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Article

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Full Length Article

IPO cycles in PakistanMuhammad Zubair Mumtaz^{a,*}, Zachary A. Smith^b^a National University of Sciences & Technology, School of Social Sciences & Humanities, Islamabad, Pakistan^b Saint Leo University, Tapia College of Business, FL, USA

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Abstract

This study investigates the cycles that IPO issuance produce in Pakistan and the US. We did not find evidence of a lead-lag relationship between IPO volume and initial returns in Pakistan; however, this evidence holds for the US IPOs. Another important finding is that Pakistani and US IPOs are sensitive to changes in market conditions. Moreover, we report evidence of emerging hot markets in Pakistan. This study compares the results of hot IPO markets to the proceeds obtained for firms that issue their shares and finds that firms raise more capital during hot markets; however, factors like regulatory regimes have different influences over the proceeds raised across the different markets. Copyright © 2021, Borsa İstanbul Anonim Şirketi. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

JEL classification: E32; G30; G32*Keywords:* IPO cycles; Initial returns; Pakistan; US**1. Introduction**

Over the past two decades or so, IPO activities have increased due to the substantial growth opportunities in Asian markets. The Pakistani stock market also witnessed this increase. Since Pakistan is an emerging country, immense potential exists for firms to go public and issue their shares. Limited literature is available to determine if the IPO cycles experienced in Asian markets are similar to more developed nations and other Asian markets. Güçbilmez (2015) examined IPO waves in China and Hong Kong using monthly data from 1999 to 2013 and found no evidence of a lead-lag relationship between the average initial returns of IPOs and the subsequent volume of IPOs issued in both markets. Moreover, he documents that China's IPO volume is not susceptible to fluctuations in market conditions but finds evidence of a statistically significant association between market returns and IPO

issuance in Hong Kong. Furthermore, his examination of the Chinese and Hong Kong IPO markets provides evidence that IPO activity and the cyclical nature of IPO performance vary across different regulatory regimes; especially, in Asian markets.

This study bridges the gap by examining the anatomy of IPO cycles in Pakistan. First, we examine the lead-lag association between initial IPO returns and the volume of IPOs issued in Pakistan and the US using the Ordinary Least Square (OLS) method. This study uses quarterly data to investigate the association due to the low IPO volume of shares issued in Pakistan. After applying the Cochrane-Orcutt procedure to adjust for serial autocorrelation, we find that volume is not a good indicator of future IPO returns in both the US and Pakistani Markets. We test the lead-lag relationship between IPO volume and initial returns using the Granger causality test and do not find any evidence of a relationship for Pakistani IPOs. However, we find that lagged initial returns predict IPO volume in the presence of seasonality for the US IPO market. Further, we explore whether IPO volume is volatile due to fluctuations in Pakistan's market conditions using a negative binomial regression

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model and compare those results against the US IPO markets. For Pakistani IPOs, we find the persistence of an association between the lagged IPO returns and volume; however, in the US, all three of the lagged IPO returns that we tested (i.e., the first three lags) were statistically significant predictors of IPO volume; so, the volume is indicative of performance in the US IPO markets. Additionally, in terms of seasonality, we find evidence that the volume of IPOs issued on Pakistani IPO markets is greater in the first quarter. In contrast, an inverse association exists between IPO volume and issuance in the first and third quarters in the US.

To examine whether or not the Pakistani IPO markets experience hot IPO cycles, we split our sample into quarters and compare each quarter's IPO performance to that of the previous 5 same quarters and if the performance of that particular quarter is greater than the preceding same 5 quarters it is classified as a 'Hot Market.' We find that 17% of the quarters were considered 'Hot Markets' in the US and 20% of the quarters were considered 'Hot Markets' in Pakistan; hence, 'Hot Markets' occur in Pakistan as well as the US. Following this line of thought, we also examined whether 'Hot Markets' affect the amount of proceeds raised by issuers. Initially, we provide evidence that the 'Hot Markets' may have some influence over the proceeds raised; however, after we include a variable that proxies for a governance regime change in the Pakistani market, the 'Hot Market' variable fades to insignificant. Therefore, we conclude that a firm's sales, its profitability, the tangible book value, the regulatory regime, and crises that occurred from 1997 to 1998 (Asian Financial Crisis) and 2007 to 2008 (US Financial Crisis) all influenced the proceeds raised for Pakistani firms as they issued their shares to the markets.

In the final section, we compare the results that we obtain when evaluating whether there is a relationship between hot IPO markets and the amount of proceeds raised by Pakistani firms against the Güçbilmez (2015) study examining this relationship in China and Hong Kong. When comparing how IPOs proceeds are likely to be affected by hot markets, the three markets provide confirmatory evidence, although at times not all three studies are statistically significant, that a firm's Market-to-Book ratio and profits have direct linkages with IPO proceeds and sales, tangible book value, and debt ratios have a negative association with IPO proceeds. Güçbilmez (2015) also deployed an interaction term that was a proxy for small and medium enterprises and hot markets and this variable affected IPO proceeds positively in the Chinese Markets and negatively in the Hong Kong IPO Markets, which lends further credence to the idea that institutional structures and regulatory regimes matter when attempting to identify cyclical patterns in IPO issuance and performance. For the Pakistani IPOs, we include a regulatory regime variable to indicate a transition from the Corporate Law Authority (CLA) to the Securities & Exchange Commission of Pakistan (SECP), which illustrates that since the regulatory regime transitioned from the CLA to the SECP the proceeds from IPOs issued in Pakistan has decreased, and a variable for the financial crises that occurred from 1997 to 1998 (Asian Financial Crisis) and

2007 to 2008 (US Financial Crisis), which also reduced IPO proceeds.

The rest of the paper is structured as follows. In Section 2, an overview of earlier studies is provided, Section 3 describes the sample and data, Section 4 examines the empirical findings, and Section 5 concludes the study.

2. A review of the literature

The cyclical nature of IPO activity is well-established from the perspective of both theoretical points of view and empirical examination (Güçbilmez, 2015; Ibbotson & Jaffe, 1975; Lowry, 2003; Lowry & Schwert, 2002; Ritter, 1984). In one of the first papers to examine the cyclical nature of IPO performance, Ibbotson and Jaffe (1975) identified hot and cold IPO markets by segmenting the returns of IPOs into two groups: IPOs with returns that were above the median IPO performance as 'hot' and those that were below the median as 'cold.' Ritter (1984) built on the concept of the 'hot' IPO market and analyzed a hot IPO market in the US from January 1980 to March 1981. On average, the listing day IPO return was 48.40%; while examining a cold market from 1977 to 1982 he identified that the average initial return was 16.30%. He further argued that higher abnormal returns in the 'hot' market were linked with the natural resources sector but after excluding this sector there were inadequate results to show that new issues generated abnormal returns. This implied that abnormal returns may be associated with a particular sector(s) through which returns may be higher. Building on previous findings Lowry and Schwert (2002) highlighted that, in general, there is a direct association between IPO issuance and performance. Moreover, Benninga, Helmantel, and Sarig (2005) indicated that these findings may illustrate that specific industries may experience IPO waves at certain times or have better investment opportunities when compared against previous periods.

