

Optimizing Saudi Bank Stock Performance Through Response Surface Methodology Approach

Mohammed Ibrahim Al-Otaibi^{1,2*}, Normaziah Mohd Nor^{2*}, Yusniyati Yusri²

¹ College of Administration and Economy, Umm Al-Qura University, Makkah, Saudi Arabia

² School of Business and Economics, Universiti Putra Malaysia, Serdang, Malaysia

*Corresponding Author: gs62815@student.upm.edu.my (MIA); mazzziah@upm.edu.my (NMN)

Received: 25 June 2024 | Accepted: 20 July 2024 | Published: 1 September 2024

DOI: <https://doi.org/10.55057/ijaref.2024.6.3.4>

Abstract: *One of the most effective methods for developing countries to increase their revenue is through the implementation of value-added tax (VAT). Nevertheless, market capitalization (MC) and trading volume (TV) are potent indicators of stock performance (SP). The objective of this paper is to determine the optimum VAT, TV, and MC on SP of Alinma Bank (ANB) and Samba Financial Group (SFG) company in Saudi Arabia, for the first time. The event study method was implemented to determine the abnormal return for each event within a specific timeframe of 15 days. Response Surface Methodology (RSM) was employed to optimize the results. On the 4th day prior to the 5% applied VAT, the model predicted an optimal result for ANB company with 2.98% abnormal return, with a 0% VAT, 37.70% TV, and a 3.16% MC. In contrast, the model anticipated an optimal outcome for the SFG company with 2.55% abnormal return at 5% VAT, 168.93% TV and 9.85% MC on the 4th day prior to the 15% VAT raise. Additionally, this research determined that there is a correlation between the variables, which VAT has a higher impact than MC and TV on SP.*

Keywords: Value-Added Tax; Volume Traded; Market Capital; Stock Performance; Modelling and Optimization

1. Introduction

Taxation is a crucial component of economic progress since it furnishes the government with essential income to allocate resources and improve the nation's infrastructure (Egbunike and Emudainohwo., 2018; and Afuberoh and Okoye., 2014). Tax policies play a vital role in growing countries by promoting investment, fostering innovation, and ensuring business models are in line with desired objectives (Barro and Furman, 2018). In 2018, Saudi Arabia implemented a VAT to generate extra income and bolster the economy Saudi Arabia implemented a VAT on January 1, 2018 in order to bolster the economy through the generation of supplementary income as stated by Sarwar et al., (2021). Originally, a 5% VAT was applied to most products and services. However, due to the recent COVID-19 pandemic, the country increased this rate threefold, implementing a 15% VAT starting from July 2020. The main impetus for increasing this rate is to enhance revenue as a result of a decline in economic activity and a rise in health expenditures. Al-Ubaydli (2020) argues that implementing a VAT is an effective strategy for bolstering the economy without resorting to staff layoffs or salary freezes.

Several scholars have identified VAT as a contributing component to stimulating economic growth. These authors include Sarwar et al. (2021), Guo and Shi. (2021), Obaretin and Uwaifo. (2020), Ayoub and Mukherjee. (2019), Ufier (2014), and Ferede and Dahlby. (2012). In addition, Ivkovic et al. (2005) have discussed the VAT and its potential adverse effects on business performance and overall sales volume. The VAT, an indirect tax, is increasingly popular in Saudi Arabia due to its ability to prevent the cascading effect of taxation. A study by Bader Alowais (2020) found that VAT positively impacted the Tadawul All Shares Market (TASI) and raised TASI by 1403.99 points. However, Further investigation is necessary to assess the possible influence of a 1% rise in VAT on stock values. Gopakumar et al. (2022) discovered support for the behavioral finance hypothesis in the stock markets of the UAE. They observed negative cumulative abnormal returns in the financial services, fixed line communications, and factories transportation industries. In a study conducted by Omar (2020), it was discovered that VAT had a direct impact on the financial performance of small and medium firms in Mombasa County. The study revealed that an increase in VAT had a negative effect on profitability as well as customer service efficiency (Omar, 2020). Alhussain (2020) found a modest decrease in total assets, liabilities, client deposits, retained earnings, and operating income before and after VAT implementation. Understanding MC and TV is crucial for analyzing the impact of VAT on stock and sukuk performance in Saudi Arabia. Larger firms with significant market caps are more stable and can better absorb economic shocks, such as VAT policy changes. It has more diversified revenue streams and access to capital, allowing them to navigate tax changes with less disruption. Higher liquidity in markets reduces transaction costs and price volatility, ensuring market stability and accurate price reflection (Bajaher and Shawtari, 2024, Bogari, 2020, and Al Rasasi et al., 2019).

