BUFT Journal of Business & Economics (BJBE)
ISSN 2664-9942 (Print)
2021 Volume 2, Pg:229-239

Macroeconomic Factors and Their Influences on Initial Public Offering (IPO) in Bangladesh

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ARTICLE INFO

Article History:
Received: 30th October 2020
Accepted: 24th February 2021

Keywords:
Initial Public Offering,
Gross Domestic Product,
Inflation,
Remittance,
Stock Market Index.

JEL Classification:
E01,
E23,
E24,
E31

ABSTRACT

Purpose: This paper examines the impact of macroeconomic factors such as GDP, inflation, interest rate, stock market index, and remittance on the number of IPOs (Initial Public Offering), total IPO proceeds and average IPO proceeds in Bangladesh 2007/08 to 2017/18. This study aims to find out the external factors affecting the decision of the firms to go public in the capital market of Bangladesh and to establish literature with proper analysis.

Methodology: The nature of the research is quantitative and the research design is descriptive. However, the study is based on secondary data from multiple sources for analyzing the dependent and independent variables. The data were analyzed using quantitative research techniques such as descriptive, correlation, and multiple regression analysis. It was then presented a regression model as a data analysis technique, which would finally identify those variables that have a significant impact on IPOs issued.

Findings: The hypothesis that the macroeconomic variables have explanatory power for the number of IPOs could not be highly supported by empirical evidence. On the other hand, empirically, macroeconomic factors can explain total IPO proceeds and average IPO proceeds. Inflation rate and remittance negatively correlate with the number of IPO, but that is not significant. Stock market index and interest have a significant positive relationship with the number of IPO issued in a year. All the independent factors have a positive relationship with the total IPO proceeds, but only the stock market index has a significant relationship with the total IPO proceeds. The stock market index has a significant positive impact on average IPO proceeds raised in a year. Also, the inflation rate, remittance, and interest rate positively correlate with the average IPO proceeds.

Limitations: The stock market data are challenging to collect, and investors are reluctant to disclose macroeconomic variables. Another major limitation is found that was knowledge gaps between the parties.

Practical Implications: The study findings can have a few important implications to different stakeholders of Bangladesh's capital market, including investors, private companies, market-makers, and market regulators like BSEC, Bangladesh bank, Ministry of Finance, and Government agencies. Specifically, the study findings can help them develop a critical understanding of the macroeconomic indicators and their significant impact on Bangladesh's primary market and overall capital market.

Originality: In fact, multiple research activities have been conducted abroad regarding macroeconomic factors and their influences on the initial public offering, but not a single work similar to this research topic has been done in Bangladesh. Researchers want to investigate the factors that influence IPO and help the investors and decision-makers.

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1. Introduction

This study analyses the relationship between macroeconomic variables and Initial Public Offerings in Bangladesh. This overall study would trigger how those variables affect the decision of IPO issues of the firm. These are the central issues of any corporation such as financing decisions, investment decisions, and dividend decisions. These decisions depend on so many variables. Issuing new securities to finance the operation in the primary market is one of the important decisions of a firm because how a firm takes a financing decision affects all the firm's activities. Debt and equity, cost of capital, etc. of any firm may affect the overall scenario of capital investment and financing decisions. The causal relationship has been examined through a complete analysis throughout this report. Therefore, a question may arise regarding what factor(s) contribute to influencing the IPO decisions, and thus the number of IPO, total, and average IPO proceeds in Bangladesh. This research gap has led us to undertake the current study by identifying the macroeconomic factors influencing total and average IPO proceeds in Bangladesh.

2. Literature Review

All the companies have to think about the costs and benefits of going to public activities and its alternatives (Brau & Fawcett 2006). According to investment theories, there are four reasons for going public: raising capital, giving a cash-out opportunity to the private shareholders, financing strategic decisions, reducing the cost of capital (Brau & Fawcett 2006). IPO makes a way to change the capital structure, increasing the stakeholders' financial credibility, which is how firms lessen their cost of debt (Rajan, 1992). Moreover, Black and Gilson (1998) have suggested that an IPO decreases the stake of venture capitalists who initially provide capital in the firm, and IPO proceeds help him/her cash out of the firm. In another study (Gleason, Madura, & Wiggenhorn, 2006), this is illustrated that companies choose to go public to acquire firms, and they pay the amount of takeover using the IPO proceeds. Brau and Fawcett (2006) said that the most important reason for the management of any company in the USA was to make the public market use the IPO proceeds to acquire other firms. Choosing the right time for going public, Loughran, Ritter, and Rydqvist (1994) established the 'Window of Opportunity Theory' which suggests that the owner of the firms decides to issue newer stocks in the primary market following the market condition by considering the lower number of equity issues and when the prices of the stocks are less in the market and vice-versa.

