

Regime Change Operation in Pakistan: Examining Yield as a Behavioral Pattern of Microblogging rumors during the Political-Obsessed Period

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ABSTRACT

In the behavioral domain, this study discloses the pattern between microblogging-opinionated information and yields on the investment. This phenomenon is particularly related to the political instability in the Pakistan's economy through the multivariate techniques. Pre-political crisis, the pessimistic sentiments were priced in yields on the investment. In environments of political instability, the intensity of decline in yields was more responsive against an incline in the negative opinions. Meanwhile, the intensity of increase in returns was less responsive against an incline in the positive opinions. The findings were further supported by the Bayesian approach. Before the political instability takes place in the Pakistan's economy, the occurrence of yields was noted in response to the bearish market period. Post-political instability, there was a higher posterior probability for occurrence of investment's yields in response to the bullish market period, but this relevance was not completely probable. From the impulse response analysis, the response of returns was reported against the standard deviation shocks in the microblogging sentiment indicators. The analysis may have potential implications in terms of disclosing the investors' behavior from a political perspective.

KEYWORDS

Political Instability; behavioral perspective; microblogging sentiment indicators; yields

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1. Introduction

Pakistan's economy has turned into the drastic political challenges, as well as the constitutional dilemma. This debate is often referred to the regime change operation in Pakistan, where the governing party has ousted through a dramatic vote of no-confidence on April 10, 2022. The country has not only plunged into critical polarization, but the largest movements have triggered against the current incumbent government and the establishment.

The dissolvement of two provincial assemblies is executed as a part of movement to pressure the incumbent government for early federal elections. The provincial elections are constitutionally authorized to be held within ninety days after the dissolution of assembly. As the date of elections is not announced by the concerned authorities, Pakistan's supreme court has intervened to hold elections as per the constitution.

The execution of the regime-change plan is not only limited to the constitutional crisis, but it has also precipitated economic uncertainty with an intensive downfall in the foreign exchange reserves. Pakistan's economy is facing a massive inflation period, and its currency's value has badly plummeted. For the policy makers in Pakistan, the main concern is the release of a \$1.1 billion loan from the International Monetary Fund (IMF). This financial package is crucial for the economy to avoid default. However, political instability is a major concern in delaying the financial agreements with the global lenders, especially the IMF.

For modelling yields on the investment, this work particularly relates the behavioral perspective to the political uncertainty in Pakistan. This phenomenon is even a serious matter whether the behavioral perspective to impact the return may have changed in environments of the country-wide crisis. The study addresses behavioral context through microblogging-opinionated information. Microblogging text, particularly tweeting data, has largely applied to understand the pattern of opinionated information with various fields, including the economic domain (Oliveira et al., 2017; Guijarro et al., 2019; Saleemi, 2020).

Incoming information can have an authoritative role on stocks' yield (Groß -Klußmann and Hautsch, 2011). Microblogging text provides a valuable content for the sentiment analysis, that is undoubtedly crucial in understanding the functioning of financial markets from the behavioral perspectives (Oliveira et al., 2013; Sprenger at al., 2014; Bartov et al., 2018; Broadstock and Zhang, 2019; Guijarro et al., 2021). This opinionated content may better guide investors in their decision making (Prokofieva, 2015), and gaining significant yields on the investment (Bank et al., 2019). The extraction of sentiment indicators from microblogging comments may identify the asset price movements a few days beforehand (Smailović et al., 2013).

Microblogging-based investment interest eliminates information asymmetry (Guijarro et al., 2021), which can protect the investment and stabilize the market (Wei et al., 2014). In this debate, there is considerable consensus in the behavioral domain that the microblogging platform can spread stock-related information more effectively (Sprenger at al., 2014). The transparency of an investment's value determines the financial position in the financial market (Cervelló -Royo and Guijarro, 2020; Saleemi, 2022).

As the microblogging network permits the exchange of information by eliminating the geographical barriers, this opinionated data is modelled as the pattern of returns on the KSE 100 Index. The novelty lies in the empirical approach, where the microblogging-related information is linked to yield on the investment during the political instability. There may not be earlier investigation on how the yield responds to the microblogging sentiment indicators in environments of the political- obsessed period. Therefore, the study aims to disclose the authoritative role of political instability on the relationship dynamics between yields and microblogging content.