RSM is a powerful method for understanding the complex link between input factors and outcomes, especially when adopting VAT. The systematic approach to testing and analysis employed by RSM resulted in the successful optimization of the objective function with minimum error rates. RSM effectively investigated the intricate relationships between input factors and the objective function (Seraj et al., 2024) using a series of deliberate experiments and mathematical modelling techniques. Furthermore, the RSM utilizes a blend of mathematical and statistical techniques to create, enhance, and optimize processes that incorporate response variables affected by many input variables. The primary objective of adopting this technique is to maximize the replies, isolate the individual effects of the factors on the responses, and ascertain the combined effects of the variables on the responses. Several trials provide valuable insights into the characteristics of the model, which are then utilized to develop a second-order polynomial predictive model that establishes a connection between the input variables of the process and the response variables, (Kostić et al., 2013; and Baş and Boyacı., 2007).

Prior research predominantly employed the differences-in-differences (DID) methodology to assess the effects of VAT on the economy and financial market, as demonstrated by studies conducted by Mgammal (2021), Alowais (2020), Waseem (2020). Although there is limited research employing the event study approach (Gopakumar et al., 2022), no previous studies have utilized RSM to optimize the analysis of data about VAT changes and their impact on SP, as far as we are aware. The objective of this study is to address these deficiencies by integrating the event study approach with RSM to examine the influence of VAT modifications on the performance of bank stocks. More precisely, we will examine the impact of MC and TV on this correlation.

2. Materials and Methods

This study utilized two approaches: the event study method to ascertain the immediate effects of the 5% and 15% VAT implemented on January 1, 2018, and July 1, 2020, on SP. Moreover, the RSM provides which percentage from 0 to 15 % that has less impact on the SP. The event refers to a phenomenon of 2 implications for VAT.

Definition of Event and Select Estimation Window: These implications involve VAT changes from 0 to 5% and 5 to 15 %. The estimation window is considered as a period before each event. In this paper, daily returns go through adjusted using asset pricing models to calculate ex-post abnormal returns using an event window of 120 days before each event and 15 days during the events.

Data Collection: The traded volume and stock data for ANB and SFG were acquired from the Tadawul All Share Index. We collected the MC data from DataStream (Eikon).

Calculate Abnormal Returns: First to calculate the daily return of ANB and SFG stock: where DSR_{it} is stock i 's daily return at time t , CP is the close price of stock i 's price index at time t and PP is the previous price of stock i 's price index at time $t-1$

$$DSR_{it} = \left(\frac{CP - PP}{PP} \right) \times 100 \quad (1)$$

Second to calculate the abnormal return (Eq.2): Here, (AR_{it}) represents the abnormal return for the bank (i) at a time (t), with (R_i) being the return on stock (i), (a_i) the intercept, (β_i) the stock's sensitivity to market returns, and (RM_t) the return on the market index at a time (t).

$$AR_{it} = R_i - (a_i + \beta_i RM_t) \quad (2)$$

Third, to calculate the daily TV and MC: To evaluate changes in trading volumes and stock returns before and after VAT events, the study calculates the percentage change (PC) as follows in Eq. 3: Where (V_1) is the metric value of trading volume of the previous trading volume and (V_2) is the value of the trading volume current day.

$$PC = \left(\frac{V_2 - V_1}{V_1} \right) \times 100 \quad (3)$$

To evaluate the daily changes % in MC, the study calculates the percentage change (PC) as follows in Eq. 4: Where (MC_1) is the metric value of market cap of the previous price and (MC_2) is the value of the market cap current day.

$$PC = \left(\frac{MC_2 - MC_1}{MC_1} \right) \times 100 \quad (4)$$

3. Results and Discussion

In this work, we employed an RSM based on the Box-Behnken Design (BBD) technique to enhance the performance of the Saudi Bank stock. The experimental design of the investigation comprises four factors and one response, as illustrated in Table 1.

Table 1: Presents the factors, input, response, and unit of measurement.

