.14: t-Test: Two-Sample Assuming Equal Variances

	Stock (Sharpe Ratio)	**Index Sharpe Ratio**
Mean	-0.872454588	-2.046563217
Variance	180.6956846	0.961170113
Observations	21	21
Pooled Variance	90.82842735	
Hypothesized Mean Difference	0	
df	40	
t Stat	0.399201378	
P(T¡=t) one-tail	0.345934134	
t Critical one-tail	1.683851013	
P(T¡=t) two-tail	0.691868268	
t Critical two-tail	2.02107539	

The mean of IPO is -0.872 and market is -02. 046.. The above results show relatively higher return for IPOs, but the difference is not significant the difference is not statistically significant. The mean quarterly Sharpe ratio of IPO equities is marginally higher than that of the market index, but the difference is negligible, according to the t-test result under the equal variance assumption, which shows a t-statistic of 0.399. Both the one- and two-tailed p-values (0.346 and 0.692) are much higher than the conventional significance criterion of 0.05.

There is no compelling evidence to support the idea that initial public offerings (IPOs) have a higher or lower risk-adjusted return than the market index during quarterly periods, as this clearly indicates that the observed difference is statistically insignificant.

Thus, we find that the market and IPOs' quarterly Sharpe ratios are statistically similar and are unable to reject the null hypothesis.

4.4.4.2 t-Test: Two-Sample Assuming Unequal Variances

TABLE 4.15: T-test: Two-Sample Assuming Unequal Variances

	Stock (Sharpe Ratio)	**Index (Sharpe Ratio)**
Mean	-0.872454588	-2.046563217
Variance	180.6956846	0.961170113
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	0.399201378	
P(T¡=t) one-tail	0.34698773	
t Critical one-tail	1.724718243	
P(T¡=t) two-tail	0.69397546	
t Critical two-tail	2.085963447	

The mean of IPO is -0.872 and market is -02. 046.. The above results show relatively higher return for IPOs, but the difference is not significant the difference is not statistically significant.

With a t-statistic of 0.399, the t-test results are nearly the same when the assumption of equal variances is loosened. Once more, there is no statistical significance indicated by the one-tailed p- value (0.347) or the two-tailed p-value (0.694). This demonstrates that the quarterly Sharpe ratio difference between IPO equities and the market index is insignificant, even in the presence of unequal variation. The test's result supports the finding that, on a risk-adjusted basis, IPO performance does not significantly deviate from market performance at quarterly intervals.

There is no discernible difference between the market and IPO Sharpe ratios on a quarterly horizon, according to both equal and unequal variance tests. This suggests that, in the medium run, initial public offerings (IPOs) do not yield better or worse risk-adjusted returns than the market index. The results lend credence to the claim that Pakistani IPO pricing practices produce post-listing returns that fluctuate in tandem with the performance of the general market, which is consistent with the idea of market efficiency at quarterly intervals.

4.4.5 Comparison of the Half-year Sharpe Ratio

The share ratios of IPO return and Market returns are compared using assumptions of equal variances and unequal variances. Table 4.16 reports the results of the two-sample T test under assumption of equal variances.

4.4.5.1 t-Test: Two-Sample Assuming Equal Variances

TABLE 4.16: T-test: Two-Sample Assuming Equal Variances

	Stock (Sharpe Ratio)	**Index (Sharpe Ratio)**
Mean	0.160528094	-0.086435959
Variance	150.2794134	0.38769385
Observations	21	21
Pooled Variance	75.33355361	
Hypothesized Mean Difference	0	
df	40	
t Stat	0.092200689	
P(T¡=t) one-tail	0.463499411	
t Critical one-tail	1.683851013	
P(T¡=t) two-tail	0.926998821	
t Critical two-tail	2.02107539	

The mean of IPO is -0.1605 and market is -0.0864 The above results show slightly better performance but not statistically significant.

With a t-statistic of 0.092, which is incredibly modest, the half-quarter test indicates that there is hardly any difference between the market and IPO Sharpe ratios. The p-values (0.927 two-tail and 0.464 one-tail) are extremely high and much over the 0.05 cutoff. The null hypothesis is accepted as a result of these findings, which demonstrate that IPOs and the market index show nearly equal risk-adjusted returns at half-quarter intervals.