Pastor and Veronesi (2005) proposed a framework concerning the pattern of IPO cycles. They argued that IPO cycles appear owing to developments in market conditions and most firms decide to go public at the same time. Studies of US IPO markets tend to report that most of the firms list their shares on the stock market at a time of high initial returns (Lowry and Schwert, 2002; Gao, Brooks, & Shami, 2010; Pastor & Veronesi, 2005; Yung, Colak, & Wang, 2008). Helwege and Liang (2004) indicate that this cyclical performance (i.e., hot and cold markets) is likely caused by industry market sentiment and not by industry clustering, but by many industries experiencing hot markets. Banerjee, Güçbilmez, and Pawlina (2016) claim that initially, firms underprice their issues more than issuers that follow them and their higher valuation multiples provide a sign to the market about the quality of their issuance, which is justified by their subsequent operating performance and this creates a linkage between performance and issuance (i.e., high-quality pioneers produce significant returns which draw followers with less impressive growth prospects into the market). Beaulieu and Bouden (2015) support Lowry and Schwert (2002) and conclude that high IPO

returns lead to high IPO issuance; however, ‘risky’ issuers prefer to offer their shares in these hot markets and contend that, similar to Pastor and Veronesi (2005), “positively related systemic risk in IPO firms might produce more IPOs in the next period” (p. 5374). However, all of this evidence about the relationship between IPO returns and subsequent issuance comes from one particular IPO market, the US.

In an analysis of Chinese and Hong Kong IPO markets, Güçbilmmez (2015) illustrated that the lead-lag relationship that is typically associated with IPO performance and issuance is not “robust to changes in the institutional framework” (p. 25). They find evidence of hot markets in both Hong Kong and China but indicate that the hot markets that occur in Hong Kong are driven primarily by market conditions, but in China, these hot markets occur as a result of regulatory changes in the marketplace. Other researchers have questioned the role that regulation plays in IPO markets, for example: (a) Canttaneo, Meoli, and Vismara (2015) indicate that regulation or changes in regulatory regimes affects the survival of IPOs in Italy, (b) Bubna and Prabhala (2011) illustrate that positive benefits resulted from by granting allocation powers to underwriters in Indian IPO Markets, and (c) Piotroski and Zhang (2014) argue that IPO issuance increases temporarily when there is the potential for political change or political promotions in China. This paper aims to evaluate the cyclical nature of IPO issuance in Pakistan and determine whether a relationship holds in terms of IPO returns and volume and whether regulatory regimes impact this relationship.

3. An overview of the institutional framework in Pakistan

This section discusses the Pakistani IPO market's institutional background, identifies the listing process of IPOs in Pakistan, compares the listing process of IPOs in different countries, and the SECP's role in IPO process.

3.1. Institutional background of the Pakistani IPO market

In Pakistan, the first IPO was issued by the Karachi Electric Supply Corporation, as a result, it was listed on the Pakistan Stock Exchange (PSX) on 2 April 1949 (Mumtaz & Smith, 2017). However, the issuance of IPOs was limited because of the business environment. To increase trading activities and protect investors' interest, the Securities and Exchange Ordinance (SEO) was promulgated in 1969. SEO contains information relating to the approval and registration of stock exchanges, how to list new issues, trading rules for brokers, and the regulation of the business. To implement the regulatory framework, the Securities and Exchange Authority of Pakistan (SEAP) was established in 1970. The purpose of SEAP is to supervise the trading behavior on the stock exchange and create fair competition that provides a level playing field for all investors. As SEAP was an affiliated organization under the Ministry of Finance, it confronted various financial constraints and it was quite challenging to execute reforms and exist as an independent and operational regulator.

As a result, the Government of Pakistan formulated a new entity called the Corporate Law Authority (CLA) in 1981. To encourage and facilitate trading activities, the power and functions of CLA were increased considerably. But the trading activities on the stock market were relatively modest over time until 1989.

Owing to liberalization, deregulation, and privatization, the Government of Pakistan took various reforms in 1991 to intensify the stock market's transparency and effectiveness. These reforms positively influenced the listing activities and a large number of private firms issued their shares to raise capital, diversify ownership, and create exit strategies for mature firms. Between 1991 and 1996, there was a significant surge in the number of IPOs as most of the firms issued their shares. To further strengthen the stock market activities, the CLA was abolished, and an independent organization “Securities and Exchange Commission of Pakistan” (SECP) was formulated in 1997 which started its operational function on January 1, 1999. The objective of the SECP is to implement reforms in the capital market and ensure that the process of issuing new shares is efficient. Since 1999, the SECP has played its role in promoting trading activities on the stock exchange including the issuance of new shares.

3.2. Listing process of IPO in Pakistan

To raise funds by way of issuing IPOs is not a new phenomenon. When a firm decides to go public in Pakistan, they apply for listing using the listing process. In this regard, SECP receives the requisite documents and a draft of the IPO prospectus from the listing firm. These documents are vetted and verified by the SECP and subsequently approved by the Company Affairs Committee. Based on documentary evidence, if a firm fulfills all the required parameters, the SECP then allows for an IPO prospectus issuance. Simultaneously, a request is submitted to the National Clearing Company of Pakistan Limited (NCCPL) to provide a trading symbol. After that, a firm applies to the SECP for approval of the prospectus' issuing date and subscription date for participation in the new shares. The SECP then assesses the proposal and if it is found feasible the issuing date for the prospectus and subscription date are set. Provisional listings are generally based on public offerings in terms of PKR 150 million or above.

Investors take part in new offerings on the subscription date(s). As a result, the PSX will announce whether the issues are over- or under-subscribed. When the issue is over-subscribed then balloting is undertaken to distribute the shares to successful investors. In the event of under subscription, the shares are subscribed by the underwriters. The application for a no-objection certificate (NOC) and the release of funds along with the auditors' certification are gathered from the underwriters. In due course, these shares are transferred to the Central Depository Company (CDC) which permits the investors to initiate trading through their CDC accounts. Next, the firm announces the formal listing in the newspapers, and the CDC account processes the trading of IPOs. The flow chart

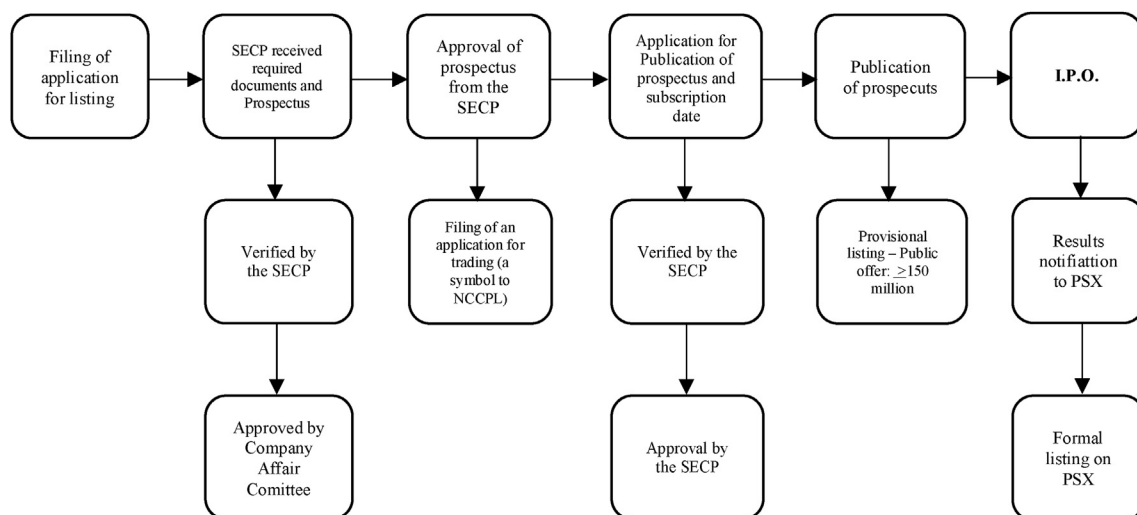


Fig. 1. Flow chart of the listing process of IPO in Pakistan.

of the listing process of IPOs in the Pakistani market is presented in Fig. 1.

