**Event Studies**

**Product Launch**

GROUP 3: ASSIGNMENT 2

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# Report

## Introduction

* This event study examines if a product launch will have a financial impact on the firm. We will use Excel, Python and SAS to perform two different models to evaluate if there is an abnormal return to the respected company during their product launch.

## Dataset: (Appendix B for [company and event date](#_Appendix_B:_Event))

* Data on holding period returns are collected from CRSP using WRDS using daily returns with 20 events from 10 companies that are traded on the US stock exchanges, with the first date being January 3, 1997, to September 24, 2021, with a total of 4400 observation for our first attempt (180 days) and 1800 observation for the alternative(50days).

## Test Statistics

* We will test the statistical significance using a T-test, given the sample size of 20. The significant level of our test is 95%
  + The null hypothesis (H0): H0: µ = 0; The alternative hypothesis (Ha): Ha: µ ≠ 0

## Model:

### Event window model

* An event study model using the [10-day event period](#_Event_Window) to calculate the standard deviation of the Cumulative Average Abnormal Return (CAAR).
  + We have also explored an [alternative of 5 days estimation period](#_Revision_2:_estimation) (using python)

### Estimation window model

* An event study model using the [180-day estimation period](#_Event_Window) to calculate the standard deviation of the CAAR.
  + We have also explored an [alternative of 50 days estimation period](#_Revision_1:_Estimation) (using python)

### Testing Procedures: (Appendix C for the [precise formulas](#_Model))

* The estimate of the normal return as the sample means of returns from the estimation window ([-180, -5](#_Event_Window)); revision 1: ([-54, -5](#_Event_Window));
* The Abnormal Return is calculated as the excess return during the event window (-4,5); revision 2: (-4,0).
* The Standardized Cumulative Average Abnormal Return (SCAAR) is calculated for each of the 20 companies' t-statistic of the CAARs for the respective company.

## Literature review

* The research conducted by Berk Talay, Billur Akdeniz, Michael Obal, and Janell D. Townsend aims to study the relationship between new product launches in international markets and firm performance, mainly the stock price. The time frame ranged from 2011 to 2018, with a sample of 1154 products in 34 categories launched in 48 countries collected in the study. Factors of national culture, product characteristics, firm size, GDP per capital and marketing intensity were considered in the study. As a result, products with high innovativeness positively affect substantial value. (Talay, Akdeniz, Obal, Townsend, 2019)

## 

## Analysis:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Event window model | | Estimation window model | |
| 180 days | 50 days (Revision 1) | 180 days | 50 days (Revision 1) |
| CAAR | [-0.24%](#_Excel_Summary_Statistics) | [0.68%](#_Excel_Summary_Statistics) | [-0.24](#_Excel_Summary_Statistics) | [0.68%](#_Excel_Summary_Statistics) |
| t-stat | [0.47](#_Estimation_Window_Model_1) | [0.75](#_Estimation_Window_Model_2) | [-0.04](#_Estimation_Window_Model_1) | [0.44](#_Event_Window_Model_1) |
| P-value | [0.64](#_Estimation_Window_Model) | [0.46](#_Estimation_Window_Model_2) | [0.96](#_Event_Window_Model) | [0.66](#_Event_Window_Model_1) |

The cumulative abnormal(µ) return within the event window(t1-t2) is [-0.24%](#_Excel_Summary_Statistics) for 180 days. According to the T-Table, the critical value for 5% confidence level two-tail test with 19 degrees of freedom is [2.093](#_T-table), in comparison, the t -statistics of our original proposal are significantly smaller. Similarly, the average abnormal return also [displayed a random pattern](#_Graph), where the daily average abnormal return for the 20 events during the event window indicated no visible way. Hence, we failed to reject the null hypothesis: H0: µ = 0

After a brief discussion among our group, we concluded that such a result might be our original proposed estimation window of 180 days is too extensive; it may have introduced noise, affecting the accuracy. Therefore, we might have falsely accepted the null hypothesis. We tested the model again by reducing the estimation window to 50 days, and all other parameters remained the same. The result of the first revision indicates our concern may be valid, given that the t-stat increased. Sadly, the t-stat of our first revision is still not significant enough to reject the Null hypothesis.