4.4.5.2 t-Test: Two-Sample Assuming Unequal Variances

TABLE 4.17: T-test: Two-Sample Assuming Unequal Variances

	Stock (Sharpe Ratio)	**Index (Sharpe Ratio)**
Mean	0.160528094	-0.086435959
Variance	150.2794134	0.38769385
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	0.092200689	
P(T¡=t) one-tail	0.463727943	
t Critical one-tail	1.724718243	
P(T¡=t) two-tail	0.927455886	
t Critical two-tail	2.085963447	

The mean of IPO is -0.1605 and market is -0.0864 The above results show slightly better performance but not statistically significant. The test yields the same t-statistic of 0.092 with p-values (0.464 one-tail and 0.927 two-tail) when unequal variances are considered.

There is no indication of a major difference based on these values. This supports the finding that IPOs and market share have similar half-quarter performance, with no unusual returns within this time frame.

4.4.6 Comparison of The yearly Sharpe Ratio

The share ratios of IPO return and Market returns are compared using assumptions of equal variances and unequal variances. Table 4.18 reports the results of the two-sample T test under assumption of equal variances.

4.4.6.1 t-Test: Two-Sample Assuming Equal Variances

TABLE 4.18: T-test: Two-Sample Assuming Equal Variances

	Stock (Sharpe Ratio)	**Index (Sharpe Ratio)**
Mean	1.600978211	-0.03807483
Variance	421.6477784	0.327208695
Observations	21	21
Pooled Variance	210.9874936	
Hypothesized Mean Difference	0	
df	40	
t Stat	0.365644715	
P(T¡=t) one-tail	0.358278405	
t Critical one-tail	1.683851013	
P(T¡=t) two-tail	0.71655681	
t Critical two-tail	2.02107539	

The mean of IPO is 1.6009 and market is -0.0380.The above results suggests stronger long-term returns, but the difference is not significant.

The test yields a t-statistic of 0.366 for the annual analysis, indicating that IPOs have somewhat higher Sharpe ratios than the market index over a one-year time-frame. However, because the p- values (0.717 two-tail and 0.358 one-tail) are much larger than 0.05, the difference is not statistically significant.

Therefore, we are unable to reject the null hypothesis and come to the conclusion that, in risk-adjusted terms, IPOs neither outperform nor underperform the market on an annual basis.

4.4.6.2 t-Test: Two-Sample Assuming Unequal Variances

TABLE 4.19: T-test: Two-Sample Assuming Unequal Variances

	Stock (Sharpe Ratio)	**Index (Sharpe Ratio)**
Mean	1.600978211	-0.03807483
Variance	421.6477784	0.327208695
Observations	21	21
Hypothesized Mean Difference	0	
df	20	
t Stat	0.365644715	
P(T¡=t) one-tail	0.359234483	
t Critical one-tail	1.724718243	
P(T¡=t) two-tail	0.718468966	
t Critical two-tail	2.085963447	

The mean of IPO is 1.6009 and market is -0.0380.The above results suggests stronger long-term returns, but the difference is not significant. Robustness is confirmed by the test's identical t- statistic of 0.366 and strikingly similar p-values (0.359 one-tail and 0.718 two-tail) under unequal variance assumptions. Long-term statistical indistinguishability between IPO and market Sharpe ratios is confirmed by these findings. Therefore, there's no proof that IPOs' yearly performance is out of the ordinary when compared to the whole market. Daily, weekly, monthly, quarterly, half-quarter, and annual time frames are all included in the results, which regularly show t-statistics near zero and p-values well over 0.05.

This clearly implies that, as compared to the market index, IPO stocks in Pakistan do not offer noticeably better risk- adjusted returns. Once risk is taken into consideration, IPOs react similarly to the market, whether in the short or long term. These results support the claim that Pakistani IPO pricing techniques result in post-listing performance that is consistent with overall market efficiency. In other words, regardless of the time horizon, investors cannot anticipate extraordinary gains from initial public offerings (IPOs) after controlling for risk.