3.3. A comparison of the listing process of IPOs

The listing process of IPOs varies across countries due to the regulators' policies in promoting the trading activities of the stock markets. The listing processes that IPOs must follow in different countries are exhibited in Fig. S1 (available online). We can observe that every country has different policies. On the other hand, institutional reforms play an essential role in determining the process followed to facilitate the listing process. Over the last 70 years, various institutional reforms were devised in Pakistan to promote trading activities on the stock markets transforming different institutions to make the process transparent and efficient. At present, SECP is actively engaged in attracting new firms to facilitate the process of issuing IPOs. An important tool associated with this process is to examine whether a firm can produce revenues and earn profits in the coming years. The SECP then allows a firm to initiate the listing process. In Sri Lanka, we can find that different measures are being followed to list a firm on the stock market. They divided this process into three phases which makes this process more rigorous and efficient.

The regulator in Turkey is using six steps for registering an IPO on the stock market. As per their criteria, preparing financial statements, considering the changes made by the General Assembly and Article of Association, and determining the price of the new issue are the salient features of this mechanism. The listing process of Bangladesh seems competitive as they are involved in getting an opinion from an expert panel and then decide on accepting/rejecting new issues for listing. Among others, the listing process of IPOs is controlled by the China Securities Regulatory Commission (CSRC) and Shanghai Stock Exchange (SSE) wherein a firm has to pass different steps including various reviews by CSRC and SSE. The US's listing process shows a clear process as a

firm applies and fulfills the requirements it will be listed. However, the listing proposal could be declined due to the non-fulfillment of the required conditions.

When we analyze the IPO process among sample countries, we find selecting underwriters, registering the process with the regulator, and determining the pricing mechanism as the similar factors that are being followed. However, every regulator has its own peculiarities when it comes to examining applications, reviewing proposals, and deciding whether a firm is listed or not. Over time, institutional structures associated with listing new shares have been refined making the listing process efficient.

3.4. Role of the SECP on the IPO activity

The SECP formally started its functional operations in 1999. The role of the SECP is to implement reforms that provide opportunities for firms to enlist on the stock market. The changes made by SECP provided a level playing field for firms to issue their shares to the public. Another important facet of the SECP's responsibilities is a thorough investigation of any firm that goes public with the condition that the firm can generate revenues and earn profits in the future. The SECP made amendments to Public Offering Regulations in 2017 to promote the listing process. The purpose of incorporating the changes in the Public Offering Regulations is to ensure that the determination of a fair price framework exists to encourage the investor base in terms of the book-building process. To overcome the subjectivity associated with the approval process and to promote quality listings, the SECP announced specific criteria to list shares, which are: (a) an operational track record of a firm for at least three years wherein it earns income for the last two years from its core businesses, (b) the book value per share shall be more than its face value, and (c) the sponsors must hold more than 51% shares for the last two years. As a result, applying these conditions has improved the listing process of new firms which has benefited investors. Over the

last twenty-two years, the SECP has promoted new issues to create fair competition and provide equal opportunities for issuers.

4. Sample and data

The data relating to new issues was obtained from annual reports published by the SECP. The firm related characteristics (i.e., total assets, fixed assets, profits, etc.) are gathered from each IPO prospectus. The data on stock prices and market returns are obtained from the Pakistan Stock Exchange (PSX). To contrast the results of this study, we also gathered information on IPO activity in the US. We extracted the quarterly data of IPO volume and initial returns in the US from Jay Ritter's website.¹

Table 1 summarizes the year-wise position of IPO volume and initial returns in Pakistan and the US over the sample period.

5. Results

5.1. Examining the relationship between IPO volume and initial returns

Smith and Mumtaz (2018), Banerjee, Güçbilmez, and Pawlina (2013), and Lowry and Schwert (2002) provide empirical evidence concerning a lead-lag relationship between IPO volume and initial returns across different markets. Loughran and Ritter (2002) document the existence of this association of favorable information, in terms of IPOs, and its effect when adequately integrated into offer prices. This kind of adjustment augments the present level of initial returns. Moreover, favorable information provides an opportunity for firms to tend to list on the stock market which as a result, increases the IPO volume. Thus, there seems to be a lead-lag association between initial IPO returns and volume. Güçbilmez (2015) reports the non-existence of a lead-lag relationship in the Chinese and Hong Kong markets; specifically, for China, he hypothesizes that this is because when a firm intends to list on the stock market, it is required to fulfill many procedural formalities. Under this circumstance, high initial IPO returns will not follow the high volume of unseasoned issues because the process of issuance is delayed.

To examine the evidence of a lead-lag association between initial IPO returns and volume in Pakistan and the US, this study follows the methodology provided in Lowry and Schwert (2002) and undertakes the Granger causality tests. The purpose of contrasting the results is to determine the persistence of the lead-lag relationship in both markets. Earlier studies used monthly data; however, we employ quarterly data due to Pakistan's low IPO volume. To identify the association between initial returns and IPO volume, the results are reported in Table 2.

The quarterly IPO volume is regressed on its lagged values in Model 1. It illustrates that two out of three lagged values

Table 1
IPOs: volume and initial returns.

Year	Pakistan		US	
	Volume	Initial returns (%)	Volume	Initial returns (%)
1995	25	29.02	457	20.52
1996	17	3.56	675	17.31
1997	3	31.41	473	13.79
1998	1	23.11	283	39.69
1999	—	—	476	75.84
2000	2	8.10	381	49.09
2001	3	2.61	80	13.34
2002	4	12.41	66	8.48
2003	4	40.17	63	14.97
2004	9	45.50	174	13.32
2005	14	19.01	161	10.35
2006	2	59.09	157	11.33
2007	10	58.47	159	17.41
2008	9	36.53	21	4.08
2009	3	60.45	41	11.78
2010	9	−7.63	96	7.99
2011	6	0.71	81	14.63
2012	5	−10.61	94	16.66
2013	2	14.42	157	21.17
2014	9	24.60	206	15.87
2015	11	23.34	118	18.81
2016	6	7.25	75	10.99
2017	6	61.81	107	12.40
2018	6	16.62	134	15.83
1995–2018	166	23.78	4735	19.33

Notes: This table presents the IPO volume and average of the monthly mean initial return. This study covers the sample of 166 and 4735 IPOs that went public in Pakistan and the US respectively from 1995 to 2018. For IPOs in the US, the initial return = $\frac{P_1}{P_0} - 1$ where P_0 = offer price, and P_1 = the closing price on the first trading day. Initial return for Pakistani IPO is computed = $\frac{P_1}{P_0} - \frac{I_1}{I_0}$ where I_0 = the market index on the offering date, and I_1 = the market index on the first day of trading.

positively and significantly influence IPO volume in the Pakistani market. In contrast, all three lagged variables significantly affect IPO volume in the US market. This evidence corroborates earlier studies (see Güçbilmez, 2015; Ibbotson & Jaffe, 1975). In Model 2, the quarterly IPO volume is regressed on the lagged values of quarterly average initial returns. Ibbotson and Jaffe (1975) used OLS modeling and found that error terms have significant serial correlation. To circumvent this issue, we apply the Cochrane–Orcutt model which adjusts for autocorrelation in residuals and the result shows that all coefficients of the lag of initial returns are insignificant in the case of Pakistan.² For the US IPOs, the results illustrate that the coefficients of R_{-2} and R_{-3} are positive and statistically significant which indicates that higher returns are obtained when there is higher volume in the US.