Factors	Input	Unit	Response	Unit
A	VAT	%	Abnormal Return	%
B	Traded Volume (TV)	%		
C	Market Cap (MC)	%		
D	Date	Day		

Effect of Reaction Market Cap: market cap influences the reaction and abnormal return of SP of ANB company. The reaction MC achieved a high level before the imposed VAT, which shows the highest actual and predicted value of 3.17 % and 2.98 % respectively as well as the MC of 3.16 %. However, the reaction market cap achieved a high level before the imposing VAT, which shows the highest actual and predicted value of 2.94 % and 2.55 % respectively as well as the MC of 9.85 % of SFG achieved a high level before the increased value-added tax from 5% to 15 % (Tables 2 and 3). The findings of this study validate that a rise in MC percentage has a favorable impact on both the actual and anticipated values of abnormal return. Conversely, a decrease in MC percentage has the opposite effect on both values.

Table 2: Actual and predicted value of abnormal return for ANB.

Run	Factors (ANB)				Abnormal Return %		Residual %
	VAT	TV %	MC %	Day	Actual Value %	Predicted value %	
1	0	17.05	-1.15	21/12/2017	-1.18	-1.31	0.1347
2	0	-43.73	-0.21	24/12/2017	-0.6900	-0.5129	-0.1771
3	0	74.07	0.42	25/12/2017	0.2200	0.0187	0.2013
4*	0	37.70	3.16	26/12/2017	3.17	2.98	0.1861
5	0	8.21	-2.66	27/12/2017	-3.06	-2.97	-0.0945
6	0	-5.80	0.52	28/12/2017	0.3600	0.1030	0.2570
7	0	-12.45	0.00	31/12/2017	-0.3400	-0.3698	0.0298
8	5	-29.75	-0.52	01/01/2018	-4.4800	-0.5347	0.0547
9	5	52.08	0.21	02/01/2018	0.0100	0.1821	-0.1721
10	5	22.29	1.46	03/01/2018	1.05	1.26	-0.2099
11	5	-15.34	-0.21	04/01/2018	-0.3400	-0.03777	0.0377
12	5	-33.73	0.52	07/01/2018	0.4200	0.0884	0.3316
13	5	8.40	-0.20	08/01/2018	-0.5400	-0.2799	-0.2601
14	5	-18.96	-0.11	09/01/2018	-0.2000	-0.2760	0.0760
15	5	0.31	0.63	10/01/2018	0.5600	0.7214	-0.1614
16	5	35.96	0.00	22/06/2020	-1.01	-0.4248	-0.5852
17	5	-59.54	-0.94	23/06/2020	-0.0700	-0.1447	0.0747
18	5	35.12	0.42	24/06/2020	-1.02	-0.1675	-0.8525
19	5	33.28	-0.01	25/06/2020	0.3400	-0.3106	0.6506
20	5	0.92	0.02	28/06/2020	-0.0700	-0.3230	0.2530
21	5	11.31	-0.83	29/06/2020	-0.0700	-0.6978	0.6278
22	5	-19.60	0.29	30/06/2020	-0.8900	-0.2188	-0.6712
23	15	-2.80	-0.15	01/07/2020	0.2000	-0.0021	0.2021
24	15	-8.16	1.23	02/07/2020	-0.2100	-0.6981	0.4881
25	15	131.33	-0.11	05/07/2020	1.16	0.9434	0.2166
26	15	31.83	-0.16	06/07/2020	-0.2100	0.3018	-0.5118
27	15	-60.70	-0.39	07/07/2020	-0.2100	-0.1863	-0.0237
28	15	-20.67	0.54	08/07/2020	-0.4800	-0.1938	-0.2862
29	15	23.00	0.13	09/07/2020	0.4700	0.3780	0.0920
30	15	-26.30	-0.27	12/07/2020	0.0600	-0.0317	0.0917

The ultimate equation, expressed in coded variables, represents an abnormal return originating from Alinma Bank = $0.0528 + 0.0266 A + 0.5414 B + 1.54 C + 0.4828 D + 0.2831 AB - 2.45 AC + 0.0380 AD + 2.02 BC + 0.2459 BD + 1.90 CD$

Where A represents VAT, B represents the TV, C represents the MC, and D represents a day.

Table 3: The actual and predicted value of the abnormal return for SFG company.