Chapter 5

Conclusion

With a focus on short-term underpricing, long-term returns, price volatility, and the function of underwriters, the current study examined the IPO pricing processes and performance in Pakistan. This study examined the relative merits of fixed-price and book-building approaches in predicting initial public offerings (IPOs) using a cross-sectional dataset of 21 IPOs issued on the Pakistan Stock Exchange (PSX) between 2020 and 2024. The results showed that Pakistani initial public offerings (IPOs) still display the well-known phenomenon of asymmetric pricing. These returns are not consistently maintained, though, and long-term performance frequently exhibits a propensity for under performance in comparison to other benchmarks.

This bolsters evidence from around the world that initial public offerings (IPOs) typically yield strong first-day returns because of cautious pricing techniques and investor zeal, but that long-term benefits are diminished by subsequent corrections. According to regression analysis, underwriter identification and the IPO pricing strategy (fixed price vs. book building) did not always have a statistically significant impact on short-term returns.

However, oversubscription turned out to be a substantial factor in determining monthly returns, indicating that signals of investor demand are crucial in understanding aftermarket performance variance. Similarly, volatility research showed that, irrespective of the pricing method selected, initial public offerings (IPOs) in Pakistan are still susceptible to short-term speculative behavior and information

asymmetry. The book-building approach is a more effective, transparent, and stable IPO pricing mechanism in Pakistan than the fixed-price approach, according to this study's compelling empirical data. It lowers post-listing volatility, boosts investor trust, and promotes price discovery. The findings are further supported by the Sharpe Ratio, which shows that initial public offerings (IPOs) only provide positive risk-adjusted returns in the near term. The fixed-price approach, on the other hand, is inflexible since the offer price is decided upon before investor interest is assessed. This frequently leads to either underpricing or overpricing, which causes unstable post-listing prices and ineffective capital deployment. According to the study, because the price reflects investor feedback, book-building initial public offerings (IPOs) have reduced volatility and more accurate pricing. Book building is a more successful strategy for contemporary IPO markets since it also increases transparency, investor confidence, and underwriter credibility.

The results are in line with Signalling Theory from a theoretical perspective. By include respectable investors and middlemen in the pricing process, the book-building method acts as a reliable indicator of a company's quality. In order to verify the worth of the issuing company and reassure investors of its dependability, underwriters are essential. In contrast to the fixed-price strategy, where such signaling mechanisms are either nonexistent or poor, this process lowers uncertainty and results in more equitable pricing.

However, the returns of IPOs that used the building process are generally found to be lower in short run than the IPO returns where the fixed price method is used. It is further added that no difference in returns is observed in longer time frame, which is an indicator of better price discovery and market efficiency theory. Regulatory intents continue to have less of an impact on IPO results than underwriter reputation, oversubscription levels, and market sentiment. This demonstrates that, similar to many emerging economies, Pakistan's initial public offering (IPO) market is still developing and needs more robust regulatory oversight and disclosures, open procedures, and increased institutional involvement. Numerous significant correlations are confirmed by the empirical investigation. Returns and volatility are greatly impacted by the IPO process, issue size, underwriter reputation, and oversubscription ratio. In particular, fixed-price IPOs

have larger short-term gains but more price changes, whereas book-building IPOs exhibit lower volatility and more steady post-listing performance. This shows that while investors may experience quick returns from fixed-price IPOs, they are subject to higher risks owing to market overreaction. The results of the study also show that oversubscription has a beneficial impact on returns since excellent beginning performance, which reflects confidence and market enthusiasm, is a result of high investor demand. Larger initial public offerings (IPOs) also typically do better, indicating that established businesses with solid foundations draw steady investors and achieve better pricing results. Because seasoned underwriters help signal company quality and assure greater valuation accuracy, the underwriter's reputation also plays a role in pricing efficiency.

IPOs exhibit blatant underpricing in the near term, as investors generate substantial profits on the first trading day and week. In contrast to market indices, the data shows worse performance and diminishing profits over the long run. This tendency is consistent with international IPO research, which shows that as new information becomes available over time, markets frequently correct initial overvaluation. As a result, initial public offerings (IPOs) in Pakistan are primarily profitable for short-term investors, with moderate to negative long-term returns.