Model 3 combines all the variables used in Models 1 and 2 and examines the augmented effect of the lags of initial returns

² The result of a Durbin-Watson d -statistics is 0.80 using the OLS specification which is less than the benchmark of 2. By applying the Cochrane–Orcutt model, Durbin–Watson d -statistics has transformed to 2.03.

¹ <http://bear.warrington.ufl.edu/ritter/ipoisr.htm>.

Table 2
Relationship between IPO volume and initial returns.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: Pakistan</i>								
V_{-1}	0.24** (0.10)		0.24** (0.10)	0.30*** (0.10)		−0.17 (1.18)	−0.16 (1.23)	0.38 (1.26)
V_{-2}	0.06 (0.10)		0.02 (0.10)	−0.04 (0.10)		1.63 (1.19)	1.24 (1.23)	0.91 (1.26)
V_{-3}	0.17* (0.09)		0.14 (0.09)	0.18* (0.09)		1.25 (1.17)	−0.08 (1.09)	−0.04 (1.13)
R_{-1}		−0.00 (0.00)	−0.01 (0.01)	−0.01 (0.01)	0.34*** (0.10)		0.35*** (0.11)	0.35*** (0.11)
R_{-2}		0.01 (0.01)	0.02** (0.01)	0.02** (0.01)	0.16* (0.09)		0.14 (0.10)	0.15 (0.10)
R_{-3}		0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.01 (0.09)		0.01 (0.10)	−0.01 (0.10)
$Q1$				1.01** (0.39)				8.49* (4.67)
$Q3$				0.61 (0.41)				1.24 (4.79)
Constant	0.75*** (0.26)	1.30*** (0.25)	0.71** (0.26)	0.25 (0.32)	4.62** (2.21)	5.29 (4.73)	3.17 (3.04)	0.38 (3.72)
n	93	91	87	85	93	91	87	85
$r^2_{adj.}$	0.12	0.01	0.15	0.20	0.17	0.00	0.15	0.16
d -Statistics	1.97	2.03	2.02	2.01	2.00	2.15	2.02	2.01
Granger	—	—	1.95 (0.13)	1.99 (0.12)	—	—	0.38 (0.77)	0.88 (0.46)
F-tests (p-value)								
<i>Panel B: United States</i>								
V_{-1}	0.66*** (0.10)		0.57*** (0.10)	0.67*** (0.10)		−0.00 (0.05)	0.02 (0.05)	−0.00 (0.05)
V_{-2}	0.48*** (0.08)		0.45*** (0.11)	0.30** (0.12)		0.04 (0.05)	−0.00 (0.05)	0.04 (0.06)
V_{-3}	−0.22** (0.10)		−0.22** (0.10)	−0.15 (0.10)		0.10* (0.05)	0.01 (0.05)	−0.01 (0.06)
R_{-1}		0.02 (0.19)	0.01 (0.20)	−0.06 (0.19)	0.66*** (0.11)		0.65*** (0.11)	0.67*** (0.11)
R_{-2}		0.48** (0.19)	0.36 (0.24)	0.52** (0.23)	0.06 (0.13)		0.06 (0.13)	0.03 (0.13)
R_{-3}		0.62*** <(0.04)	−0.11 (0.21)	−0.24 (0.20)	0.06 (0.11)		0.03 (0.11)	0.04 (0.11)
$Q1$				−2.07*** (0.64)				1.91 (3.62)
$Q3$				−1.02 (0.67)				5.35 (3.75)
Constant	6.19 (3.78)	20.17* (11.85)	3.51 (4.12)	11.00*** (4.82)	3.89* (1.98)	11.82* (6.05)	3.05 (2.20)	1.24 (2.69)
n	93	93	90	89	93	93	90	89
$r^2_{adj.}$	0.72	0.11	0.73	0.75	0.55	0.02	0.53	0.54
d -Statistics	1.94	2.76	1.99	2.06	1.99	2.04	1.98	0.81
Granger	—	—	1.46 (0.23)	6.83 (0.00)	—	—	0.31 (0.82)	0.49 (0.30)
F-tests (p-value)								

Notes: This table tests the relationship using quarterly data of IPO volume and average initial return in Pakistan and the US between 1995 and 2018. We apply OLS estimation to examine the relationship. We use Cochrane–Orcutt models in Model (2) and (6) for adjusting autocorrelation in error terms. The dependent variable is the quarterly IPO volume in Model (1)–(4), and the quarterly average IPO initial return in Model (5)–(8). $Q1$ and $Q3$ are dummy variables equal one if IPOs are issued in the first and third quarters. d -Statistics refers to a Durbin–Watson test. Granger F -tests for the joint significance is reported in Model (3–4) and (7–8). Robust standard errors are reported in parentheses. ***, **, and * show significance at 1, 5, and 10% levels respectively.

on volume after controlling for the lags of volume. The positive coefficients of lagged volume (V_{-1}) and lagged initial returns (R_{-2}) are statistically significant for Pakistan, which illustrates that these variables affect IPO volume. In the US, we find that all values of lagged volume produce statistically significant results but all of the lagged return variables have an insignificant effect. The Granger F -test result suggests that lagged initial returns do not predict the IPO volume in both markets. In Model 4, we report that volume is seasonally high in the first quarter for Pakistani IPOs whereas in the US IPO market volume increases in the second and fourth quarters. This finding corroborates previous evidence.³ Helwege and Liang (2004) argued that fewer IPOs are listed on US exchanges in the first and third quarters is because ‘roadshows are difficult to schedule right after Labor Day and Christmas’ (p. 549), which

decreases issuance in January and September. Like Model 3, this study reports that the lagged initial returns do not influence IPO volume in the Pakistani market (Model 4). For the US market, lagged initial returns are jointly significant at 1% level in Model 4 as seasonality is considered. Next, we use initial returns as a dependent variable in Models 5 through 8. In Model 5, the quarterly average initial return of IPOs is regressed on its lagged values and we determine that the lagged returns predict initial returns (R_{-1} and R_{-2}) and they are significant determinates at 1 and 10% levels for Pakistan. In the US, the coefficients of lagged returns (R_{-1}) were positive, and robustly forecast initial returns (Ibbotson & Jaffe, 1975). Using a Cochrane–Orcutt estimation, Model 6 examines the effect of the lags of volume on initial returns and finds an insignificant result in both markets. The results of Model 7 report that R_{-1} is the sole factor that significantly influences initial returns for Pakistani and US IPOs. The Granger F -test indicates that the lags of volume do not forecast initial returns in both markets. Model 8 suggests that seasonality affects the initial return for the Pakistani capital market where IPOs yield positive returns in

³ Yung et al. (2008) document about the surge in US IPO volume during the fourth quarter relative to the first quarter. Likewise, Banerjee et al. (2013) report that the IPO volume in UK is lower in the first and third quarters. Güçbilmez (2015) also identifies that the US IPO market volume is lower during the first and third quarters.

the first quarter whereas we find no evidence of seasonality for the US IPOs.⁴

We may conclude that the previous volume of new issues influences the current volume and previous IPO performance affects the current IPO performance in both the markets. Lowry and Schwert (2002) were the first to report the presence of a lead-lag association between initial returns and volume. This study reports a significant relationship between present IPO volume and prior initial returns [Models 3–4] which suggests that no evidence exists between IPO volume and initial returns in Pakistan; additionally, there is evidence of this relationship in the US in the wake of seasonality effect. This evidence demonstrates that association relating to lead-lag relationship is an integral component of the IPO market (Lowry & Schwert, 2002).