Rani and Kaurmann (2017) found that changes in interest rates have explanatory power to describe the size of firms' initial public offerings. In the context of Poland, Meluzín, Zinecker, and Kovandová (2014) argued that the interest rate affects the number of IPOs issued. In Sri Lanka, researchers found long-run equilibrium relationships among GDP, 91-day interest rate, inflation and exchange rate, total IPO proceeds raised average IPO proceeds raised, but the only exchange rate and interest rate hold granger causality with the total IPO proceeds. In economics, there is a simple relationship between IPO issues and interest rates (Brau, Francis, & Kohers, 2003). The interest rate changes the decision of IPO issue for new companies because when the interest rate becomes lower, companies can use debt to raise their capital instead of equity issues. In another research done by Jovanovic and Rousseau (2004), it was found that the relationship between IPO volume and interest rate is dynamic. When the interest rate is high, IPO issues are discouraged because the future income has to be discounted at a very high rate. Nevertheless, if the interest rate is very low, there is an option to wait until the rate rises to a favourable level. On a similar line, Rani and Kaurmann (2017) showed GDP as an explanatory variable to determine the number of IPO and market interest rates possessed co-integration, but there is no causal relationship with IPOs in India (Rani and Kaurmann, 2017). Concerning the volume of IPO, Halim and Yaakob (2016) concluded that the growth rate of the economy and overall stock market has a positive correlation with IPO volume in Europe. In Malaysia, from 1990 through 2008, there came out a negative relationship between the interest rate and the number of IPO. However, industrial production and the number of IPO have a positive relationship, and there are a long-run equilibrium relationship among these three (number of IPO, interest rate & industrial production) variables (Ameer 2012; Choe et al., 1993; Tran and Jeon, 2011). Brau et al. (2003) found the opposite of Ameer (2012); Tran and Jeon (2011). They saw a positive correlation between the interest rate and IPO volume using a dataset of 25-30 years. The study conducted by Brau et al. (2003) was based on data sets from the USA, and the study by Tran and Jeon (2011) was based on 2691 firms from no specific country.

In Nepal, Dahal (2007) experienced that IPOs were heavily undersubscribed and under-priced (by about 53.25 percent) until 2006, and the returns of the IPOs were affected by the subscription times of issue amount and stock market index. In addition to that, Niroula (2015) analyzed the factors which affect the under-pricing of IPOs and saw that IPOs were oversubscribed, and investors think IPOs are a safe investment that gives higher returns and it gives the justification for the higher oversubscription rate. Then, Pradhan and Shrestha (2018) studied that the subscription rate, the reputation of the issue manager, and firm size have a significant influence on the short-run returns of the IPOs. Porta et al. (1997) revealed that there is a dynamic relationship between IPOs and six macroeconomic variables in the long run and short run. According to Angelini & Foglia (2018), the number of IPO is explained by the business cycle, volatility, and interest rate. They did not find any effect on the stock market on IPO activity. In Bangladesh, the performance of the primary market was oversubscribed compared to the prior year, and it gave a chance to make a quick profit to the investors of the primary market (Angelini & Foglia, 2018). A survey by Rzeszutek et al. (2020) reported that most of the managers want to go for a public offering when a bullish market prevails and after good historical corporate financial results. He argued and said that inefficient equity market shares would have the right price at any time in both the bearish and bullish market. Rydqvist and Högholm (1995) studied the data of 10 European countries and concluded that the stock market index and business condition paves the way for going to public activity. Breinlinger and Glogova (2002) tried to know the influence of macroeconomic factors on IPOs using data from European countries, but their study did not give any explanatory results from the hypotheses.

In the emerging market, there is enough evidence to support the connectivity between the relation of stock return and macroeconomic factors (Bilson, Brailsford, & Hooper, 2001). Rees (1997) showed that there is a positive correlation between the frequency of IPOs and the stock market level from the year 1972 to 1994. On the other hand, Porta et al. (1997) studied and showed that the impact of the economic condition has a significant effect on the number of IPOs for 49 countries. They found that the GDP growth rate influenced the number of companies issuing IPOs. Along with the GDP growth rate, the interest rate has an impact on the number of IPOs, and the total proceeds raised through equity issues (Chang, 2009; Gleason et al., 2006; Jovanovic & Rousseau, 2004).

