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| EBUS633 **Big Data Analytics for Business**  **Individual Coursework Assignment 2**  Date for Submission: May 18 2023, by 12 (noon) |

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**Introduction**

The apparel sector has been affected globally by the invasion of Russia in Ukraine. The war led to a global price increase of raw materials and cost of living and affected the global supply chain (GlobalData, 2022). The Russian president declared evasion into Ukraine on February 24, 2022. The war has severed many key shipping routes and forced the suspension of transportation services, causing a surge in air freight rates causing serious disruptions (Ngoc Nguyen et al., 2022). The manufacturing sector has been affected by the Ukraine war leading to disruption of the supply chain network. The manufacturing companies have been affected by the shortages of labour, disruptions in the logistics of the companies, and shortages in supplies to companies. Ukraine and Russia supply 80% of the exportation of sunflower, 19% exportation of corn and more than a quarter of wheat (Ngoc Nguyen et al., 2022). Due to the war in Ukraine, many clothes manufacturing companies were affected by the pressure of price increases and the availability of clothes (Milewska Beata, 2022). War affects economic activity and global welfare, such as human capital, causing a labour shortage and inventories. National income, like wages, GDP, and inflation (Lim Weng et al., 2022). The manufacturing sector was chosen for this report. Event study, the Intergroup comparison and the Multiple Regression model were used to test the predictions.

**2. Hypothesis Development**

The data used was secondary. The hypotheses are stated below:

**H1**: Impact of the Ukraine war on the stock prices in the manufacturing sector.

**H2**: The Ukraine war negatively impacts clothes manufacturing companies other than other manufacturing companies.

**H3**: Ukraine war negatively impacts small manufacturing companies more than large manufacturing companies.

The factors that will be used to predict H2 and H3 are the type of company and company size. H1 explains the impact of the Ukraine war on the stock prices in the manufacturing sector.

The Russia-Ukraine war introduced new uncertainty to the world stock market in addition to COVID-19. The share prices index fell by more than 10% since the attack. There are limited studies on the impact of the war on the stock markets (Boungou and Yatié, 2022).

The Fashion industry has suffered a setback due to a global disruption in the supply chain network due to ongoing Russia -Ukraine war and the speedy rise in inflation (Russell Michelle, 2022). The clothes manufacturing companies were chosen because of the shortages of raw materials in the global supply chain. Russia supplies 90% of Leon, which is used to produce microchips, and Ukraine's company refines 60% of it. Highest exporter of sunflower oil (Ngoc Nguyen et al., 2022).

The other factors are the number of employees, gross profit, sales turnover, and inventories. The disruption of supply affects labour, resulting in a lack of truck drivers and logistics is affected. There was previous research on a possible gap in market response to foreign and domestic U.S. firms due to the Ukraine conflict (Clancey-Shang, 2022).

**3. Event Study**

The risk model used is the market model. The 10 days before the event date and 10 days after the event days. The analysis used the default setting; the PERMNO identifier was selected. The event date of 24-02-2022 was used.

100 days estimation window days, with 70 as observations. 50 days Gap is the number of trading days established set up between the end of the estimation window and the beginning of the window.

Table 1 was realised to determine whether to accept or reject H1. Using P value <0.05 as a threshold.

**H1**: **Impact of the Ukraine war on the stock prices in the manufacturing sector., whether there was a significant decrease, increase and no significant change.**

The result of the event chart in the appendices shows a positive impact on manufacturing.

The total return day is 31 days which is 10 days before and 10 days after. (CAR)= 0.0668546.

Abnormal return is for each induvial day. The stats are used for the academic report to test the difference in results from H1. The result should be between 0 and 1 Probability, cross-sectional for Abnormal Return. The smaller the value, the result is more significant.

The higher the T value, the more significant.

The chart result (See figure 7) reads that the result is over the 0% horizontal line over the period. -10 days before is 0.97%, 0 days is 2.63% and 10 days after is 6.99%. It is positive you accept the H1 hypothesis because the line is over the 0% horizontal line based on the confidence level; it's significant.

Mean Cumulative Total Return (At the end of Event Window) = -0.0412087382755894.

Mean Cumulative Abnormal Return (At the end of Event Window) = 0.0599943229759936.