5.2. Examining the relationship between IPO volume and market conditions

Researchers have attempted to relate changes in market cycles and illustrate that cycles exist in the issuance of IPOs, which fluctuates over time. This evidence is based on adverse selection and time variation in market conditions (Güçbilmez, 2015; Yung et al., 2008). Previous studies argue that before an increase in IPO volume, which is classified as a hot market, private firms take advantage of market conditions and float cheap equity (Alti, 2006; Helwege & Liang, 2004). To develop the relationship between IPO volume and market conditions, researchers have established well-documented evidence for the US, UK, Italy, France, China, and Hong Kong markets. However, the potential to examine this relationship widely exists for Asian economies. Thus, this study analyzes whether IPO volume is susceptible to fluctuations in the market conditions in Pakistan. In this context, we may expect a weak association between IPO volume and market conditions.

We use a negative binomial model for our analysis presented in Table 3, because it is suitable when the IPO volume is overdispersed. A Poisson model may be employed in the non-existence of overdispersion presuming that $\sigma^2 = \text{mean}$ and in this condition, it can be considered as a suitable technique. To examine the overdispersion, we apply a standard likelihood-ratio test wherein $\alpha = 0$ in the non-existence of overdispersion. In all the models, we reject the null hypothesis and report overdispersion of IPO volume. This argument suggests that a negative binomial model is preferable to the Poisson model.

To determine IPO cycles, Pastor and Veronesi (2005) argue that an appropriate time for a firm is to float their shares is when most of the private firms list themselves to go public. Specifically, they identified that IPO volume is: (a)

directly associated with lagged market returns, (b) inversely affected the present and prior changes in market returns, and (c) inversely associated with present and previous changes in terms of market volatility. Moreover, Pastor and Veronesi (2005) suggest that a direct association between IPO volume and the lagged value of market conditions results from sentiments or growth possibilities; however, this effect may lose its significance if market conditions are properly controlled for. In line with this hypothesis, we examine whether or not market conditions influence IPO volume. To investigate the sensitivity of IPO volume on market conditions, we use the Karachi Stock Exchange (KSE-100 index) and S&P-500. RM refers to quarterly market return and we estimate it by taking the difference between the present index and the last quarter's index scaled by the last quarter's index. σ refers to variation in daily market returns in a quarter. $\Delta\sigma$ denotes the variation in σ between the present and prior quarters. P/B indicates the price/book value of the market index in the respective quarter.

To test our hypothesis regarding IPO volume and market conditions, we use a negative binomial regression model. Table 3 demonstrates the empirical findings of this study. In Model 1, this study investigates the impact of prior market returns on volume of unseasoned issues and finds that in the case of the US the coefficients of all three lags are statistically significant at a 1% level which illustrates that previous market returns predict the IPO volume. However, when analyzing the Pakistani IPO market the coefficient of RM_{-2} is a statistically significant factor that influences IPO volume. Model 2 incorporates the control variables and suggests that previous market return forecasts IPO volume in Pakistan. Similar findings were reported in the US. The crisis period's coefficient has a negative effect on IPO volume in the Pakistani IPO market but has an insignificant effect. The results of US IPOs are almost the same as identified in Table 2 except for the crisis period which suggests that during the first and third quarters of examination, the likelihood of IPO issuance would be lower. In Model 3, we add lead variables of market return along with other control variables. This study reports that the coefficient of all the lead variables were statistically insignificant, in the Pakistani IPO market. Contrarily, we find that RM_{+3} is one of the lead variables that influence IPO volume in the US.

We introduce the change in the volatility of market returns in Model 4 and determine that all coefficients are negative but have an insignificant effect in both markets which illustrates that a change in the volatility of the market return does not cause IPO volume. This finding is contrary to earlier studies, which found statistically significant relationships between the volatility of the market's returns and IPO volume (e.g., Güçbilmez, 2015). Model 5 suggests that the coefficient of the lagged value of P/B has a significant relationship with IPO volume in the US without considering the other variables. Lastly, we add all the variables to examine their combined impact. We report that the lagged value of P/B does not affect Pakistani IPOs; moreover, this effect disappears in the case of the US IPOs.

⁴ To contrast our analyses, we also use monthly IPO to examine the effect of the Granger F-test in the US market. The result suggests that we do not reject the null hypothesis that the lags of initial returns have an explanatory power to predict initial volume. However, the result rejects the null hypothesis that lagged IPO volume cause initial return. These findings corroborate earlier studies (Güçbilmez, 2015; Lowry & Schwert, 2002).

Table 3
Relationship between IPO volume and market conditions.

Model	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Pakistan</i>						
RM_{-1}	2.18 (2.46)	5.02** (2.36)	4.94** (2.40)			5.06** (2.42)
RM_{-2}	4.60* (2.42)	5.83** (2.31)	5.76** (2.42)			5.80** (2.46)
RM_{-3}	0.59 (2.27)	1.95 (2.22)	1.69 (2.28)			1.22 (2.32)
RM			−2.17 (2.27)			−2.16 (2.28)
RM_1			−0.65 (2.33)			−0.28 (2.36)
RM_2			−1.87 (2.32)			−1.67 (2.33)
RM_3			1.64 (2.30)			1.96 (2.36)
$\Delta\sigma$				0.04 (0.11)		
$\Delta\sigma_{-1}$				0.11 (0.11)		
$\Delta\sigma_{-2}$				0.06 (0.11)		
$\Delta\sigma_{-3}$				−0.09 (0.12)		
P/B_{-1}					0.18 (0.19)	−0.31 (0.21)
V_{-1}		0.17*** (0.06)	0.16*** (0.06)	0.17*** (0.05)		0.17*** (0.06)
V_{-2}		0.03 (0.06)	0.02 (0.06)	0.01 (0.06)		0.02 (0.06)
V_{-3}		0.13** (0.05)	0.12** (0.05)	0.09* (0.05)		0.15** (0.06)
$Q1$		0.66*** (0.24)	0.66*** (0.25)	0.60** (0.25)		0.64** (0.25)
$Q3$		0.43 (0.27)	0.42 (0.27)	0.40 (0.27)		0.37 (0.28)
Crisis		−0.17 (0.27)	−0.01 (0.33)	−0.07 (0.27)		−0.13 (0.35)
Constant	0.33** (0.12)	−0.70*** (0.26)	−0.59* (0.30)	0.40 (0.25)	−0.18 (0.19)	0.31*** (0.21)
n	93	93	90	93	96	90
Wald p -value	0.012	0.086	0.092	0.063	0.002	0.099
Log pseudolikelihood	−155.96	−144.27	−140.02	−147.93	−170.06	−138.98
Likelihood-ratio test						
of $\alpha = 0$						
χ^2 value	16.15	2.83	2.56	3.09	29.71	2.44
p -value	<0.001	0.046	0.055	0.023	<0.001	0.059
<i>Panel B: United States</i>						
RM_{-1}	10.96*** < (3.09)	10.45*** (2.10)	10.29*** (2.09)			9.88*** (2.03)
RM_{-2}	15.16*** (2.92)	7.93*** (2.07)	9.27*** (2.03)			8.53*** (2.00)
RM_{-3}	14.33*** (3.17)	7.49*** (2.17)	6.89*** (2.06)			6.93*** (2.08)
RM			7.30*** (2.05)			6.63*** (1.94)
RM_1			−2.36 (2.02)			
RM_2			−0.26 (1.89)			
RM_3			−4.05*** (1.96)			
$\Delta\sigma$				−0.06 (0.05)		
$\Delta\sigma_{-1}$				−0.06 (0.05)		
$\Delta\sigma_{-2}$				−0.06 (0.06)		
$\Delta\sigma_{-3}$				−0.02 (0.05)		
P/B_{-1}					0.44*** (0.06)	0.17 (0.45)
V_{-1}		0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)		0.01*** (0.00)
V_{-2}		0.00 (0.00)	0.00 (0.00)	0.00 (0.00)		0.00 (0.00)
V_{-3}		0.00 (0.00)	0.00* (0.00)	0.00 (0.00)		0.00* (0.00)
$Q1$		−0.55*** (0.13)	−0.43*** < (0.13)	−0.48*** (0.15)		−0.50** (0.13)
$Q3$		−0.43*** (0.14)	−0.26* (0.14)	−0.34** (0.16)		−0.34** (0.13)
Crisis		−0.42*** (0.13)	−0.46*** (0.13)	−0.32** (0.15)		−0.39*** (0.12)
Constant	3.45*** (0.08)	3.06*** (0.08)	2.95*** (0.09)	3.13*** (0.11)	0.47*** (0.09)	2.81*** (0.48)
n	93	93	90	93	96	93
Wald p -value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Log pseudolikelihood	−427.17	−380.54	−361.09	−400.93	−468.75	−374.71
Likelihood-ratio test						
of $\alpha = 0$						
χ^2 value	1842.87	339.97	289.25	605.19	2990.19	305.84
p -value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Notes: We test the quarterly data of IPO volume in Pakistan and the US between 1995 and 2018. We use negative binomial regressions to estimate our results. Quarterly IPO volume is used as a dependent variable. Robust standard errors are reported in parentheses. ***, **, and * show significance at 1, 5, and 10% levels respectively.