Studies on macroeconomic effects suggest that the growth of industrial production sometimes drives the way to go public through an IPO for firms for raising new capital (Flannery & Protopapadakis, 2002). The high growth of industrial production will increase the output, and then the firm will need higher capital. The study says GDP has a positive correlation with IPO volume (Bilson et al., 2002; Choe et al., 1993; Korajczyk & Levy, 2003). Korajczyk and Levy (2003) focused on the dataset of the USA during the period 1984-1999 and tried to see the choice of the capital structure of firms based on macroeconomic factors and found a positive relationship between IPO volume and GDP per capita. It was found from a study that there is an impact of business cycles and used GDP per capita growth (as a proxy for the demand of capital) on IPO volume (Choe et al., 1993). The study was conducted based on the USA during the period 1971-1991.

In this study, GDP, inflation, interest rate, stock market index, remittance are taken as independent macroeconomic variables to define the change in the number of IPO issued, average, and total IPO proceeds raised in a specific period. The number of IPO, total IPO proceeds, and average IPO proceeds is dependent variables in this model. These variables are taken from the annual reports of CDBL.

2.1 IPO

IPO means the first time offering and sells company stock to general investors. The company issuing the stocks raises the proceeds by selling its common stock to the public. In the current study, the term 'IPO' is proxy by the number of IPO issued per year; Total IPO proceeds raised per year; and Average IPO Proceeds raised per year, which are also the dependent variable of the study. Flannery and Protopapadakis (2002); Tran and Jeon (2011) used these variables as proxies to define IPO in their research.

2.2 Number of IPO

The number of IPO is the number of IPO issued by companies in a year. Generally, the number of IPOs refers to the frequency of IPO issued per year in the capital market. Ameer (2012); Loughran et al. (1994) considered the number of IPOs as the proxy for IPO in their researches.

2.3 Total IPO Proceeds Raised

IPO proceeds define the company's capital amount by selling its shares to the public investor. The total proceeds show the total of all the proceeds raised by all the IPO issuing companies in a year. In this study, the total amount of proceeds represents the amount collected by all the IPOs issued in a year in Bangladesh's capital market. This amount is the aggregate IPO value in the market per year. Breinlinger and Glogova (2002) took the total IPO proceeds raised as their important proxy for IPO since it represents the monetary value and the IPO volume in the market.

2.4 Average IPO Proceeds Raised

Average IPOs are taken by dividing the total IPO proceeds by the number of IPOs issued in a year. This value shows the average size of IPO activities in the market.

2.5 Gross Domestic Product

GDP refers to the economy's business cycle movements and represents the level of future business activity. Higher growth represented by higher GDP results in increased output and expansion in the economy. It influences more firms to issue IPO to fund their expansions. Porta et al. (1997) and Rydqvist and Högholm (1995) have shown a strong positive impact of GDP growth rates on the Number of IPOs in the case of evolving markets. Like that, Rees (1997) found a positive relationship between GNP growth rate and the volume of IPO, i.e., the total IPO proceeds raised.

***H_1**: There is a significant positive, causal relationship between gross domestic product (GDP) and the IPO*

2.6 Inflation

The inflation rate is considered as a proxy for inflation in the present study. Bilson, Brailsford, and Hooper (2002) used the inflation rate as a proxy for inflation in their study. Higher inflation refers to investors' expectation to get a higher rate of return for new investments, meaning the increasing cost for firms, which discourages firms from issuing IPOs.

***H_2**: There is a significant causal relationship between Inflation (INF) and IPO.*

2.7 Interest Rate

In this study, interest rate refers to the Scheduled Banks Rates-Weighted average Advance Rate. This variable shows the money market condition in the present study. Ameer (2012) argued that there is an impact of monetary policy on the capital market, and it influenced the IPO timing and represented there that interest rate had a strong and negative relationship with IPO number. When the interest rate level is higher, IPO issues will be discouraged because the future income will be discounted heavily due to the higher rate. Similarly, Rani and Kaurmann (2017), another researcher, found out the same conclusion from the USA context that firms encourage IPO issues when the interest rate level is lower than the rate or previous period, and also interest rate level can justify the size of the IPO issues.

