THE HONG KONG POLYTECHNIC UNIVERSITY
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Group Project

FTC's Lawsuit Loss Regarding Microsoft's Acquisition of Activision Blizzard

AF3316 Investment

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Outline

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  - Methods
  - Results
  - Discussion
- **Part II – Portfolio Analysis**
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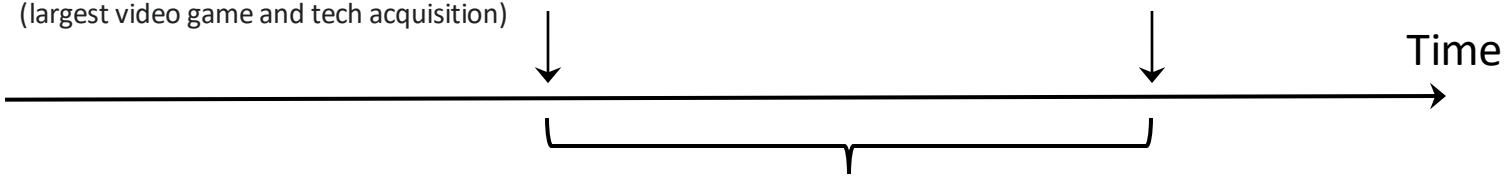
  - Market beta analysis for 2 groups before and after the event
  - Market beta analysis for 4 groups before and after the event
  - Small Firm Effect
  - Investment strategy recommendation

Part I - Background

- Activision Blizzard, Inc. is an American video game holding company. Activision Blizzard currently includes three operating units: Activision, Blizzard Entertainment and King.
- Among major intellectual properties produced by Activision Blizzard are:

Microsoft announced its intent to acquire Activision Blizzard for $68.7 billion on January 18, 2022.
(largest video game and tech acquisition)

Completed on October 13, 2023.



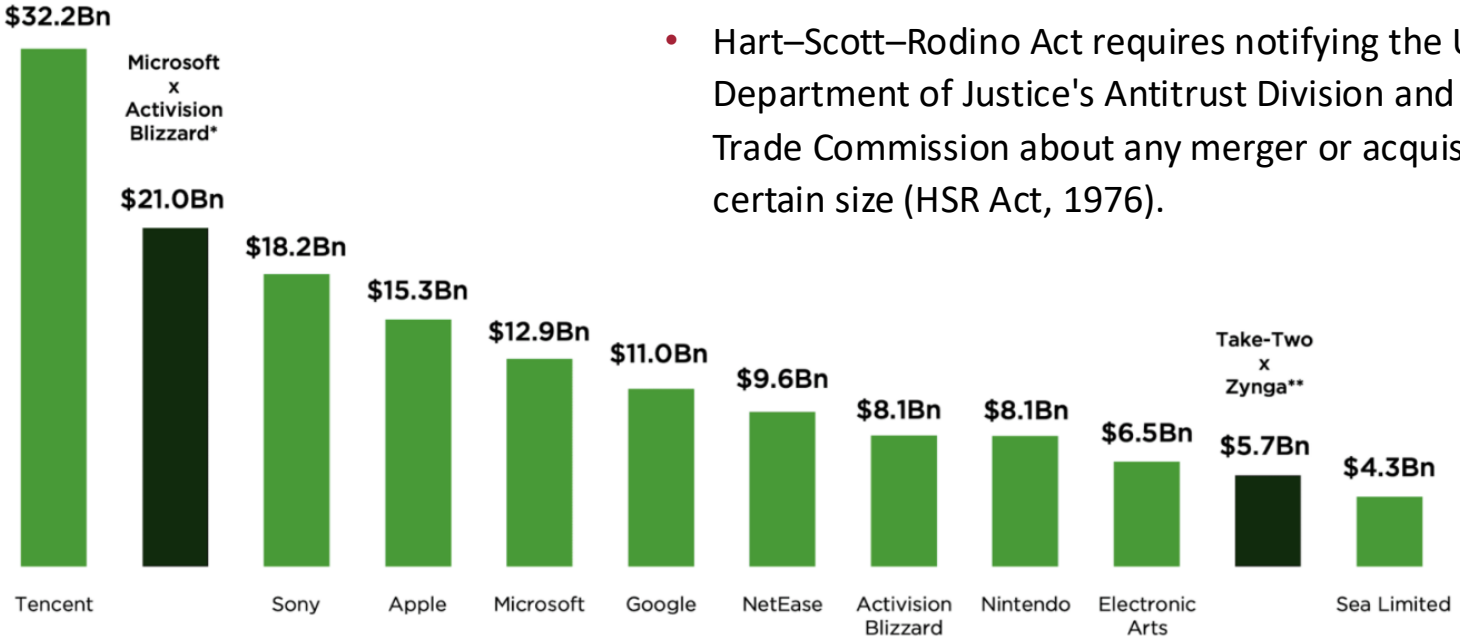
Why does this acquisition take almost two years ?