5.3. Hot IPO cycles in Pakistan

Hot market cycles occur when IPO volume and initial returns spike, which leads to increases in IPO activity;

moreover, hot markets are also defined as periods in which more firms issue their shares (Jin, Guo, Zhou, & Li, 2016; Thanh, 2020; Zhou & Zhou, 2010). Previous studies indicate that during the transitory phases, firms issue their shares at a

low price (e.g. [Thanh, 2020](#)) which illustrates that firms prefer to raise shares during these periods when investors are enthusiastic and the volume of new shares rises thereby creating hot markets ([Jin et al., 2016](#)). Besides the classification of the hot market under investor sentiments, the literature provides various explanations of hot market activity: (a) many firms decide to list on the stock market at the same time ([Zhou & Zhou, 2010](#)), (b) industry grouping owing to clustering by underwriters ([Benveniste et al., 2002](#)), (c) procyclical adverse selection, and (d) patterns in aggregate demand for equity market ([Lowry, 2003](#)).

To identify the hot IPO cycles, prior studies proposed various methods. For instance, to segregate the sample into even periods like months ([Helwege & Liang, 2004](#); [Pastor & Veronesi, 2005](#)), quarters ([Güçbilmez, 2015](#)), or years ([Bustamante, 2012](#)) and categorize periods according to the number of IPOs. The hot periods are classified by setting a benchmark (e.g., top 25% or top 30% or top 50%) or a significant surge in the historical average or moving average ([Banerjee et al., 2013](#); [Helwege & Liang, 2004](#); [Yung et al., 2008](#)). To capture the cyclicity of the data, few studies (e.g., [Pastor & Veronesi, 2005](#); [Yung et al., 2008](#)) level the data of IPO volume by splitting then into three months or four quarters. The methods described above with the exclusion of those used by [Yung et al. \(2008\)](#) and [Banerjee et al. \(2013\)](#) recognize hot markets ex-post and thus create a “look-ahead bias”. [Yung et al. \(2008\)](#) compare IPO volume in every quarter with the last quarter to circumvent this issue. This technique seems robust to identify the IPO cycles quarterly that is ‘internationally’ hot relative to all past quarters; however, it cannot determine quarters that are ‘locally’ hot relative to the latest quarters. [Banerjee et al. \(2013\)](#) compared IPO volume in every quarter with the last five years of IPO activity to address this. Using the moving average of IPO volume, they detected IPO cycles.

This study follows the method employed by [Yung et al. \(2008\)](#), [Banerjee et al. \(2013\)](#), and [Güçbilmez \(2015\)](#). We split IPOs based on the quarters and contrast them with the IPO activity in earlier quarters. In particular, a quarter is categorized as hot if the volume of new issues is more or equal to the maximum volume of the same quarters of the prior five years. This method is suitable for identifying locally hot periods and prevents a look-ahead bias. Moreover, it considers the problem of seasonality as q1 of a year is matched only with the q1 of earlier years, the q2 only with the q2 of previous years, and so on.

We consider 24 years from 1995 to 2018 and select hot quarters since 2000 only because the procedure requires the last 5 years' statistics as an input. [Fig. 2](#) presents hot quarters (black blocks) in Pakistan and the US between 2000 and 2018. Since the Dot-com Bubble, there has been a steep decline in US IPO volume ([Gao, Ritter, & Zhu, 2013](#)). In the US, five quarters are distinguished as hot between 2000 and 2013, followed by a persisting hot market in 2018. In general, $13/76 = 17\%$ of quarters are classified as hot in the US between 2000 and 2018. From Pakistan's perspective, we find $15/76 = 20\%$ quarters as hot over the sample period. We report

that hot quarters are clustered between 2007 and 2013. During the 2017 and 2018 period, we also determine some quarters as hot for the IPO activity period.

In short, the results report that hot markets appear in Pakistan and the US. In both the markets, we determine that hot markets are influenced by the market performance which illustrates that in a boom period, the likelihood of floating new issues would be higher — this hypothesis is consistent with the theory.

5.4. Examining the effect of a hot market on the IPO proceeds raised

Previous studies (e.g., [Alti, 2006](#); [Güçbilmez, 2015](#)) argue that firms obtain higher proceeds during a hot IPO activity period. By controlling for firm features and the value of growth possibilities before going public, [Alti \(2006\)](#) found that during a period of hot IPO activity, firms obtain a large amount of proceeds relative to the cold period in the US market. Similarly, [Güçbilmez \(2015\)](#) examines the proceeds raised by firms during hot markets in China and Hong Kong and report that firms are successful in obtaining a higher amount of proceeds during this activity period. However, the magnitude of IPO proceeds in China is higher than in Hong Kong due to the higher activity of issuance of IPOs in the Chinese market. In line with earlier studies, we question whether firms obtain more proceeds during a hot IPO activity period in Pakistan.

The data for this particular analysis related to firm traits are obtained from the IPO prospectus. Stock prices and market indexes are gathered from the database of PSX. In this study, the combination of variables is the same as used by earlier studies and considered as crucial predictors of a firm's financing preferences (for instance, [Helwege & Liang, 2004](#); [Alti, 2006](#); [Güçbilmez, 2015](#)). The description of the variables is explained as follows. Assets refer to total assets and Sales denote net sales and they are determined in millions of Pakistani rupees. Profit refers to the profit margin (net income/total assets). Tan refers to asset tangibility. Debt is measured as long-term debt/total assets. M-to-B is the market-to-book ratio (the market value of common equity/book value of common equity). All variables are selected at the time of the issuance of IPO except the M-to-B ratio which is based on the year following the IPO. Pro is the total proceeds/total assets. Hot, a variable of interest, is a dummy variable that takes the value of one if a firm issued shares in a hot IPO market and zero otherwise. Two other dummy variables are included in this study to examine their influence on the proceeds raised by a firm. The regime refers to the regulatory framework under which shares are floated to raise funds. This study considers two regimes (i.e., CLA, and SECP). If IPOs are issued under the SECP regime it is equal to one and zero otherwise. Finally, the price discovery mechanism is a dummy variable. If the IPOs are issued using the book-building process it is equal to one and zero otherwise ([Mumtaz and Smith, 2021](#)).