***H_3**: There is a significant causal relationship between the Interest rate (SBR) and IPO.*

2.8 Stock Market Index

The stock market index refers to an aggregate value produced by combining several stocks or other investment vehicles. The present study used the Dhaka Stock Exchange Limited Index (SMI) as its proxy for the stock market index performance measure. The window of opportunity theory proposed by Ritter and Welch (2002) and the market timing hypothesis show that a stock index reflects investors' behavior, sentiments, and tendency, affecting the costs of floating equity; ultimately, it causes the IPO volume to change over time. That means firms opt to go public as stock prices in the market increase because the cost of going public is relatively low during these periods (Ameer, 2012). Loughran et al. (1994) have noted that a significant positive relationship remains between the stock market index and its IPO number.

***H_4**: There is a significant positive, causal relationship between the stock market index (SMI) and the IPO.*

2.9 Remittance

Remittance increases the aggregate demand in the economy and increases consumption, resulting in higher productivity of the firms. Consequently, it increases the firms' demand for funds in return (Frank & Goyal, 2007). Further, Okumu et al. (2018) has suggested that remittance has a significant positive relationship with stock market prices represented by NEPSE. So, remittance should have a positive relationship with the dependent variables in this study.

***H_5**: There is a significant positive causal relationship between Remittance (REM) and the IPO.*

3. The Rationale of the Study

The capital market plays an important role in the economy. The capital market is recognized as a vehicle for a country's rapid economic development through the mobilization of available resources in that country. As a developing economy, Bangladesh has a long and illustrious history of its capital market development. Different financial assets are traded in this market. From almost a skeleton shape capital market is slowly but steadily moving ahead. Initial Public Offering, Direct Listing, and trading in the secondary market are showing an enormously optimistic trend. New companies are coming to the stock exchanges and get listed to expand their equity base for further improvement. There are lots of reasons to offer initial public offerings from the perspective of a private company. Sometimes, the reason comes from the company's core performance, and sometimes macroeconomic factors drive the situation. This study has been undertaken to show the actual reasons behind the IPO issues. The result will give a conclusion about the influence of macroeconomic variables, which affected the IPO issues empirically. So the issuer can get the idea about the timing, economic condition, and other variables that will impact upcoming IPOs.

4. Objectives of the Study

The objectives of this paper are the following:

- To analyze the relationship between the variables and the number of IPO and their proceeds in a specific period.
- To examine which factors have the most influence on new offerings of the companies.

5. Methodology

5.1 Sources of Data

The present study collected all the secondary data from multiple sources for analyzing the dependent and independent variables. This study covers the yearly data related to IPOs (proxy by Number of IPOs, IPONUM; Total IPO Proceeds raised, IPOTP; and Average IPO Proceeds raised, IPOAP) and macroeconomic variables: Gross Domestic Product (GDP), Inflation [proxy Inflation rate (INF)], Interest rate [proxy by Scheduled banks rates-Weighted average Advance Rate (SBR)], Stock Market Index [proxy by SMI], and Remittance (REM), from the fiscal year 2007/08 to 2017/2018. These data are mainly collected from CDBL annual reports, Bangladesh Bank annual reports, DSE website & other websites from FY 2008 to FY 2018. Annual reports of Bangladesh Bank & CDBL have been collected from their websites. Other sources are published journals, articles, DSE websites, Bangladesh Bank's other publications, which gave a sense on this topic. The dataset covers 157 IPO issues and total IPO proceeds of the stock market in 11 years.

5.2 Techniques of Analysis

The data were analyzed using quantitative research techniques such as descriptive, correlation, and multiple regression analysis. First of all, we have done a descriptive statistical analysis of the data. This includes the mean, standard deviation of the observations. Then we have presented a regression model as a technique of our analysis, which would finally identify those variables that have a significant impact on IPOs issued in the last 11 years.

5.3 Model Specification

Regression model: There is a need to be specific to establish a model for the analysis. An improper specification can mislead the result and thereby desired findings. We based our analysis on time series data of the macroeconomic variables and IPO-related data from FY 2007-08 to FY 2017-18. Multiple regressions were undertaken between the dependent variables and the proxies of the independent variables.