This study evaluated whether investors are fairly compensated for the degree of risk they assume when participating in initial public offerings (IPOs) by using the Sharpe Ratio as a measure of risk- adjusted return. The Sharpe Ratio aids in assessing performance consistency over time because initial public offerings (IPOs) in developing nations like Pakistan frequently exhibit significant levels of volatility and unpredictability. A low or negative Sharpe Ratio denotes subpar risk- adjusted performance, whereas a high ratio shows that the IPO offers a good return in relation to its risk. Long-term declines or negative Sharpe Ratios, however, show that these initial gains are not sustainable and that initial public offerings (IPOs) perform worse over time than market benchmarks. This lends credence to the idea that initial public offerings (IPOs) yield higher profits during the first trading sessions, but that long-term investors see lower returns after prices level out. The results have significant implications for policymakers, underwriters, and investors. Regulators such as the SECP and PSX should encourage broader adoption of book

building and enforce strict disclosure standards to improve market transparency. Issuing firms are recommended to use the book-building method to achieve fair valuations and attract informed investors. For investors, understanding the short-term nature of IPO returns is essential to making better investment decisions.

5.1 Policy Implication

The study's conclusions have important ramifications for investors, issuers, regulators, and underwriters in Pakistan's capital market.

5.1.1 Increasing Regulatory Oversight

To ensure fair allocation and discourage underwriters from giving preference to certain institutional investors, the Securities and Exchange Commission of Pakistan (SECP) should increase its oversight of book-building activities. Investor trust in the IPO process can be restored, and agency conflicts can be reduced with stricter compliance procedures.

5.1.2 Transparent Allocation Mechanisms

To ensure fair participation, the hybrid book building and fixed price model needs to be improved. Financial inclusion would be improved and speculative flipping would be decreased if a larger percentage of IPO shares were distributed to regular investors under clear regulations.

5.1.3 Better Reporting and Disclosure

Issuing companies are required to include more information in their prospectuses, such as thorough risk analyses, governance procedures, and earnings projections. Increased openness will lessen information asymmetry and aftermarket speculation.

5.1.4 Market Development and Investor Education

To assist retail investors in comprehending IPO procedures, hazards, and long-term value concerns, the PSX and SECP ought to broaden their financial literacy initiatives. Furthermore, measures that encourage greater involvement from

institutional investors will help to stabilize demand and lessen volatility in the aftermarket.

5.2 Study Limitations

Although this study offers insightful information about Pakistani IPO success, it must be noted that it has several limitations.

5.2.1 Limitations on Sample Size

The study examined 21 initial public offerings (IPOs) between 2020 and 2024, which restricts how broadly the findings may be applied. Stronger conclusions might be drawn by a larger sample spanning several decades.

5.2.2 Cross-Sectional Design

The cross-sectional method made it more difficult to record macroeconomic shocks, changing patterns, or structural adjustments in the capital market. Time dynamics might be better taken into account in a panel-based or longitudinal investigation.

5.2.3 Restricted Variable Scope

Only factors such IPO process, size, underwriter identity, oversubscription, and volatility were included in the analysis. Other important elements were left out, including sector-specific hazards, corporate governance, lock-up clauses, and ownership concentration.

5.3 Future Research Directions

Considering the study's limitations and conclusions, a number of potential avenues for further investigation can be identified. To evaluate cyclical trends and structural shifts in IPO pricing mechanisms under various economic circumstances,

future research should include IPOs over longer time periods (10–15 years). A more thorough understanding of underpricing and volatility in the Pakistani IPO market may be possible by taking into account behavioral factors such investor attitude, media excitement, or social media influence.Research might assess how well SECP reforms—like the 2009 implementation of book building and the 2015 revisions—improve price discovery and lessen underpricing. Future studies should look at whether price anomalies vary substantially among businesses like manufacturing, IT, or pharmaceuticals, given that Pakistan's IPOs cover a wide range of industries.

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