The rest of the manuscript is arranged as follows. The procedure applied to construct models and data curation is illustrated in Section 2. The data quantification is depicted and explained in Section 3. Finally, section 4 highlights the potential insights into dynamic of the research.

2. Material and Methods

The return on the investment is examined as a behavioral pattern of the investor emotions through the R language approach. The tweeting data covers the period January 01, 2018 – January 06, 2023, where the root of the regime-change operation in the Pakistan's economy is examined from April 10, 2022. As the data is unstructured in its original form, the study requires text mining techniques. This process transforms the text into valuable content for behavioral analysis. The structured text for each opinion is finally quantified in a positive or negative emotion. The construction of the sentiment indicators is depicted as per Equations (1) and (2).

$$\sum_{t=1}^{T} PE_t = PE_1 + PE_2 + \dots + PE_T$$
(1)

$$\sum_{t=1}^{T} NE_t = NE_1 + NE_2 + \dots + NE_T$$
(2)

where *T* illustrates the number of positive or negative emotion on day t; $\sum_{t=1}^{T} PE_t$ indicates the accumulated bullish values of day t; and $\sum_{t=1}^{T} NE_t$ depicts the accumulated bearish values of the same period. The yield on the KSE 100 Index is estimated as per Equation (3).

$$Yield_t = \left(\frac{TE_t}{TE_{t-1}}\right) - 1 \tag{3}$$

where $Yield_t$ indicates the return on the investment of day t, TE_t depicts the execution price of the transaction on day t, and TE_{t-1} represents the closing price of the previous trading session.

The Multiple linear Regression model investigates whether the yield on the investment is a behavioral pattern of the microblogging emotions. The benchmark model is estimated as per Equation (4).

$$Yield_{t} = \alpha + \theta_{1} \sum_{t=1}^{T} Bearish_{t} + \theta_{2} \sum_{t=1}^{T} Bullish_{t} + \epsilon_{t}$$

$$\tag{4}$$

where $Yield_t$ refers to the return on the investment of day t; $\sum_{t=1}^{T} Bearish_t$ depicts the aggregated negative emotions of day t; and $\sum_{t=1}^{T} Bullish_t$ is the aggregated positive emotions of the same day.

Based on the Gaussian distribution, the study constructs the Bayesian model as per Equation (5):

$$p(Yield|EI) = \frac{p(Yield\cap EI)}{p(EI)}$$
(5)

where *EI* relates to the emotion indicators, p(Yiled|EI), as the posterior probability, illustrates the occurrence of yields in response to the microblogging emotion indicators; p(EI) elucidates the likelihood of the emotion indicators to being accurate; and $p(Yield \cap EI)$ shows the probability of all the parameters being accurate. The expression, $p(Yield \cap EI)$, is altered as per Equation (6):

$$p(Yield \cap EI) = p(EI|Yield)p(Yield)$$
(6)

The Bayesian Theorem for a normal distribution is examined as:

$$p(Yield|EI) = \frac{p(EI|Yield)p(Yield)}{p(Yield)}$$
(7)

where p(Yield) is the likelihood of the return; and p(EI|Yield) suggests the possible occurrence of the microblogging emotion indicators, conditioning the yield on the investment being accurate.

3. Analysis and Discussion

Table 1 depicts the numerical measurements for the variables. The measurement of the investor sentiments is noted to be positively skewed with most values to the right of mean. However, the yields are negatively skewed with most values to the left of mean. It is reported that the dataset contains the fat-tailed numerical distributions. This indicates extreme values in the corresponding data sampling. The graphical distribution for the variables is depicted in Figure 1, where the variations are observed over time. It is worthwhile investigating whether yields are exposed to microblogging-opinionated information, particularly in environments of political uncertainty. This may help to understand the microblogging-based investment interest in the light of political perspective.