[Table 4](#) shows the summary statistics of the variables used in this study. The allocation of Assets among firms that were listed on the PSX is highly skewed. This shows that IPOs are

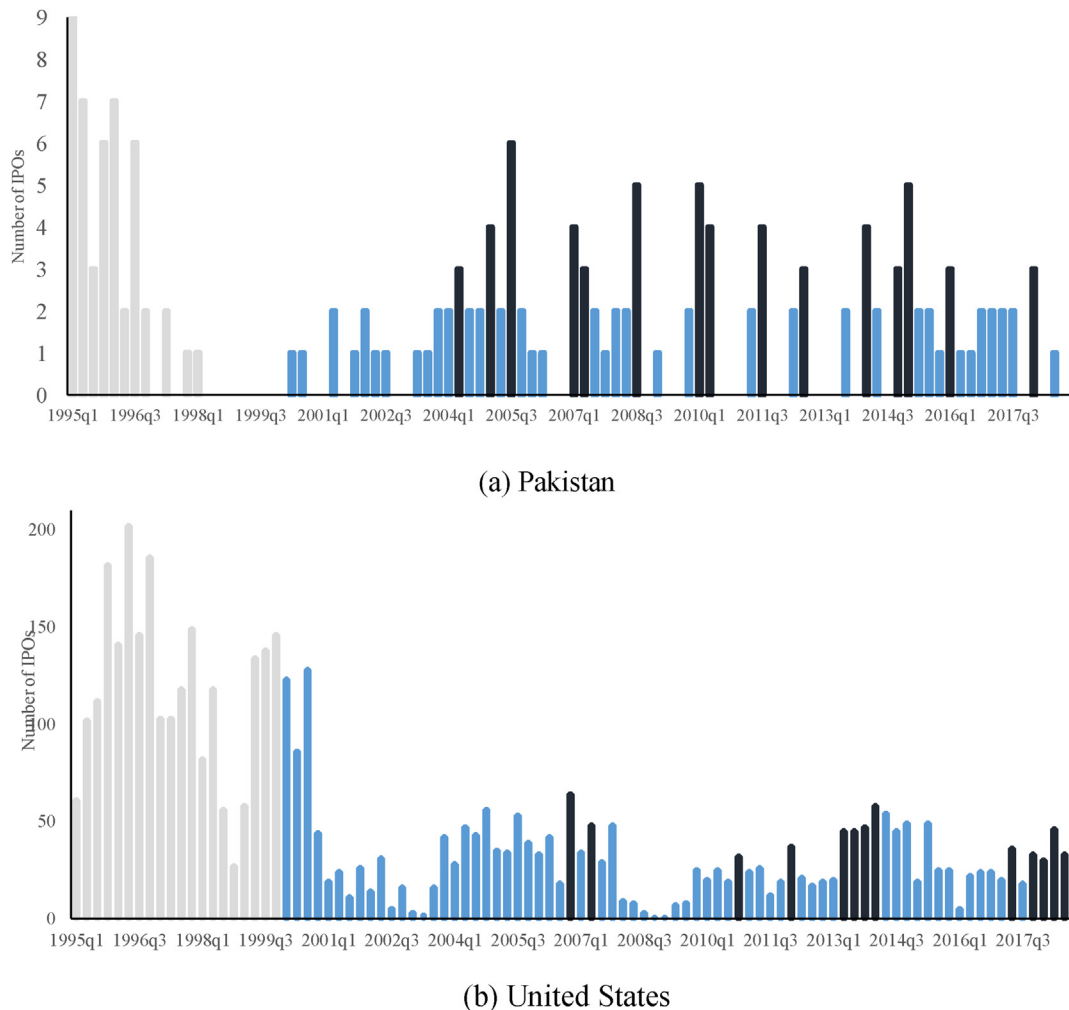


Fig. 2. Hot markets in Pakistan and the US. Black blocks show hot quarters which are classified between 2000 and 2018. The quarters between 1995 and 1999 (empty blocks) are not identified as the process requires the last five years' data.

Table 4

Descriptive statistics.

Variables	N	Mean	Median	Std Dev.	Skewness	Kurt
Assets	166	14,317.19	1534.17	58,179.75	7.36	59.84
Sales	149	5593.64	560.00	12,659.00	4.30	14.16
Profit	149	-0.15	0.07	1.48	-6.13	46.35
Tan	165	0.36	0.34	0.30	0.40	-1.10
Debt	153	0.20	0.11	0.22	1.42	1.46
MtoB	166	2.20	1.49	1.99	2.68	8.66
Pro	166	0.24	0.15	0.26	1.72	2.39
Hot	166	0.72	1.00	0.45	-0.97	-1.07
Regulatory regime	166	0.73	1.00	0.45	-1.04	-0.93
Price discovery mechanism	166	0.15	0.00	0.36	1.97	1.91

Notes: We consider 166 IPOs listed on the PSX between 1995 and 2018. All variables are selected before the issuance of IPO except M-to-B.

issued by sizeable firms such as Pakistan Petroleum Limited, Oil & Gas Development Company, Kot Addu Power Company, Fatima Fertilizer, Wateen Telecom, United Bank, and Habib Bank Limited. Before the issuance of IPOs, median sales of the firms are 560 million Pak rupees with a high

standard deviation which illustrates the large dispersion among sample IPOs. On average, the net profit margin of firms going public is -15.0% indicating that most of the firms incur losses. However, the median net profit margin is 7.0% with a standard deviation of 1.48%. Tangibility refers to net plant, property, and equipment scaled by total assets and the results show that the average and median values are 36% and 34%, respectively. This reflects that at the time of IPO, firms own one-third of fixed assets increasing after obtaining funds through the issuance of new shares. Long-term debt as a percentage of total assets is considered as a proxy to measure the riskiness associated with the issuance of IPOs. At the time of going public, the firm's on average borrow 20.10% of total assets. The mean value of M-to-B is 2.20% with a median value of 1.49%. Pro is total proceeds as a percentage of total assets and the result shows that on average Pro is 24.12% illustrating that total proceeds are one-fourth of total assets in sample IPOs. The median value of Pro is 0.17 for IPOs issue in hot markets and 0.09 for the remaining IPOs. The result of the Wilcoxon–Mann–Whitney test identifies that the difference in the median values of Pro between hot and cold IPO activity

Table 5
Effect of a hot market on the amount of proceeds raised by IPO firms.