Part I - Background

- Key reason:

  Antitrust law

Top Companies by Game Revenues for 2021



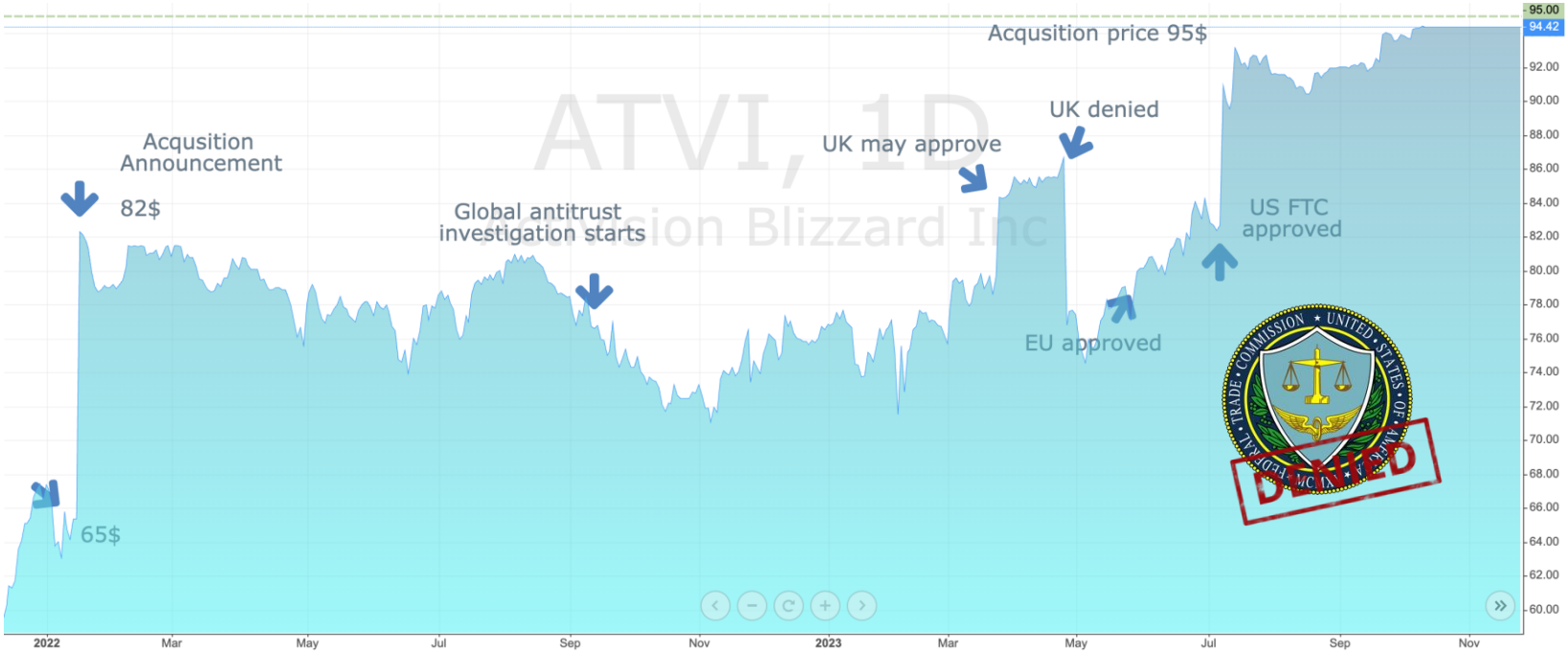
- Hart–Scott–Rodino Act requires notifying the U.S. Department of Justice's Antitrust Division and the Federal Trade Commission about any merger or acquisition over a certain size (HSR Act, 1976).

Part I - Background

- Pivotal event:

  US Federal Trade Commission (FTC) lost its lawsuit against Microsoft on July 11, 2023

Activision Blizzard Stock Price



Part I – Analysis before the event

- Companies Directly Affected:
  - Microsoft:

    On the one hand, This acquisition may strengthen the competitiveness of Microsoft's Xbox gaming platform and subscription services such as Xbox Game Pass, solidifying its influential position within the global gaming ecosystem (Kadirov, 2024).
    On the other hand, Investors might believe that Microsoft paid a premium for acquiring Activision Blizzard or took on debt to finance the acquisition.

    Thus, the company's stock price might not demonstrate significant fluctuations in response to this event.

  - Activision Blizzard:

    Before the July 11th court ruling, Activision Blizzard's stock traded at approximately $82 per share. Given Microsoft's proposed $95 per share acquisition price, it's reasonable to anticipate a significant upward pressure on the stock price as the deal approaches finalization.