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|  |

**Event Study test result presentation table**:

Table 1 The Effects of the Ukraine War on the Stock Prices

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model | N | Day | AAR/CAAR | P value (cross-sectional t-test). |
| Market Model | 2175 | -10 | 1.00% | < .00001. |
| Market Model | 2175 | -9 | 0.58% | < .00001 |
| Market Model | 2175 | -8 | 0.32% | 0.000625. |
| Market Model | 2175 | -7 | -0.70% | < .00001. |
| Market Model | 2175 | -6 | 1.60% | < .00001. |
| Market Model | 2175 | -5 | 0.23% | 0.002771. |
| Market Model | 2175 | -4 | 0.25% | 0.165127. |
| Market `Model | 2175 | -3 | 0.27% | 0.000969 |
| Market Model | 2175 | -2 | -0.56% | <.00001. |
| Market Model | 2175 | -1 | 0.45% | < .00001. |
| Market Model | 2175 | 0 | 0.41% | .000141 |
| Market Model | 2175 | 1 | -0.66% | < .00001 |
| Market Model | 2175 | 2 | 0.51% | .000018 |
| Market Model | 2175 | 3 | 0.83% | < .00001. |
| Market Model | 2175 | 4 | -0.51% | < .00001 |
| Market Model | 2175 | 5 | -0.77% | < .00001. |
| Market Model | 2175 | 6 | -0.84% | < .00001 |
| Market Model | 2175 | 7 | 1.9% | < .00001. |
| Market Model | 2175 | 8 | 1.7% | < .00001. |
| Market Model | 2175 | 9 | 0.6% | < .00001. |
| Market Model | 2175 | 10 | -0.08% | <.353511. |
| Market Model | 2175 | (-10,10) | 6.9% |  |

The result of day 10 is not significant (<.353511), and 4 days before the event are not significant (0.165127). The result of 0 days is used to determine the result, which is significant at 0.00014; it is less than 0.05.

**4**. **Intergroup Comparison and Multiple Regression**

Intergroup comparison was used to test the H2 and H3 hypotheses. Chose date range 2022-01 to 2022 – 12. Apply company codes, and upload LPERMNO file. Variable in screen to be left as default. Selected SIC AND EMP.

Table 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Group | N | Mean CAR | Mean CAR diff | P- value independent sample T-test. |
| clothes manufacturing companies | 18 | -.0221059174 | 8%  (-.0832398466) | P=0.056 or <.001 |
| Other manufacturing companies | 1862 | 0.0611339216 |
| Large manufacturing companies | 1123 | 0.5748144705 | 7%  (0.0079052128) | <0.001 |
| Small manufacturing companies | 716 | 0.6538665983 |

Group 1 has a more negative impact than the 2nd group, so we go to the independent samples Test table and choose from the second row. The result from the significant two-sided level is <0.001. The result shows that the prediction is consistent with the result, and H2 is accepted.

H3: Shows the test result is significant, the prediction is consistent with the hypothesis, and H3 is accepted.

**Next step to test H2 in Model 2**

The manufacturing companies are divided into small and large companies.

* Large companies have 200 or more employees, and small companies have less than 200 employees.
* Analyse the data, compare means, click independent variables, and use 0.20 as the cut point for the employees' figures attached in the appendices.
* 2 Factors used are company type and company size.

A single regression model to compare the dependent variable (CAR) and independent variable (clothes), the type of manufacturing companies.

R2= 0.001, the R2 is always between 0 and 1 and could not be negative or higher than 1.

* ANOVA decides whether the model is significant, Df is N – 1 number of cases or companies. Total of 1880 companies in the regression. Sample size =df+1.
* The coefficient: The intercept is 0.061, and the slope is -0.083. The unstandardised column is looked at, which shows the actual intercept.
* The T value is an unstandardised Coefficient/coefficient standard error.

**Model**: CAR = 0.061 + -0.083 \* clothes.

The constant value is 0.061, and the coefficient is -0.083.

Did Ukraine War have a more negative or more positive impact on the stock returns of clothes manufacturing companies?

Should the H1 hypothesis be accepted or rejected?

The coefficient is used to determine the relationship between two variables to determine if the relationship is positive, negative or no relationship. An increase in CAR increases the clothes, and a negative value affects the other variable negatively.

The single regression has a coefficient value of -0.083. It has a negative effect on the relationship.

Both should move in the same direction, not just the significant level. The significant level for the result is 0.11, which is higher than the p-value of 0.05. We reject the hypothesis.

The clothes manufacturing company is negative and has a negative impact on the other manufacturing companies.

**5. Discussion.**

**H1: Impact of the Ukraine war on the stock prices in the manufacturing sector** (see Table 1).

The p-value was generated using the T score calculator, which correlates with the Excel result. Table 1 shows the result of Abnormal stock returns of the Ukraine war. N= 2175 with 10-day data. The highest abnormal return was determined on the day of +7 day, +8, and +6 day of the Ukraine war p<0.05.

The negative AR and CAR were before the war (-7 and -2 and p<0.05). Other days after the event date (+1-day, +4-day, + 5 days, +6-day, -10 day) have p<0.05, which is significant +10 and -4 have a negative abnormal return, which has p>0.05 and not significant. This event study will measure the Impact of the Ukraine War on companies' stock prices.