Run	Factors (SFG)				Abnormal Return %		Residual %
	VAT	TV %	MC %	Day	Actual Value %	Predicted value %	
1	0	-77.35	-0.08	21/12/2017	-0.1700	0.4133	-0.5833
2	0	65.55	-0.42	24/12/2017	-0.1100	-0.7082	0.5982
3	0	29.00	-2.11	25/12/2017	-1.57	-2.68	1.11
4	0	93.42	0.52	26/12/2017	-0.3200	0.2982	-0.6182
5	0	-52.17	0.08	27/12/2017	0.7300	0.2909	0.4391
6	0	-64.59	-0.26	28/12/2017	-0.6500	-0.2988	-0.3512
7	0	136.51	1.12	31/12/2017	0.3800	1.01	-0.6316
8	5	-57.53	-0.34	01/01/2018	-0.5200	-0.7258	0.2058
9	5	-49.85	0.26	02/01/2018	0.2900	-0.0239	0.3139
10	5	677.36	2.12	03/01/2018	-0.1300	-0.2755	0.1455
11	5	51.57	2.50	04/01/2018	2.05	2.27	-0.2250
12	5	-44.29	0.33	07/01/2018	-0.3700	0.0334	-0.4034
13	5	-29.20	0.01	08/01/2018	-0.0300	-0.2737	0.2437
14	5	-54.02	-0.33	09/01/2018	-0.2500	-0.9055	0.6555
15	5	-52.21	0.66	10/01/2018	0.3400	0.3698	-0.0298
16	5	54.06	-0.69	22/06/2020	-0.6900	-0.9923	0.3023
17	5	-20.84	-0.42	23/06/2020	-0.2900	-0.6432	0.3532
18	5	12.88	4.10	24/06/2020	0.6400	3.10	-2.46
19*	5	168.93	9.85	25/06/2020	2.94	2.55	0.3949
20	5	-57.75	4.97	28/06/2020	8.05	5.35	2.70
21	5	906.52	-2.73	29/06/2020	6.33	6.38	-0.0456
22	5	-75.83	0.57	30/06/2020	-1.71	0.3802	-2.09
23	15	0.13	-0.20	01/07/2020	0.1000	-0.6077	0.7077
24	15	-57.99	-0.19	02/07/2020	-0.6000	-0.9796	0.3796
25	15	-58.45	0.76	05/07/2020	-1.16	-0.6780	-0.4820
26	15	123.85	-1.13	06/07/2020	0.4400	1.12	-0.6769
27	15	-9.64	-0.54	07/07/2020	-0.8400	-0.4495	-0.3905
28	15	0.14	1.68	08/07/2020	-0.4100	0.0627	-0.4727
29	15	35.40	-1.11	09/07/2020	1.41	0.2564	1.15
30	15	-80.81	0.19	12/07/2020	-1.17	-0.9324	-0.2376

The ultimate equation, expressed in coded variables, represents an abnormal return originating from Samba Financial Group = $-1.68 - 1.61 A - 4.77 B - 4.48 C + 3.54 D + 1.45 AB - 4.41 AC + 0.3505 AD - 10.90 BC + 3.27 BD + 0.9479 CD$

Where A represents VAT, B represents the TV, C represents the MC, and D represents a day.

The predicted R values of 0.8734 and 0.8521 are reasonably consistent with the corrected R values of 0.8081 and 0.7897 for ANB and SFG, respectively. An empirical guideline is that the adjusted and anticipated R values should have a difference of no more than 0.2. The values here are on the order of 0.01. Adequacy accuracy quantifies the ratio of the signal strength to the noise level. A ratio over 4 is preferable. The ratio of 22.6281 to 13.0135 signifies a satisfactory signal. This paradigm is applicable for navigating the design space (Table 4). A

linear correlation was seen between the anticipated and actual values, indicating that the regression model accurately represents the data. Figures 1a and 1b depict a graph illustrating the projected and observed values for each institution. The plot serves as a valuable tool for assessing the significance of the proposed model. The anticipated outputs from the empirical model align with the observed values within the range of the operating variables. The line is maximized with the largest number of points.

Table 4: Adjusted versus predicted R-squared.

	ANB	SFG		ANB	SFG
Std. Dev.	0.4342	1.15	R2	0.8743	0.8521
Mean	-0.1017	0.4237	Adjusted R2	0.8081	0.78979
C.V. %	427.08	271.23	Predicted R2	0.8022	0.7995
			Adeq Precision	22.6281	13.0135

The optimum experimental parameters for observing abnormal returns in stocks using the model were as follows: a VAT rate of 0%, a reaction TV of 37.70%, and a MC of 3.16%. Given the ideal circumstances, the model forecasted a peak reaction of 2.988% abnormal return. Nevertheless, for SFG, the most favorable experimental parameters for determining abnormal stock returns using the model were a VAT rate of 5%, a TV reaction of 168.93%, and a MC of 9.85%. Given the ideal circumstances, the model forecasted a peak reaction of 2.55% anomalous return. The ANOVA analysis, specifically Tables 5 and 6, provides the most accurate match for the 2FI response surface model. The F-value of the model indicates its statistical significance. The probability of a "model F-value" of this magnitude occurring solely due to noise is only 0.01%. Values of "Prob > F" below 0.0100 suggest that the model terms are statistically significant. The relevant model terms in this example include A, B, C, D, AB, AC, AD, BC, BD, and CD.