Part I – Analysis before the event

- Major Competitors May Be Indirectly Affected:
  - Sony Group Corporation:

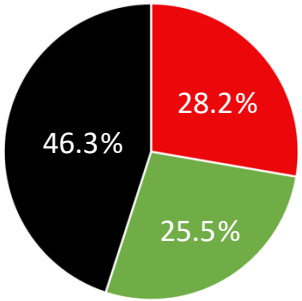
    Sony's PlayStation platform may confront exclusivity or timed-exclusivity risks regarding popular game titles like Call of Duty, potentially undermining Sony's user base and gaming ecosystem.

    Notably, Sony has emerged as one of the primary opponents in Microsoft's acquisition case of Activision Blizzard.

    Thus, these compounded challenges could trigger a noticeable decline in Sony's stock price.
  - Nintendo Co., Ltd.:

    The significant differences in user demographics and game genres between Nintendo and Activision Blizzard resulted in that this event is unlikely to affect its stock price substantially.

Global Console Gaming Market Company Share



Part I – Analysis before the event

- Broader Impact on the Gaming Industry and Partners:
  - After this acquisition, industry valuations for high-value IPs and large gaming companies may rise accordingly, potentially leading to accelerated industry consolidation. Therefore, some game publishers and developers (such as EA, Take-Two, Konami, etc.) could experience moderate increases in their stock prices due to these market dynamics.
  - Besides, the firms collaborating with Activision Blizzard in the gaming, entertainment, media, and technology industries may also experience mild stock price increases.
- Impacts on Future M&A Deals:
  - The FTC's defeat in this case may diminish its credibility. Other major corporations undergoing antitrust scrutiny at the time (such as Meta, Google, and Amazon) could potentially benefit from this outcome. While this constitutes an intriguing topic for discussion, we will concentrate the analysis on companies that experienced more direct and immediate impacts.

Part I – Methods

- The market reaction to the acquisition is measured by the Abnormal Returns (ARs), Average Abnormal Returns (AARs), and Average Cumulative Abnormal Returns (ACARs), which a market-adjusted model computes.

$$AR_{i,t} = R_{i,t} - R_{m,t} \quad (1)$$

Here, $AR_{i,t}$ is the abnormal return of stock i at time t, $R_{i,t}$ is the actual return of stock i at time t, $R_{m,t}$ is the S&P 500 index in the US at time t. All stock data used in this report are sourced from finance.yahoo.com.

- Correlation analysis is adopted for further investigation in sensitivity.

Part I – Methods

- Treatment Group: 15 stocks with high exposure to the event
- Control Group: 15 stocks with low exposure to the event but otherwise similar characteristics to the affected stocks

Treatment group and control group

Treatment Group		Control Group	
Company Name	**Ticker**	**Company Name**	**Ticker**
Activision Blizzard, Inc.	ATVI	AMC Entertainment Holdings, Inc.	AMC
ASUSTeK Computer Inc.	2357.TW	BANDAI NAMCO Holdings Inc.	7832.T
Electronic Arts Inc.	EA	DoubleUGames Co., Ltd.	192080.KS
Hasbro, Inc.	HAS	GungHo Online Entertainment, Inc.	3765.T
HTC Corporation	2498.TW	G-bits Network Technology (Xiamen) Co., Ltd.	603444.SS
International Games System Co.,Ltd.	3293.TWO	Kakao Games Corp.	293490.KQ
Konami Group Corporation	9766.T	Lions Gate Entertainment Corp.	LGF-A
Modern Times Group MTG AB	MTG-A.ST	NETDRAGON	0777.HK
Ourpalm Co., Ltd.	300315.SZ	Nintendo Co., Ltd.	7974.T
Paramount Global	PARA	Perion Network Ltd.	PERI
Pearl Abyss Corp.	263750.KQ	Pinterest, Inc.	PINS
Roku, Inc.	ROKU	Square Enix Holdings Co., Ltd.	9684.T
Take-Two Interactive Software, Inc.	TTWO	Tetra Tech, Inc.	TTEK
The Turtle Beach Corporation	TBCH	The Walt Disney Company	DIS
Unity Software Inc.	U	Tianyu Digital Technology (Dalian) Group Co., Ltd.	002354.SZ