**The Multilinear Regression Model.**

2nd model used 2 independent variables, Clothes and EMP, for the coefficient. See Figure 25.

R2 = 0.10. ANOVA, df= N-1. The significant level is < 0.001.

N= Total number of companies is 1839.

The coefficient level is <0.001. Clothes and employees have negative effects.

**The second Multiple regression model (model 3)**

4 variables – sales/turnover, clothes, employees, and inventories.

R2= 0.15. Anova Df= N-1. Df= 1837.

Sample size = 1837. The significant level is <0.001.

**The Model Result for multiple regressions Comparison Table 3**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Model 1 | Model 2 | Model 3 |
| Intercept | -0.061 | 0.068 | -0.068(<0.001) |
| Clothes | -0.083 | -0.068 | -0.066 |
| Emp |  | -0.001 | -0.001 |
| Sales/Turnover |  |  | 3.065E-7 |
| Inventories |  |  | 6.380E-7 |
| N | 1880 | 1839 | 1838 |
| F | 2.522(p>0.11) | 9.353(<0.001) | 5.079 (<0.001). |
| R Square | 0.001 | -0.010 | 0.011 |

**Section 3: H1:**

The result was based on the historical period before and after the stock return of 2176 companies. Applied the market model, an event study method was used; two-tailed hypotheses were used to determine whether the abnormal returns differed from zero.

Data from 14 February 2022 – 7 March 2022 were used. February 24, 2022, was the date of the event, that is, the Ukraine war.

From a previous study, H1 and H2 were tested to determine the positive and negative abnormal returns obtained from stocks.

H1 is accepted based on the outcome, which is significant. The chart was used to derive the result and the output.

The Ukraine war has had a positive impact on stock prices.

Inventories were affected as a result of supply chain disruption due to the Ukraine war

**Section 4 result**: **Using the 2 hypotheses.**

Past research indicates that Ukraine's war led to a shortage of clothing in companies that outsourced production to Ukraine (Milewska Beata, 2022).

**Limitations**

Model 1- 3 results show differences in the number of companies. The results achieved in this research contained a 10-day event window from 14th February 2022 to 7th March 2022. Longer days are suggested for the study against the 10 days that have been applied. It is helpful for short-term investors. The effect of long and short periods can be assessed for future studies. Other areas in the manufacturing sector can be looked into, like food manufacturing, asides from the clothing companies. The research is limited to companies listed in the U.S. stock market. For future studies, the long-term effect of the current Ukraine war on the global supply chain could be examined (Maurya Prince et al., 2023).

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**Appendices**

**Figure 1. Clothes Manufacturing companies' SIC codes.**

|  |
| --- |
| **SIC codes** |
| 2300 |
| 2320 |
| 2330 |
| 2390 |

**Figure 2**

|  |
| --- |
| Mean Abnormal Return |
| 0.009696834 |
| 0.00576045 |
| 0.003295941 |
| -0.007069371 |
| 0.016023141 |
| 0.002328065 |
| 0.002491316 |
| -0.002651485 |
| -0.005551378 |
| 0.004514954 |
| 0.004155074 |
| -0.006639912 |
| 0.005083475 |
| 0.008311258 |
| -0.005110691 |
| -0.007650869 |
| -0.008415567 |
| 0.018685526 |
| 0.016760037 |
| 0.00695523 |
| -0.000873081 |
| 0.060098949 |

**Figure 3**

|  |
| --- |
| Probability, Cross-sectional t-statistic for Abnormal Return |
| 9.05351E-31 |
| 9.85534E-13 |
| 0.000624604 |
| 3.6279E-23 |
| 1.53721E-28 |
| 0.002770686 |
| 0.165098759 |
| 0.00096554 |
| 4.38464E-11 |
| 7.22665E-06 |
| 0.0001413 |
| 6.17244E-13 |
| 1.75745E-05 |
| 2.6653E-13 |
| 7.95497E-08 |
| 2.77212E-16 |
| 1.64892E-10 |
| 1.14603E-47 |
| 2.63921E-45 |
| 4.62513E-11 |
| 0.353325804 |

**Figure 4**

|  |
| --- |
| Probability, Cross-sectional t-statistic for Cumulative Abnormal Return(At the end of Event Window) |
| 7.18E-33 |
| 7.17671E-33 |
| 7.17671E-33 |
| 6.53997E-33 |
| 6.53997E-33 |
| 6.53997E-33 |
| 6.53997E-33 |
| 6.53997E-33 |
| 6.53997E-33 |
| 6.63355E-33 |
| 6.63355E-33 |
| 6.63355E-33 |
| 4.18133E-33 |
| 4.18133E-33 |
| 4.18133E-33 |
| 4.18133E-33 |
| 4.18133E-33 |
| 5.34124E-33 |
| 5.34124E-33 |
| 5.34124E-33 |
| 5.34124E-33 |

Figure 5

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Figure 6

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Figure 7

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Figure 8

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Figure 9

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Figure 10

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Figure 11

To test the hypotheses, the following screenshots and steps were taken

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Figure 12

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Figure 13

TO MERGE VARIABLES

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Figure 14

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**Figure 15**

**Merge table in SPSS (Multiple regression model)- includes other 4 factors used in the study (Clothes, emp, gross profit, sales, and inventories).**

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Figure 16

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Figure 17

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Figure 18

To compare 2 groups, you use the following.