The functional form of the study's model is as follows: Initial Public Offering $=f$ (gross domestic product, inflation, interest rate, stock market index, remittance). More specifically, considering the proxies of the dependent variable of the variables, the given model has been segmented into the following models:

$$\text{Model (i) } IPONUM = a1 + \beta 1 GDP + \beta 2 INF + \beta 3\text{SBR} + \beta 4\text{SMI} + \beta 5 REM + \varepsilon 1 \quad (1)$$

$$\text{Model (ii) } IPOTP = a2 + \beta 1 GDP + \beta 2 INF + \beta 3\text{SBR} + \beta 4\text{SMI} + \beta 5 REM + \varepsilon 2 \quad (2)$$

$$\text{Model (iii) } IPOAP = a3 + \beta 1 GDP + \beta 2 INF + \beta 3\text{SBR} + \beta 4\text{SMI} + \beta 5 REM + \varepsilon 3 \quad (3)$$

In the regression model, the number of IPO, total IPO proceeds, and average IPO proceeds are the dependent variables, and we have taken GDP, Inflation, Interest Rate, and Stock Market Index & Remittance as the independent variables.

Table 1. Variable Definition

Variable	Unit	Source	Sign Expectation
Number of IPO	Frequency	CDBL report	
Total IPO Proceeds	Taka	CDBL report	
Average IPO Proceeds	Taka	CDBL report	
GDP	Taka	BB Website	+
Inflation	Percentage	BB Website	_
Remittance	Taka	BB Website	+
Interest Rate	Percentage	BB Website	_
Stock Market Index	Index	Dhaka Stock Exchange Limited	+

Source: Summary of Literature Review

Gross Domestic Product (GDP) determines the movement of the economy, increased output, expansion, and future business-level activity, so it should have a positive relationship with the dependent variables. Inflation [proxy Inflation rate (INF)] indicates higher costs for the firm when financing. So they do not want to issue an IPO when inflation is higher. Interest rate [proxy by Scheduled banks rates- Weighted average Advance Rate (SBR)] defines the present condition of the market, and the increased interest rate is used as the discount rate for future income. That is why it has a strongly negative relationship with IPO number, total IPO proceeds, and average IPO proceeds. The stock market index is the combined value of the stocks which measure the performance. As a result, the stock market index is expected to have a strong positive relationship with dependent variables. Remittance simultaneously increases demand, consumption, and thus productivity. So the firm will need higher capital if the remittance increases. This factor should have a significant positive relationship with the dependent variables. This table (Table 1) shows a summary of the information and its sources. It also represents the expected relationship of these dependent variables with the macroeconomic factors in the sign expectation column.

6. Analysis and Findings of the Study

Table 2 gives an overview of descriptive statistics of yearly IPOs and macroeconomic factors' data series. The total number of years is 11 and the total number of IPO was 157. The mean of N IPO is 14.27. In 2009-10, the highest number of IPOs got approved by the authority. Inflation was, on average, 7.36%. Yearly, BDT 630 million has been raised as a fund from the primary market.

Table 2. Summary Statistics

	Number of IPO	Total IPO Proceeds	Average IPO Proceeds	Inflation	GDP	Interest Rate	Remittance	Stock Market Index
Mean	14.27273	9403.671	630.2074	7.362727	12578.03	11.83636	97209.03	4657.415
Maximum	21	18299	1076.412	10.62	22504	13.8	124063.4	6117.234
Minimum	9	2732.31	185.5607	5.44	5419.2	9.6	54295.16	2917.713
Standard Deviation	3.523944	5396.094	279.6964	1.70606	5665.094	1.421459	23570.52	1086.426
Variance	12.41818	2.91e+07	78230.1	2.910642	3.21e+07	2.020545	5.56e+08	1180321
Skewness	0.16579	0.2226	0.01138	0.81115	0.35159	-0.15179	-0.5931185	-0.3112
Kurtosis	2.409593	1.794939	2.103403	2.385486	1.969582	1.895538	1.973589	2.141518

Source: Stata Output

One of the assumptions of multiple regressions is that the independent variables are not correlated with each other. For this reason, we prepared a correlation matrix to examine whether there exist a multicollinearity problem. The correlation matrix indicates that there is a high correlation between remittance and GDP. So, we are apprehending that there is a multicollinearity problem. To verify the existence of a multicollinearity problem, we also conduct a variance inflation factor (VIF) test. Table 5 provides the VIF test estimates.