Likewise, given the result of the first revision, we decide to revise our event window to a shorter range. The rationale behind the revision is that be believed an extensive event window may introduce noise to lower the power of the test. Hence, we ran [revision two](#_Revision_2:_estimation) to examine if reducing the event window would further improve the t-stat that may be significant to reject the null hypothesis

|  |  |  |
| --- | --- | --- |
| Revision 2: estimation window is 50-days and the event window: is 5-days. | | |
|  | Event window model | Estimation window model |
| t-stat | [1.19](#_Estimation_Window_Model_3) | [1.16](#_Event_Window_Model_2) |
| P-value | [0.24](#_Estimation_Window_Model_3) | [0.26](#_Event_Window_Model_2) |

Identical to the first revision, the reduced event window increased the T- statistic further to [1.19](#_Estimation_Window_Model_3), which is still insignificant. At this point, all alternative is consistent with our original finding, such that we failed to reject H0 at a 5% confidence level.

The last concern is clustering. The closest events would be RTX3080 and iPhone13, which is slightly more than three months apart. Our original estimation window of 180 days could have caused clustering. Fortunately, given revision 1 with a reduced estimation window of 50 days, no events overlap; hence it is unlikely to cause clustering issues.

As a result, we have concluded that a new product launch may not financially impact a company. This is inconsistent with our expectations and the literature found, where we are expected product launch will have a financial impact on the firm. That being said, the contradiction is not surprising, given that our data selection is minimal compared to the literature. In addition, our studies have a small sample size, with only large-cap companies concentrating on a few industries within the United States. If we have more time, we would like to get a larger and more inclusive sample, with more sectors and companies size in mind. This study of product launches provides insight into a general return trend for the company involved, and we believe this study is helpful for shareholders and potential investors to speculate on possible abnormal returns following a breakthrough product.

# Appendix

## Appendix A: Event Window

Timeline

Description automatically generated

## Appendix B: Event date

Table

Description automatically generated

## Appendix C: Model

### Event Window Model

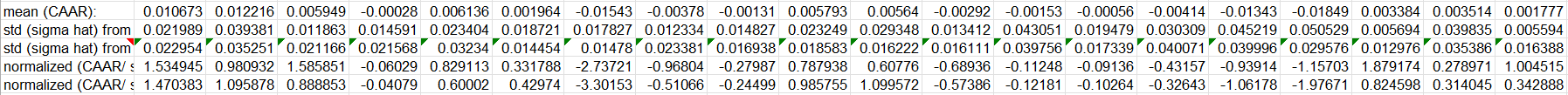
1. *t=*

### Estimation Window Model

1. *t=*

## Appendix D: Excel Summary Statistics





Graphical user interface, text, application, table, Excel

Description automatically generated

Text

Description automatically generated

### Excel Graph

Chart, line chart

Description automatically generated

Chart, line chart

Description automatically generated

## Appendix E: Python Summary Statistics

### Python code

#### Estimation Window Model Code

Graphical user interface, text, application

Description automatically generated

#### Event Window Model Code

Graphical user interface, text, application

Description automatically generated

### Estimation period 180

#### Estimation Window Model

Table

Description automatically generated with medium confidence

#### Event Window Model



### Revision 1: Estimation period 50

#### Estimation Window Model

Table

Description automatically generated with medium confidence

#### Event Window Model



### Revision 2: estimation period 50, event window:5

#### Estimation Window Model

A picture containing table

Description automatically generated

#### Event Window Model

Text

Description automatically generated

## Appendix F: SAS Summary Statistics

### SAS Code

Text

Description automatically generated

Text

Description automatically generated

### SAS Summary statics

Table

Description automatically generated

## Appendix G: T-table

Table

Description automatically generated

# References

Talay, M. B., Akdeniz, M. B., Obal, M., & Townsend, J. D. (2019). Stock Market Reactions to New Product Launches in International Markets: The Moderating Role of Culture. Journal of International Marketing, 27(4), 81–98. <https://doi.org/10.1177/1069031x19874789>