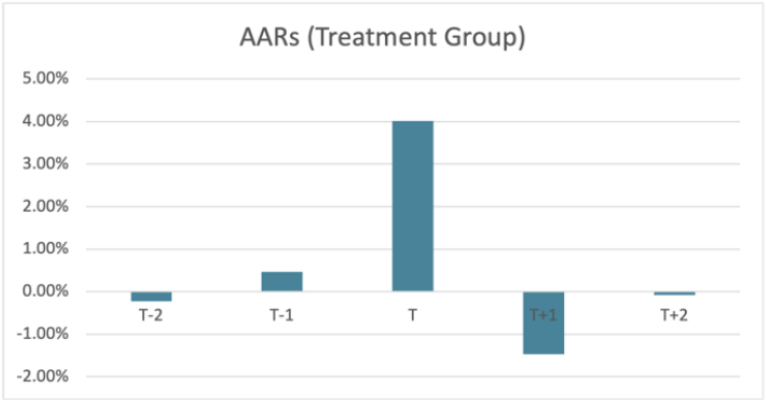
Part I – Results

Daily ARs of Treatment Group and Control Group

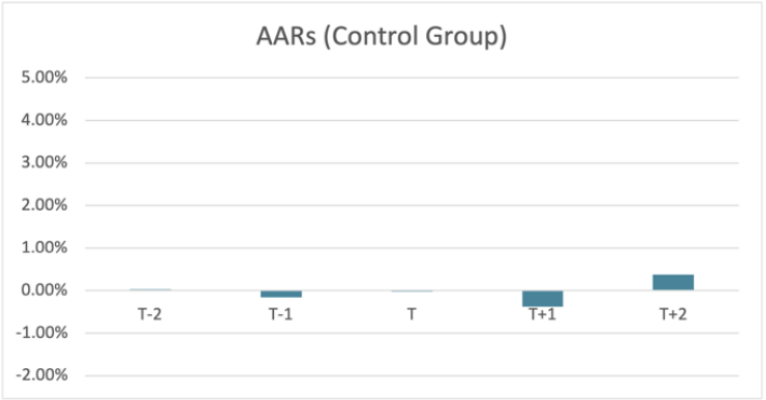
Treatment Group's AR						Control Group's AR					
Ticker	T-2	T-1	T	T+1	T+2	T-2	T-1	T	T+1	T+2	Ticker
ATVI	-0.04%	0.09%	9.35%	-1.83%	-1.36%	-1.81%	0.71%	2.87%	-0.51%	0.06%	AMC
2357.TW	-2.04%	-0.58%	0.70%	-0.57%	-1.19%	-1.57%	-1.85%	-0.57%	-0.13%	0.91%	7832.T
EA	-0.86%	0.80%	4.53%	-2.09%	0.07%	0.05%	0.25%	-0.19%	0.58%	2.59%	192080.KS
HAS	0.69%	-0.98%	0.47%	-0.62%	-0.11%	-0.50%	-1.39%	-0.52%	-2.02%	1.21%	3765.T
2498.TW	-1.29%	-1.31%	4.21%	-1.26%	0.36%	-0.35%	-0.09%	-2.80%	-2.00%	0.12%	603444.SS
3293.TWO	0.13%	1.57%	2.56%	-1.05%	-0.07%	-3.48%	-1.94%	3.66%	2.58%	3.97%	293490.KQ
9766.T	-0.72%	0.05%	1.28%	-2.14%	0.86%	3.16%	-0.46%	-3.35%	1.33%	-1.30%	LGF-A
MTG-A.ST	1.79%	-0.24%	3.03%	-0.03%	-2.27%	-0.39%	0.59%	0.28%	-0.20%	-0.04%	0777.HK
300315.SZ	-2.76%	1.49%	3.05%	-7.46%	-2.29%	0.88%	-0.96%	-1.43%	-0.05%	1.12%	7974.T
PARA	-0.80%	-0.55%	2.96%	-2.46%	0.84%	4.43%	1.95%	0.60%	0.18%	-2.12%	PERI
263750.KQ	0.49%	-1.24%	4.16%	-0.74%	1.46%	1.21%	-0.02%	3.36%	-0.22%	-1.34%	PINS
ROKU	2.29%	7.78%	10.47%	0.44%	-0.73%	0.45%	-0.57%	-2.36%	-0.53%	0.13%	9684.T
TTWO	0.51%	0.28%	4.06%	-1.29%	-1.27%	-0.02%	2.86%	-1.26%	-0.93%	-0.06%	TTEK
TBCH	-0.86%	1.28%	0.39%	0.05%	-1.89%	0.18%	-0.85%	0.91%	0.00%	-0.50%	DIS
U	0.07%	-1.48%	8.99%	-1.04%	6.36%	-1.82%	-0.70%	0.41%	-3.80%	0.73%	002354.SZ
Average	-0.23%	0.46%	4.01%	-1.47%	-0.08%	0.02%	-0.17%	-0.03%	-0.38%	0.37%	Average