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Figure 19

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Figure 20

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Figure 21

output for the H2 hypotheses

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Figure 22

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**1st model Figure 23**

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**Single regression 2nd model Figure 24**

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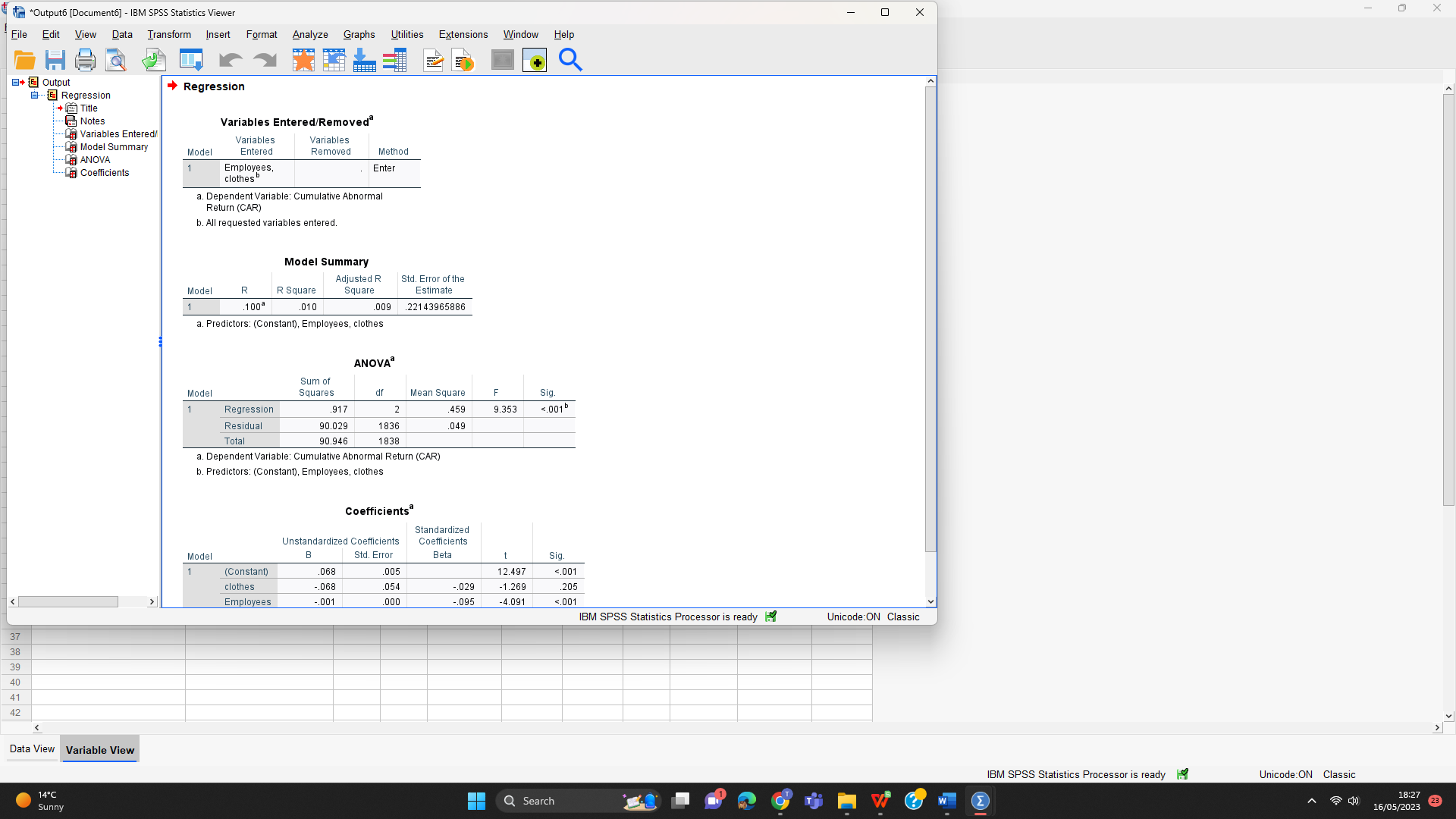
2nd model using two variables diagram is below. Figure 25

Figure 26

3rd model. A picture containing text, screenshot, software, computer

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