Table 5: Analysis of variance (ANOVA) table for response surface 2FI model for ANB company.

Source	Sum of Squares	df	Mean Square	F-value	P-value	
Model	24.91	10	24.91	13.21	< 0.0001	Significant
A-Value-added tax	0.0020	1	0.0020	0.0108	0.9184	
B-Traded Volume	0.6925	1	0.6925	3.67	0.0705	
c-Market Cap	0.7641	1	0.7641	4.05	0.0585	
D-Date	0.3749	1	0.3749	1.99	0.1746	
AB	0.0570	1	0.0570	0.3024	0.5888	
AC	2.24	1	2.24	11.86	0.0027	
AD	0.0038	1	0.0038	0.0204	0.8880	
BC	0.2401	1	0.2401	1.27	0.2732	
BD	0.0169	1	0.0169	0.0896	0.7679	
CD	0.6737	1	0.6737	3.57	0.0741	
Residual	3.58	19	0.1885			
Cor Total	28.49	29				

Table 6: Analysis of variance (ANOVA) table for response surface 2FI model for SFG company:

Source	Sum of Squares	df	Mean Square	F-value	P-value	
Model	101.67	10	10.17	7.70	< 0.0001	Significant
A-Value-added tax	0.4507	1	0.4507	0.3413	0.5659	
B-Traded Volume	8.67	1	8.67	6.57	0.0190	
c-Market Cap	10.25	1	10.25	7.76	0.0118	
D-Date	3.54	1	3.54	2.68	0.1181	
AB	0.3935	1	0.3935	0.2994	0.5906	
AC	3.05	1	3.05	2.31	0.1450	

AD	0.3063	1	0.3063	0.2320	0.6356
BC	38.49	1	38.49	29.15	< 0.0001
BD	1.68	1	1.68	1.27	0.2733
CD	0.1310	1	0.1310	0.0992	0.7562
Residual	25.09	19	1.32		
Cor Total	126.76	29			

The effect of VAT, MC, and TV on the stock performance of ANB on the implication day on 01/01/2018. The plot in Figure 2a shows the effect of the VAT change percentage from 0 to 5 %, the market cap daily change %, and the trading volume daily change % on the stock abnormal return, i.e., when the VAT was 5% that decreased the market cap, the trading volume, and the abnormal return by -0.52%, -29.75%, and -0.48% respectively. However, the plot in Figure 2b shows the effect of the VAT change percentage from 0 to 5 % on the SFG on the same day the market cap, the traded volume, and the abnormal return dropped by -0.34, -57.53, and -0.52.

The second event occurred on July 1, 2020, which marked the day when the VAT rose from 5% to 15%. The plot in Figure 2c demonstrates the relationship between the percentage change in VAT from 5% to 15%, the daily changes in market capitalization, and the daily changes in trading volume, and how these factors affect the abnormal return of ANB's stock. The daily changes in market capitalization, trading volume, and abnormal return were -0.15%, -2.8%, and 0.2% respectively. For SFG, the daily changes in market capitalization, trading volume, and abnormal return were -0.2%, 0.13%, and 0.1% respectively (Figure 2d).

To optimize the conversion of market capitalization into abnormal return, it is necessary to examine the process factors within particular ranges. This analysis was performed using Design Expert 7.0.0. The model predicted that in the instance of ANB, there would be an optimal outcome of a 3.16% MC and a 2.98% abnormal return. This prediction was based on a VAT rate of 0 and a trading volume of 37.70% on the fourth day before the installation of a 5% VAT. The information is contained in Table 7. However, by setting the VAT rate at 5% and the transaction volume at 168.93% four days prior to the 15% VAT increase in the case of SFG, the model predicted a MC of 9.85% and a deviation of 2.55% from the average returns. The information is contained in Table 7.