Part I – Results

Daily AARs of Treatment Group



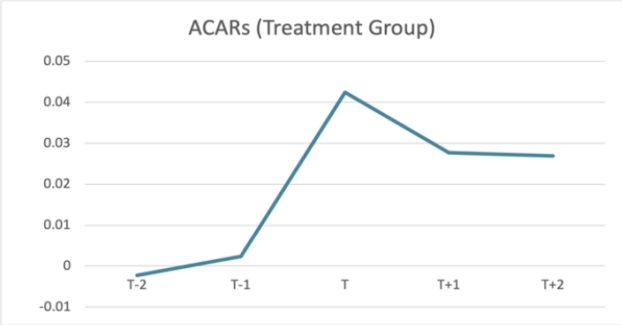
Daily AARs of Control Group



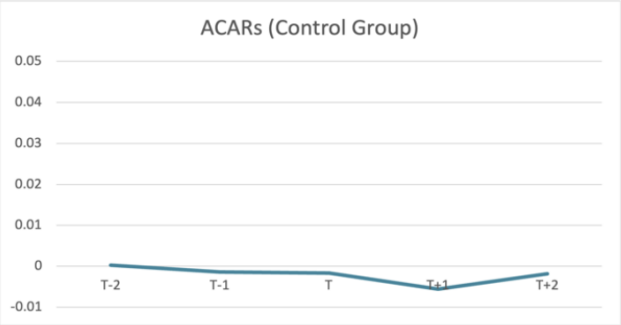
- Although the stock properties of the control group are similar to those of the treatment group, their stock prices showed no significant changes due to minimal impact from the event, with the AAR being merely -0.03% on day T. In contrast, the stock prices of the treatment group exhibited two distinct fluctuations. On Day T, the AAR suddenly increased from 0.46% on Day T-1 to 4.01%. By Day T+1, the AR had dropped to -1.47%. Among stocks of the treatment group, the most pronounced changes were observed in Activision Blizzard's stock price, where the AR surged to 9.35% on Day T, followed by consecutive declines of -1.83% and -1.36% on Day T+1 and Day T+2, respectively.

Part I – Results

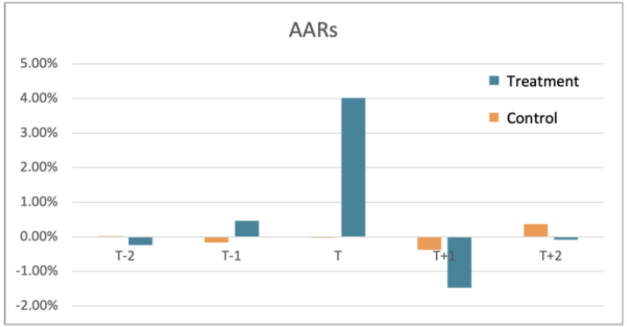
Daily ACARs of Treatment Group



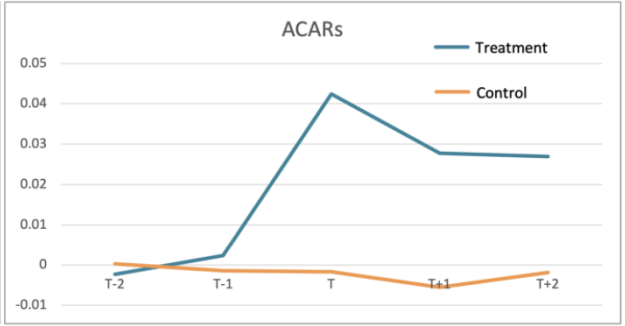
Daily ACARs of Control Group



Daily AARs Comparison



Daily ACARs Comparison



Part I – Results

Correlation Analysis

Treatment Group's Stock Returns Correlation Analysis						
Ticker	T-2	T-1	T	T+1	T+2	Correlation Coefficient
ATVI	-1.83%	0.04%	11.02%	-1.61%	-2.24%	/
Collaborating Group						
2357.TW	-2.04%	-0.58%	0.70%	-0.57%	-1.19%	71.22%
HAS	0.69%	-0.98%	0.47%	-0.62%	-0.11%	87.44%
PARA	-0.80%	-0.55%	2.96%	-2.46%	0.84%	78.05%
TBCH	-0.86%	1.28%	0.39%	0.05%	-1.89%	48.74%
U	0.07%	-1.48%	8.99%	-1.04%	6.36%	66.11%
Collaborating Group Average	-1.28%	-0.29%	4.12%	-0.32%	1.75%	82.36%
Peer Group						
EA	-0.86%	0.80%	4.53%	-2.09%	0.07%	92.03%
2498.TW	-1.29%	-1.31%	4.21%	-1.26%	0.36%	87.14%
3293.TWO	0.13%	1.57%	2.56%	-1.05%	-0.07%	87.14%
9766.T	-0.72%	0.05%	1.28%	-2.14%	0.86%	58.59%
MTG-A.ST	1.50%	0.00%	3.70%	0.71%	-1.42%	82.40%
300315.SZ	-2.76%	1.49%	3.05%	-7.46%	-2.29%	72.78%
263750.KQ	0.20%	-1.00%	4.84%	0.00%	2.31%	78.02%
ROKU	2.29%	7.78%	10.47%	0.44%	-0.73%	85.83%
TTWO	0.51%	0.28%	4.06%	-1.29%	-1.27%	99.04%
Peer Group Average	-0.18%	1.58%	4.64%	-0.97%	0.37%	94.07%
Treatment Group Average						
(Except Activision Blizzard)	-0.57%	0.91%	4.45%	-0.74%	0.86%	93.89%