Model	(1)	(2)	(3)	(4)	(5)
Hot	0.30*** (0.06)		0.25*** (0.05)	0.01 (0.04)	0.06 (0.04)
Hot x price discovery					−0.03 (0.29)
MtoB		0.09*** (0.02)			0.01 (0.02)
ln (Sales)			−0.04*** (0.01)		−0.02** (0.00)
Profit			0.02*** (0.00)		0.02* (0.01)
Tan			−0.46*** (0.05)		−0.66*** (0.07)
Debt			−0.07 (0.08)		−0.07 (0.13)
Regulatory regime				−0.29*** (0.04)	−0.22*** (0.04)
Price discovery				−0.05 (0.05)	0.05 (0.28)
Crisis period					−0.18*** (0.05)
Constant	0.49*** (0.06)	0.88*** (0.04)	0.61*** (0.04)	0.44*** (0.05)	0.89*** (0.05)
<i>n</i>	166	166	164	164	164
<i>r</i> ² _{adj}	0.11	0.06	0.51	0.26	0.75

Notes: We estimate the results of 166 IPOs listed on PSX between 1995 and 2018. Pro = total proceeds/total assets is the dependent variable. Standard errors are reported in brackets. ***, **, and * show significance at 1, 5, and 10% levels respectively.

period is statistically significant [$z = 4.624$, $\text{Prob}>|z| = 0.000$]. The results indicate that firms that issue their shares in a hot IPO market attract more proceeds. Moreover, the differences in Pro is due to the financial soundness and growth prospectus of the pre-IPO firm. Our variable of interest is Hot which indicates that the number of IPOs issued in a year has to be more than average IPOs (i.e., hot IPO market). The mean value of Hot is 0.72 which indicates that 72% IPOs are issued in hot markets. The regime variable indicates that 73% of IPOs were issued under the SECP regime. Lastly, we report that on average 15% IPOs are issued using the book building mechanism. It is essential to mention that the book-building process in Pakistan was introduced in 2009 which is the main reason for a smaller number of IPOs issued under this method.

To test the association between the hot market and the proceeds raised, we estimate five models using OLS, the results of which are demonstrated in Table 5. In Model 1, Pro is regressed on Hot and we identify a direct and statistically significant relationship on the proceeds raised by IPO firms. This finding illustrates that firms obtain higher proceeds during the hot IPO activity period (Güçbilmez, 2015; Smith & Mumtaz, 2018). In Model 2, the effect of Pro on M-to-B is determined and we report a positive and significant relationship, which illustrates that an increase in the market value of equity relative to the book value of equity enhances the probability that firms generate higher proceeds (Güçbilmez, 2015). Along with firm characteristics, we estimate Pro on Hot (Model 3) and find that the IPO activity period is a significant determinant. This indicates that in the presence of firm explanatory variables, hot markets remain an important determinant in attracting higher proceeds. The coefficient of net sales negatively and significantly influences the proceeds raised. This evidence is in line with Güçbilmez (2015) which illustrates that firms with low net sales may generate higher proceeds. Profit margin, another firm characteristic, positively affects the proceeds raised, which indicates that firms earn a profit before going public may have a lower probability of risk and thereby obtain higher funds in response to issuing new

shares. The lower tangibility of fixed assets predicts that firms raise higher proceeds, which illustrates that firms may lack funds to invest in fixed assets before going public. The evidence confirms that higher proceeds tend to be invested in fixed assets which promote increases in production capabilities. We find that the coefficient of debt does not effect IPO proceeds.

The results of Model 4 suggest that the regulatory regime is an important predictor of the amount of proceeds raised by IPO firms. This finding indicates that firms that issued their shares during the CLA regime obtained more funds. The coefficient of the price discovery mechanism does not influence IPO proceeds. In Model 5, we add the crisis period along with all other parameters. The result indicates that in the event of the crisis period, firms could obtain lesser proceeds – further it is elaborated that cold activity period is not conducive for firms to go public. This study interacts the hot IPO activity period with the price discovery mechanism but determines an insignificant effect. In Model 5, net sales, profit margin, the tangibility of fixed assets, and regulatory regime are the significant parameters of funds raised by IPO firms.

5.5. Discussion and comparison of the results of IPO markets

This section compares the findings of Güçbilmez (2015) and the current study. Güçbilmez (2015) examines the lead-lag relationship in China and Hong Kong and compares them with the US market during the 1999 to 2013 period. He used a sample of 1665, 1041, and 2207 IPOs for China, Hong Kong, and the US, respectively. In this study, we employ 166 and 4735 IPOs for Pakistan and the US, respectively. Güçbilmez (2015) reports the dynamics of IPO activity in Hong Kong are the same as exists in the US. He documented the non-existence of an association between IPO volume and market returns in China. He further justified that Chinese regulators have controlled IPO activity. In the case of Pakistan, we find that number of IPOs is affected by fluctuations in market conditions but not changes in volatility; moreover,

similar to the results that Güçbilmez found in China, we find that the regulatory regime in Pakistan had a significant impact on IPO activity.

We further contrast the determinants of the hot market in terms of the proceeds raised in the three IPO markets, namely, China, Hong Kong, and Pakistan. The IPO activity period positively influences the proceeds raised in all markets; however, the proceeds raised by Chinese firms are higher than the Hong Kong and Pakistani markets. The coefficient of M-to-B positively and significantly affected the amount of proceeds raised in all markets. Additionally, across the three markets, the $\ln(\text{Sales})$ negatively and statistically influences the IPO proceed raised, which illustrates that firms with lower sales may obtain more proceeds. In China and Pakistan, the profit margin significantly affects the funds raised by the IPO firm. Tan's coefficient is negative for the Chinese and Pakistani IPO market showing that firms with the lower tangibility of fixed assets may have the possibility to attract a large amount of proceeds.

The debt and IPO proceeds have an inverse and significant relationship in the case of the Chinese market which indicates that higher financial leverage before going public creates ex-ante uncertainty thus firms that issue their shares obtain a lower level of proceeds. This study incorporates regulatory regimes (CLA/SECP) and the price discovery mechanism (fixed offer/book-building mechanism) as dummy variables and determines that during the era of CLA, firms attract a higher amount of proceeds. Moreover, we find that issuing shares in the cold IPO activity period may lead to lower proceeds. In short, we may conclude that drivers of the proceeds raised vary from market to market. However, some characteristics are the same in all three markets.

6. Conclusion

Over the past three decades, the IPO market in Pakistan has been developing; thus, it is categorized as an emerging market in Asia. Earlier literature has widely reported underpricing and long-term performance of unseasoned issues; however, this study fills a gap by examining IPO cycles in Pakistan. To this end, we analyze our hypotheses related to IPO cycles and compare the results with the US market between 1995 and 2018.

This study reports that the dynamics of IPO activity in Pakistan have dissimilarities with the US. First, we analyze the lead-lag association between IPO volume and initial returns. In Pakistan, we do not find any evidence of a lead-lag relationship. For the US IPOs, we report that lagged initial returns predict IPO volume in the presence of seasonality. Second, we test the market conditions associated with IPO volume using a negative binomial regression model. The results for both the US and Pakistani markets indicate that IPO volume is influenced due to sensitivity in market conditions and it demonstrates strong seasonality. Third, we determine that the hot markets emerge in Pakistan which is evident from the fact that 20% of quarters are categorized as hot.

Fourth, we investigate the relationship between hot markets and the proceeds raised by IPOs. We find that IPO firms in Pakistan and the US generate more proceeds in the presence of hot markets controlling for firm characteristics and growth prospects. These results corroborate the market timing hypothesis which suggests that firms obtain funds when markets heat up as they require more resources to participate in new ventures. The crisis period has affected the Pakistani market and during these periods, IPOs obtain a lesser amount of proceeds. Lastly, we compare models of hot markets in China, Hong Kong, and Pakistan and identify that hot markets play a crucial role in attracting a large amount of IPO proceeds. However, other drivers of IPO proceeds vary from market to market. The significance of this study underpins the idea that IPOs are issued in waves and identifies the attributes of IPOs in Pakistan and the US; moreover, it highlights that the regulatory regimes overseeing IPO issuance matters and these institutions can affect the cyclical nature of IPO issuance and performance.

Declaration of competing interest

The authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bir.2021.01.001>.

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