Variables	Median	Mean	Standard Deviation	Skewness	Kurtosis
Yield	0.00021	0.00008	0.0115	-0.4980	6.9586
Bearish	0.0400	0.0549	0.0506	2.3338	14.1394
Bullish	0.1100	0.1277	0.0919	0.8412	3.6913

Table 1. Descriptive measuremen	t of the dataset (Daily basis).
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Notes: Significance level codes: *** < 0.001; ** < 0.01; * < 0.05.



Figure 1. Numerical distribution of the variables over time (Monthly basis).

A multiple linear regression technique is first applied to find the linear combination in Table 2. Before the political crisis takes place in the Pakistan's economy, the bearish market period is negative and significantly associated with yields on the KSE 100 Index. This quantification indicates that an incline in pessimistic sentiments decreases returns on the investment. Therefore, the investment's yield is priced in response to the negative opinions. Meantime, an insignificant relationship is found between bullish market period and yields on the investment. In this debate, the microblogging-based positive sentiments are not relevant to estimate returns on the KSE 100 Index. It may concern for investors, that the significance of microblogging-generated information is addressed in terms of negative sentiments during the political stability period.

The results are changed in environments of political uncertainty. The microblogging sentiment indicators are reported to be linked with yields on the KSE 100 Index. A negative, but significant relationship is found between the bearish market period and yields on the investment. The relationship implies, that an increase in pessimistic emotions causes lower returns. Most importantly, the return on the investment is more exposed to the negative opinions. This may raise a serious-level attention in the potential investors, that are concerned to accept the financial position of KSE 100 Index during the political-obsessed era. Meanwhile, the bullish market period is positive and significantly correlated with yields. It further matters to disclose, that the intensity of change in returns is less responsive against an incline in positive sentiments. In this context, the investors are also concerned to assess

the positive opinions in the political-obsessed environment, but the authoritative role of the optimistic sentiments on yields is less intensive.

Variables	Parameters	Estimate	Std. Error	p-value
Pre-political crisis				
Yield (i)	Intercept	0.002	0.0006	0.001 **
	Bearish	-0.055	0.0086	0.000 ***
	Bullish	0.007	0.0043	0.1
Political uncertainty environments				
Yield (ii)	Intercept	0.0008	0.0016	0.619
	Pessimistic	-0.0678	0.0157	0.000 ***
	Optimistic	0.0268	0.0122	0.029 *

Table 2. Quantification	of regression	model (Da	aily basis).
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Notes: i) Residual standard error: 0.0115; Adjusted R-squared: 0.0367; F-statistic: 21.2; p-value: 0.000: (ii) Residual standard error: 0.0093; Adjusted R-squared: 0.0933; F-statistic: 10.42; p-value: 0.000.

Variables	Parameters	Median	PD	% in ROPE	ESS
Pre-political crisis					
Yield (i)	Intercept	0.002	99.95%	6.03%	3190
	Bearish	-0.06	100%	0%	1715
	Bullish	0.007	94.88%	6.68%	2031
Political uncertainty environments					
Yield (ii)	Intercept	0.0008	68.60%	42.87%	2457
	Bearish	-0.07	100%	0%	1447
	Bullish	0.03	98.92%	0%	1347

Table 3. Quantification of Bayesian mo	odel (Daily basis).
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Notes: Probability of Direction: PD; Region of Practical Equivalence: ROPE; Effective Sample Size: ESS.

The following experiment quantifies the dataset in Table 3 using the Bayesian theorem methodology. This may better reveal the posterior likelihood for occurrence of investment's yields in response to the microblogging emotion indicators. Pre-political uncertainty, the posterior probability indicates a 100% negative relativeness between bearish market period and returns. This quantification depicts a 100% occurrence of yields in response to the negative opinions. Therefore, the investment's yield seems to be priced against pessimistic sentiments. However, the Bayesian model reports a 94.88% posterior likelihood between bullish market period and yields on the KSE 100 Index. Thereby, there is less probability for occurrence of returns in response to the positive opinions. The convergence in parameters is checked by visually demonstrating the trace plots in Figure 2. The breaks or gigantic spikes are not observed in the parameters. Therefore, there is no convergence problem in the adopted model. This debate is further supported by the ESS values of all relevant parameters, which are greater than 400. The probability of direction for the microblogging sentiment indicators is visualized in Figure 3. The graphical probability of direction suggests that there is a higher likelihood for occurrence of investment's yields in response to the bearish market sentiments during the political stability period.