Part I – Discussion

1. Following the court ruling on July 11, 2023, Activision Blizzard's stock price surged nearly 10% on the same day, rising from $82.7 to $90.99 per share. Before Microsoft's acquisition announcement on January 18, 2021, Activision Blizzard's share price stood at $65.39. This indicates that before the ruling, the market had priced in approximately a 58% probability of acquisition success ((82.7 - 65.39)/(95 - 65.39)). Post-ruling, the implied market probability increased to about 86% ((90.99 - 65.39)/(95 - 65.39)), reflecting a nearly 30% boost in market confidence regarding Microsoft's successful acquisition.

2. However, Activision Blizzard's stock price experienced consecutive declines on day T+1 and day T+2. This suggests the market might have overreacted initially. Studies show that stock prices often exhibit short-term reversals following shocks (Atkins & Dyl, 1990; Brown & Harlow, 1988). This finding supports the Semi-Strong Form Market Efficiency to some extent.

3. The correlation analysis revealed that the stock prices of the Peer Group exhibited a correlation coefficient of approximately 94%, nearly 12% higher than that of the Collaborating Group, suggesting Peer Group stocks may be more sensitive to this event.

Part II – Market beta analysis

- Period: October 2020 to December 2024
- Capital Asset Pricing Model (CAPM) is used.

$$E(r_i) = r_f + \beta_i[E(r_M) - r_f] \quad (2)$$

- A regression analysis is conducted using β_i as the independent variable and $E(r_i - r_f)$ as the dependent variable.

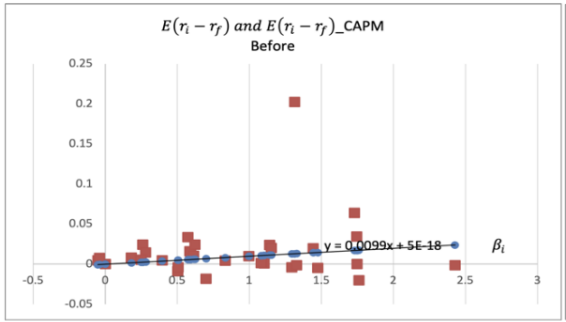
1. 30 Stocks
2. Treatment Group and Control Group
3. 4 groups: Control & Small (C&S), Control & Big (C&B), Treatment & Small (T&S), and Treatment & Big (T&B).

Part II – Market beta analysis for 30 stocks

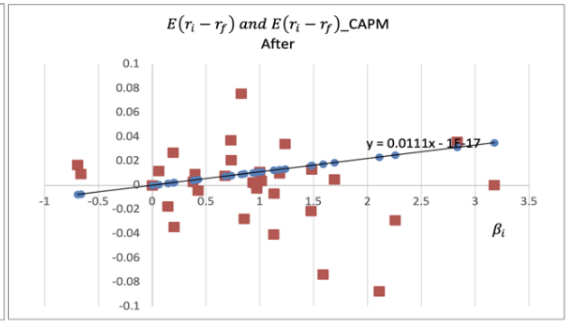
Average Return, β, α for 30 stocks

	Average Return	β	α
Before	1.70%	92.02%	0.68%
After	0.36%	98.28%	-1.16%

$E(r_i - r_f)$ *and* $E(r_i - r_f)$*_CAPM Before*



$E(r_i - r_f)$ *and* $E(r_i - r_f)$*_CAPM After*



Regression Analysis of β for 30 stocks

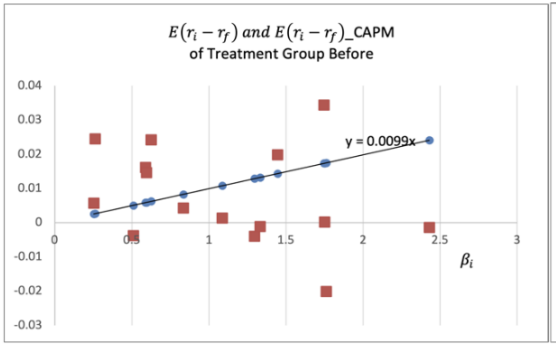
	R^2	β Coefficients	P-value
Before	1.81%	0.82%	46.25%
After	4.34%	-0.75%	25.25%

Part II – Market beta analysis for 2 groups

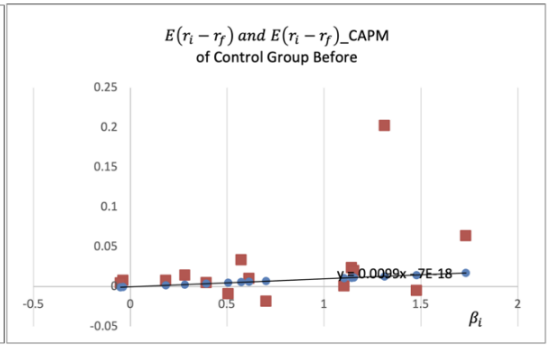
Average Return, β, α for the Treatment Group and Control Group Before the event