Table 7: Optimization of process variables for ANB and SFG company

		Goal	Lower Limit	Upper Limit	Important
AB	VAT	In target	0	15	3
	TV	In target	-60.7	131.33	3
	MC	In target	-2.66	3.16	3
	Date	In target	0	15	3
	R1	Maximize	-3.06	3.17	5
SFBG	VAT	In target	0	15	3
	TV	In target	-80.81	906.57	3
	MC	In target	-2.73	9.85	3
	Date	In target	0	15	3
	R1	Maximize	-1.71	8.05	5

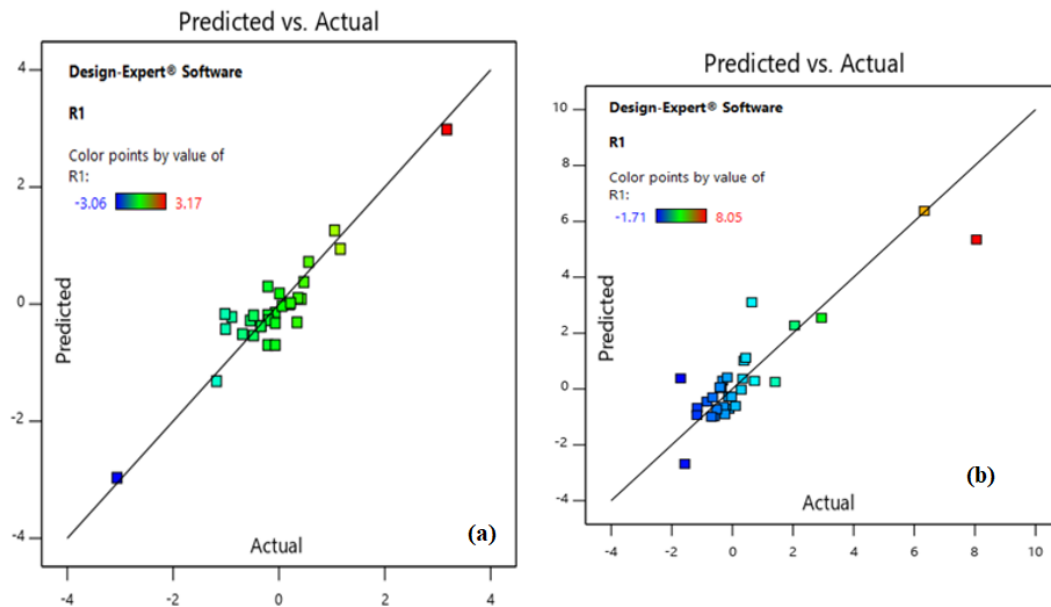


Figure 1: Plot of the actual versus predicted percentage of (a) ANB and (b) SFG.