Table 3. Correlation Matrix

	Inflation	Remittance	GDP	Interest Rate	Stock Market Index	Number of IPO	Total IPO Proceeds	Average IPO Proceeds
Inflation	1.000							
Remittance	-0.5053	1.000						
GDP	-0.6579	0.8309	1.000					
Interest Rate	0.6879	-0.1429	-.5969	1.000				
Stock Market Index	-0.2148	0.3316	0.4038	-0.3601	1.000			
Number of IPO	0.2450	-0.1250	-.4755	0.4290	0.3195	1.000		
Total IPO Proceeds	0.3904	0.1720	-.1718	0.4058	0.5748	0.7253	1.000	
Average IPO proceeds	0.3071	0.3726	0.0616	0.3097	0.5665	0.4563	0.9350	1.000

Source: Stata Output

We find that GDP has a variance inflation factor of 16.17, which is quite high. So, we dropped the GDP amount from the model. Then again, we test VIF after dropping the GDP amount. Then we got the mean VIF of 2.20.

Table 4. Multicollinearity Problem (VIF Test)

Including GDP		
Variable	VIF	1/VIF
GDP	16.17	0.061852
Remittance	13.91	0.071903
Interest Rate	9.18	0.108971
Inflation	3.71	0.269811
Stock Market Index	1.45	0.688847
Mean VIF	8.88	

Continued on next page

Excluding GDP		
Variable	VIF	1/VIF
GDP	16.17	0.061852
Remittance	13.91	0.071903
Interest Rate	9.18	0.108971
Inflation	3.71	0.269811
Stock Market Index	1.45	0.688847
Mean VIF	8.88	

Source: Stata Output

Due to the multicollinearity problem, regression analysis was not giving the best possible result. So, GDP has been excluded from the regression analysis. Here, the model is significant as a 5% level, and a 30% chance of the Number of IPO can be explained by the macroeconomic factors defined by adjusted R Square. Inflation rate and remittance negatively correlate with the number of IPO, but that is not significant. Stock market index (increased by 3.899%) and interest (increased by 27.71%) have a significant positive relationship with the number of IPO issued in a year.

6.1 Number of IPO and Macroeconomic Variables

Table 5. Regression Analysis

Number of IPO	Coef.	Std. Err.	T	P>|t|
Inflation rate	-1.063131	.9497641	-1.12	0.306
Remittance	-.0000725	.0000528	-1.37	0.219
Interest Rate	2.412531	1.053016	2.29	0.062
Stock Market Index	.0023359	.0010034	2.33	0.059
Cons	-10.28877	11.0598	-0.93	0.388
Number of obs = 11				
F (4, 6) = 2.09				
Prob> F = 0.2005				
R-squared = 0.5821				
Adj R-squared = 0.3034				
Root MSE = 2.9411				

Source: Stata Output

On the other hand, macroeconomic factors' change can explain more than 63% chance of total IPO proceeds, which created a sense of strong relationship among the variables. All the independent factors have a positive relationship with the total IPO proceeds, but only the stock market index has a significant relationship with the total IPO proceeds collected from the general investor during this period. (Table 5)

6.2 Total IPO Proceeds and Macroeconomic Variables

Table 6. Regression Analysis

Number of IPO	Coef.	Std. Err.	T	P>|t|
Inflation rate	796.3749	1048.564	0.76	0.476
Remittance	.0265491	.0583422	0.46	0.665
Interest Rate	2014.373	1162.556	1.73	0.134
Stock Market Index	3.88139	1.107824	3.50	0.013
cons	-40960.72	12210.3	-3.35	0.015
Number of obs = 11				
F (4, 6) = 5.40				
Prob> F = 0.0343				
R-squared = 0.7827				
Adj R-squared = 0.6379				
Root MSE = 3247				

Source: Stata Output

About 58% of the change of the dependent variable can be explained by the independent variables. The stock market index has a significant positive impact on average IPO proceeds raised in a year. Also, the inflation rate, remittance, and interest rate have a positive relationship with average IPO proceeds. Nevertheless, those effects are not significant.

6.3 Average IPO Proceeds and Macroeconomic Variables

Table 7. Regression Analysis

Average IPO Proceeds	Coef.	Std. Err.	T	P>|t|
Inflation rate	80.47133	58.54939	1.37	0.218
Remittance	.0053853	.0032577	1.65	0.149
Interest Rate	50.79252	64.91447	0.78	0.464
Stock Market Index	.1581758	.0618584	2.56	0.043
cons	-1823.67	681.7952	-2.67	0.037
Number of obs = 11				
F (4, 6) = 4.45				
Prob> F = 0.0520				
R-squared = 0.7479				
Adj R-squared = 0.5798				
Root MSE = 181.31				

Source: Stata Output

Heteroscedasticity tests the consistency of the variance of the standard errors, and it happens mostly in panel data. If those errors are not constant, the conclusion will be wrong according to the regression model.