Before	Average Return	β	α
Treatment	0.87%	74.00%	1.69%
Control	2.53%	110.05%	-0.33%

$E(r_i - r_f)$ and $E(r_i - r_f)$_CAPM of Treatment Group Before the event



$E(r_i - r_f)$ and $E(r_i - r_f)$_CAPM of Control Group Before the event



Regression Analysis of β for Treatment Group and Control Group Before the Event

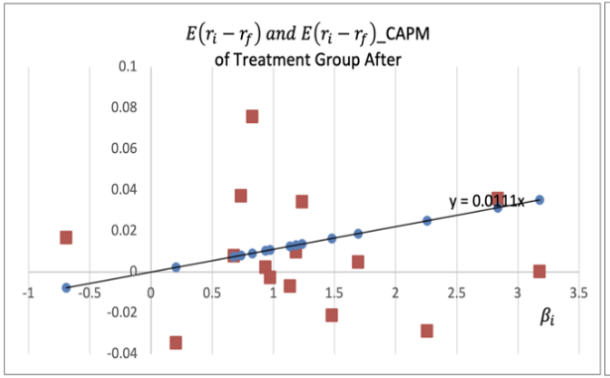
Before	R^2	β Coefficients	P-value
Treatment	8.91%	-0.66%	27.97%
Control	16.73%	3.91%	13.01%

Part II – Market beta analysis for 2 groups

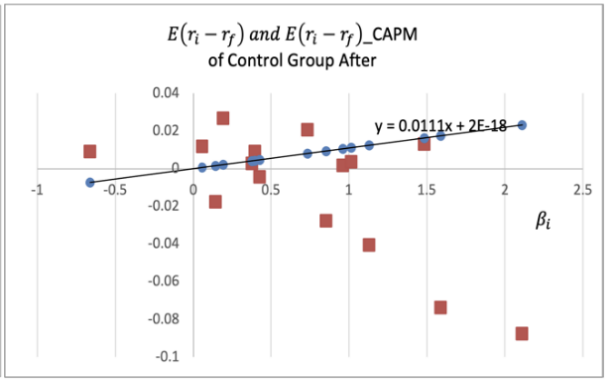
Average Return, β, α for Treatment Group and Control Group After the event

After	Average Return	β	α
Treatment	1.30%	124.37%	-0.50%
Control	-0.58%	72.19%	-1.81%

$E(r_i - r_f)$ and $E(r_i - r_f)$_CAPM of Treatment Group After the event



$E(r_i - r_f)$ and $E(r_i - r_f)$_CAPM of Control Group After the event



Regression Analysis of β for Treatment Group and Control Group After the Event

After	R^2	β Coefficients	P-value
Treatment	0.45%	-0.20%	81.20%
Control	44.81%	-3.23%	0.63%

Part II – Market beta analysis for 4 groups

Control & Small, Control & Big, Treatment & Small, and Treatment & Big Groups and Their Sizes(USD)

Control & Small	Size	Treatment & Small	Size
PERI	312,558,171	MTG-A.ST	41,301,606
LGF-A	560,730,381	TBCH	359,879,231
TTEK	5,106,488,451	HAS	9,723,562,862
002354.SZ	6,072,345,250	PARA	16,066,468,130
0777.HK	6,641,117,430	300315.SZ	17,708,307,218
AMC	10,194,020,542		