Figure 2. Pre-political crisis, examining the convergence problems in the Bayesian model.



Figure 3. Pre-political uncertainty, the Probability of Direction for the sentiment parameters.



Figure 4. Post-political uncertainty, analyzing the convergence effects in the Bayesian model.





The findings are changed in environments of the political crisis. The posterior likelihood identifies a linkage between microblogging sentiment indicators and yields. The probability of direction shows a 100% negative linkage between bearish sentiments and returns. Therefore, a 100% posterior likelihood is suggested for occurrence of yields against the pessimistic emotions. In this debate, the investors are concerned about fundamental value of the investment, particularly in the political-obsessed environment. Therefore, the investment's yield seems to be priced in response to microblogging-based negative information. Meantime, the Bayesian theorem indicates a 98.92% positive relativeness between bullish sentiments and returns on the investment. Thereby, the posterior probability suggests a 98.92% occurrence of returns against the microblogging-based optimistic opinions. In this case, a higher

posterior likelihood is reported, but the occurrence of yields is not completely probable in response to the positive opinions. Figure 4 examines the convergence effects in the parameters using the trace plots. The breaks or gigantic spikes are not noted in the parameters. Therefore, there is no convergence impact in the adopted model. This finding is further endorsed by the ESS values of the parameters. Post-political instability, the probability of direction for the investor sentiment indicators is visualized in Figure 5. The graphical probability of direction depicts, that there is a higher probability for occurrence of investment's yields in response to the sentiment parameters. Shock from Bearish Shock from Bullish



Figure 6. Pre-political uncertainty, Impulse Response analysis.



Figure 7. Impulse Response analysis in environment of political uncertainty.

The study further examines the occurrence of yields against the standard deviation shocks in the microblogging emotion indicators. Pre-political uncertainty, Figure 6 visualizes the response of yields towards the standard deviation shocks in the investor sentiments. It is observed that the yield fluctuates around the line zero. This indicates the response of yields against the standard deviation shocks in the bearish marker period, as well as bullish market period. In environments of political uncertainty, this phenomenon is not changed at each responsive period. Figure 7 suggests that the yield varies against the standard deviation shocks in the pessimistic and optimistic sentiments.

4. Conclusion

The transparency of information seems a series concern in the time period, where the political crisis has turned into economic chaos. In this context, microblogging-generated information is investigated as the risk determinant of yields on the KSE 100 Index. The sentiment analysis was linked to the political perspective in the Pakistan's economy through various methodological techniques.

Before the political instability, a negative linear linkage was noted between pessimistic opinions and yields on the investment. The result was noted to be influenced in environments of the political uncertainty. The intensity of decline in returns was more responsive against an incline in the pessimistic market period. This behavior may raise serious concerns in the market, where the investors' consensus might have built in the light of political-obsessed environments. Meantime, a positive association was found between optimistic sentiments and returns. However, the intensity of change in returns was less responsive against an incline in the optimistic market period.

The findings were further supported by applying the Bayesian methodology. Before the political uncertainty takes place in the Pakistan's economy, the occurrence of yields was reported in response to the pessimistic opinions. In environments of political instability, the probability of direction suggested the occurrence of yields against the pessimistic sentiments and optimistic opinions. Meantime, the occurrence of returns was noticed against the standard deviation shocks in the microblogging emotion indicators.

The analysis may better reflect the political aspect in terms of determining the investors' position from the microblogging-based behavioral perspectives. As the center of this research is the Pakistan's economy, the findings may not be generalizable to other economies. However, the quantification of the benchmark models may suggest, that incoming information from microblogging comments should be addressed in the investors' decision marking. This may help to protect investment by eliminating the information asymmetry in the market, and gain significant yields as per the opinionated content. In the political-obsessed environment, other researchers are encouraged to find the pattern of microblogging-related information with various economic dimensions, including yields at the firm levels.

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Conflict of interest

The author declares the originality of this manuscript with no conflict of interest.

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