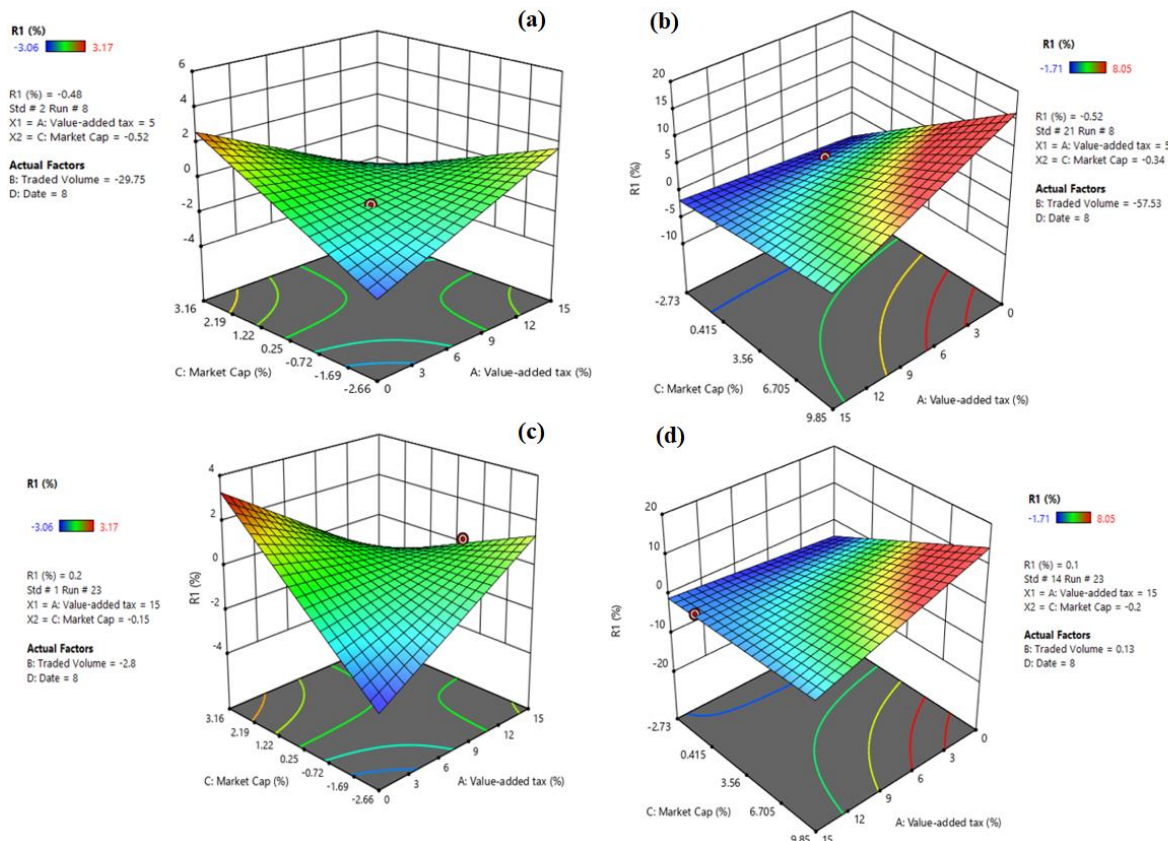


Figure 2: The effect of value-added tax and market cap on the stock performance of ANB and SFG (a and b) in the first event, and (c and d) second event.

4. Conclusion

This paper aims to determine the optimum VAT, TV, and MC on SP. This study adopted the event study approach to discover the aberrant return within a certain 15-day period. Additionally, the RSM technique was used to optimize short-term outcomes. The results indicate a correlation between VAT, market capitalization, traded volume, and stock

performance. The association between the analyzed banks was clearly demonstrated in the initial event, as evidenced by the fluctuations in TV and MC. The abnormal returns of both banks exhibited fluctuations on the days when they implemented VAT modifications. The study employed Design Expert 7.0.0 software to optimize process factors, aiming to maximize the conversion of MC into abnormal returns. ANB successfully reached a favorable outcome with significant accounts receivable when a certain MC was exempt from VAT four days before the adoption of VAT. The model predicted a departure from the average return for SFG when the VAT % and traded volume reached specific values four days before a VAT hike. This research specifically focuses on two Saudi Arabian banks and aims to examine the introduction and escalation of VAT in Saudi Arabia. Future research proposes augmenting the dataset of this study by integrating more banks, thereby yielding a more exhaustive comprehension of the impact of VAT and other factors on SP using RSM.

Acknowledgement

The authors would like to thank the Umm Al-Qura University and Universiti Putra Malaysia for providing the support for this study.

References

- Afubero, D.; and Okoye, E. (2014). The impact of taxation on revenue generation in Nigeria: A study of federal capital territory and selected states. *Int. J. Public Adm. Manag. Res.* 2, 22–47.
- Alhussain, M. (2020). The impact of value-added tax (VAT) implementation on Saudi banks. *Journal of Accounting and Taxation*, 12(1), 12-27. DOI: <https://doi.org/10.5897/JAT2019.0378>
- Alowais, B. (2020). Effect of Value Added Tax on Stock Prices in Saudi Arabia. DOI: <http://hdl.handle.net/10211.3/216622>
- Al Rasasi, M. H., Alsabbab, S. O., and Alarfaj, O. A. (2019). Does stock market performance affect economic growth? Empirical evidence from Saudi Arabia. *International Journal of Economics and Finance*, 11(9), 21. DOI: <https://doi.org/10.5539/ijef.v11n9p21>
- Al-Ubaydli, O. (2020). Saudi Arabia reaps the benefit of establishing VAT. *Alrabia News*.
- Ayoub, Z.; Mukherjee, S. (2019). Value Added Tax and Economic Growth: An Empirical Study of China Perspective. *Signifikan J. Ilmu Ekon.* 8, 235–242. [CrossRef]. DOI: <http://dx.doi.org/10.15408/sjie.v8i2.10155>
- Bajaher, M., and Shawtari, F. A. (2024). Does the stock liquidity drive the trade credit of publicly listed firms in Saudi Arabia?. *International Journal of Emerging Markets*, 19(2), 456-474. DOI: <https://doi.org/10.1108/IJOEM-05-2021-0692>
- Barro, R.J.; Furman, J. (2018). Macroeconomic Effects of the 2017 Tax Reform. *Brook. Pap. Econ. Act.* 2018, 1, 257–345. [CrossRef] 4. ICC. 2018. Available online: <https://cdn.iccwbo.org/content/uploads/sites/3/2018/02/icc-position-paper-on-tax-and-the-unsdgs.pdf> (accessed on 15 June). DOI: 10.1353/eca.2018.0003
- Baş, D., and Boyacı, İ. H. (2007). Modeling and optimization I: Usability of response surface methodology. *Journal of food engineering*, 78(3), 836-845.). DOI: <https://doi.org/10.1016/j.jfoodeng.2005.11.024>
- Bogari, A. (2020). The economic and social impact of the adoption of value-added tax in Saudi Arabia. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 4(02). DOI: <https://jurnal.stie-aas.ac.id/index.php/IJEBAR>
- Egbunike, F.C.; and Emudainohwo, O.B. (2018). Gunardi, A. Tax revenue and economic growth: A study of Nigeria and Ghana. *Signifikan. J. Ilmu Ekon.* 7, 213–220. [CrossRef]. DOI: <http://dx.doi.org/10.15408/sjie.v7i2.7341>