Test for Heteroscedasticity
Ho: Constant variance
Prob> chi2 = 0.9897

The value of the probability in the Heteroscedasticity test is 0.9897, which is more than 0.05. This means there is no heteroscedasticity problem in the data series. Cronbach's Alpha Value measures the internal consistency and reliability of the variables, which show some underlying comments. Here, the alpha is 0.3661, and it shows there is no internal consistency among the variables as a group.

Table 8. Autocorrelation Test

Tests	Breusch-Godfrey Test (Prob> chi2)	Durbin Watson (Prob> chi2)	Lag Order Selection
Relationship			
Number of IPO and Macro Variables	0.0506	0.1445	4
Total IPO Proceeds	0.0211	0.0531	3
Average IPO Proceeds	0.1008	0.2548	3

Source: Stata Output

To find the Lag Order Selection and serial autocorrelation in independent variables, an autocorrelation test has been done. Auto Correlation showed the difference of relationship among variables in the same time series of different time intervals. The model determined that lag should be 4, 3 & 3 respectively for three relationship dimensions. Mostly, there is no autocorrelation among the data series, which is proved by Breusch-Godfrey Test & Durbin Watson Test. The Vector Error Correction Model has been done to show the speed of adjustment of the dependent variables due to the change in other variables, and the relationship of the variables will return to the equilibrium. However, no result could be found from the model in the context of Bangladesh in this study.

7. Conclusion

The study concludes according to a multi-collinearity problem that the stock market index, remittance, inflation, and interest rate are macroeconomic variables explaining the movements in the IPO activities in the capital market. The stock market index has a positive relationship with all the dependent variables. Remittance and inflation rates have a negative effect on the number of IPO. Interest Rate has a significant positive impact on the number of IPOs issued. All the independent variables reflect a positive relationship between Total IPO proceeds and Average IPO Proceeds. It also shows that private firms take advantage of the upward trends of the market and get prepared to issue their IPOs following the market sentiment.

In the context of Nepal, the findings are similar to the previous study of Rani and Kaurmann (2017), who said that the interest rate has explanatory power on IPO activities. The study is partially similar to the findings of Halim and Yaakob (2016) in the context of India and Langlet and Lilliehöök (2017). It agrees with the research of Rees (1997) in the context of the UK, where it was found that the stock market index has a positive significant causal relationship with the number of IPOs issued, total IPO proceeds, and average IPO proceeds. This present research has discovered a significant impact of the stock market index on the proceeds taken from the primary market in Bangladesh. This study strongly supports (Brau et al., 2003; Frank & Goyal, 2007), where they found a positive relationship of interest rate and IPO volume on the data series of 25 years (1990-2014) (Frank & Goyal, 2007). However, Ameer (2012) found the opposite result in this context in Malaysia. This present study states the opposite conclusion of Angelini & Foglia (2018). They stated that the stock market index does not affect IPO activities. It has given the same conclusion as Loughran et al. (1994) found a positive relationship between the stock price level and the number of IPO.

The study findings can initiate some important implications to different stakeholders of the capital market of Bangladesh, including owners of firms, investors, analysts, private companies, market-makers, security houses, and mutual funds, as well as to market regulators like BSEC, DSE Limited, The Registrar of Joint Stock Companies and Firms (RJSC), CDBL, Bangladesh bank, Ministry of Finance, and Government agencies. More specifically, the findings of this study can help them to develop a critical understanding of the macroeconomic indicators and their significant impact on the primary market and overall capital market in Bangladesh. They also can formulate policies to help market makers, investors, or others adapt to the dynamics of the macroeconomic factors to motivate more private companies to go public and help the capital market become more inclusive, active, and robust. Stock Market Index is observed as a major and influential factor that has an impact on the IPO activities in the Primary Market as per the present study. In addition to that, companies wishing to go public in the future can also refer to the study and will fix the time of their IPOs more systematically as per the favourable macroeconomic condition. This study suggests that firms can issue their IPOs and can utilize the sentiments of the market as per these macro indicators. Furthermore, analysts can take the study as a reference to predict the primary market activities, make good financing decisions from the perspective of firms, and to prudent investment decisions while designing investment portfolios.

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