- Ferede, E., and Dahlby, B. (2012). The impact of tax cuts on economic growth: Evidence from the Canadian provinces. *National Tax Journal*, 65, 563–594. DOI: <https://doi.org/10.17310/ntj.2012.3.03>
- Gopakumar, A. A., Kaur, A., Ramiah, V., and Reddy, K. (2022). The sectoral effects of value-added tax: evidence from UAE stock markets. *Journal of Risk and Financial Management*, 15(10), 429. DOI: <https://doi.org/10.3390/jrfm15100429>
- Guo, Y.M.; Shi, Y.R. (2021). Impact of the VAT reduction policy on local fiscal pressure in China in light of the COVID-19 pandemic: A measurement based on a computable general equilibrium model. *Econ. Anal. Policy* 69, 253–264. [CrossRef]. DOI: <https://doi.org/10.1016/j.eap.2020.12.010>
- Ivković, Z., Poterba, J., & Weisbenner, S. (2005). Tax-motivated trading by individual investors. *American Economic Review*, 95(5), 1605-1630. DOI: 10.1257/000282805775014461
- Kostic. M.D., Jokovic. N.M., and Stamenkovic .O.S. (2013). Optimization of hemp seed oil extraction by n-hexane, *Ind. Crop. Prod.* 48 133–143. DOI: <https://doi.org/10.1016/j.indcrop.2013.04.028>
- Mgammal, M. H. (2021). Does a value-added tax rate increase influence company profitability?: an empirical study in the Saudi stock market. *Journal of the Australasian Tax Teachers Association*, 16(1), 92-128. DOI: DOI: 10.3316/informit.331027699809499?download=true
- Obaretin, O., and Uwaifo, F. N. (2020). Value added tax and economic development in Nigeria. *Accounting and taxation review*, 4(1), 148-157. DOI: <http://hdl.handle.net/11159/4462>
- Omar, M. A. (2020). Effect of Value Added Tax on Financial Performance of Small and Medium Enterprises in Mombasa County.
- Sarwar, S., Streimikiene, D., Waheed, R., Dignah, A., and Mikalauskiene, A. (2021). Does the vision 2030 and value added tax leads to sustainable economic growth: the case of Saudi Arabia?. *Sustainability*, 13(19), 11090. DOI: <https://doi.org/10.3390/su131911090>
- Seraj, M., Parvez, M., Khan, O., and Yahya, Z. (2024). Optimizing smart building energy management systems through industry 4.0: A response surface methodology approach. *Green Technologies and Sustainability*, 100079. DOI: <https://doi.org/10.1016/j.grets.2024.100079>
- Ufier, A. (2014). Quasi-experimental analysis on the effects of adoption of a value added tax. *Economic Inquiry*, 52, 1364–1379. DOI: <https://doi.org/10.1111/ecin.12099>
- Waseem, M. (2020). The role of withholding in the self-enforcement of a value-added tax: Evidence from Pakistan. *Review of Economics and Statistics*, 104(2), 336-354. DOI: https://doi.org/10.1162/rest_a_00959