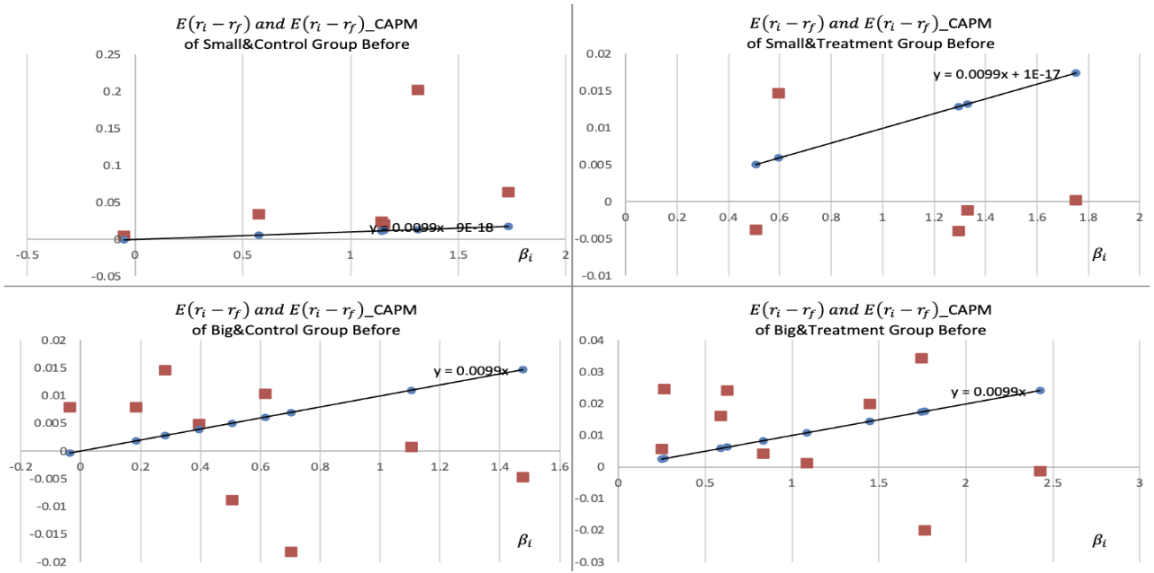
Control & Big	Size	Treatment & Big	Size
603444.SS	28,485,265,338	2498.TW	23,949,576,637
PINS	35,080,615,376	ROKU	26,056,975,214
3765.T	133,355,686,351	TTWO	27,342,759,997
DIS	216,519,727,477	EA	30,465,982,134
9684.T	686,198,162,502	U	38,869,013,316
192080.KS	941,851,449,119	3293.TWO	39,168,170,999
7832.T	1,582,044,477,667	ATVI	58528474620
293490.KQ	3,693,870,314,400	2357.TW	133,084,535,280
7974.T	5,825,007,013,820	9766.T	518,563,046,551
		263750.KQ	2,462,917,940,000

Part II – Market beta analysis for 4 groups

Average return, β, α for C&S, C&B, T&S, and T&B Groups Before and After the Event

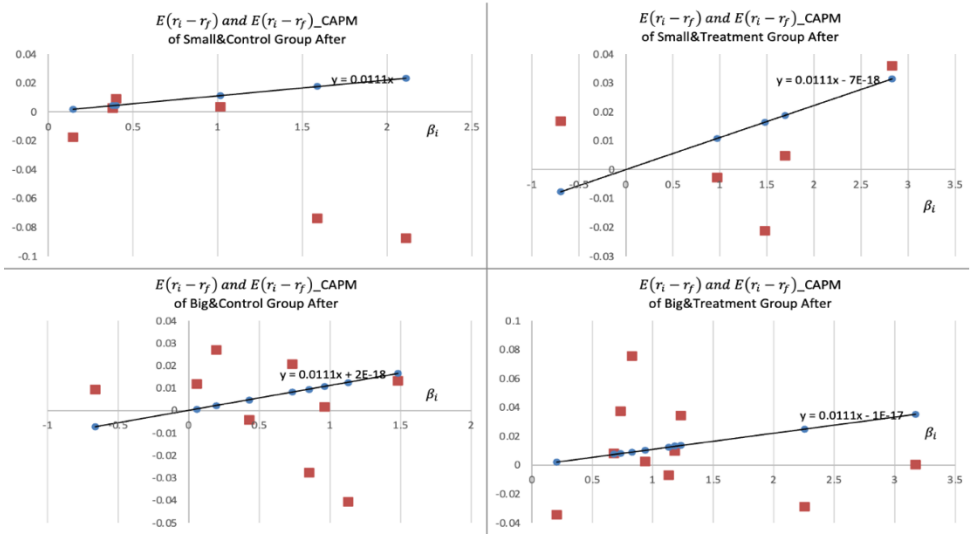
Before	Average Return	β	α	After	Average Return	β	α
C&S	5.92%	97.82%	4.84%	C&S	-2.28%	94.02%	-3.76%
C&B	0.28%	58.11%	-0.41%	C&B	0.56%	57.64%	-0.51%
T&S	0.23%	109.59%	-0.97%	T&S	1.10%	125.72%	-0.72%
T&B	1.20%	110.28%	-0.01%	T&B	1.40%	123.70%	-0.40%

$E(r_i - r_f)$ and $E(r_i - r_f)$_CAPM of C&S, C&B, T&S, and T&B Before the Event



Part II – Market beta analysis for 4 groups

$E(r_i - r_f)$ and $E(r_i - r_f)$_CAPM of C&S, C&B, T&S, and T&B After the Event



Regression Analysis of β for C&S, C&B, T&S, and T&B Before and After the Event

Before	R^2	β Coefficients	P-value	After	R^2	β Coefficients	P-value
C&S	21.05%	5.37%	36.00%	C&S	73.88%	-4.70%	2.82%
C&B	21.67%	-1.03%	20.67%	C&B	13.01%	-1.24%	34.03%
T&S	13.89%	-0.55%	53.67%	T&S	4.05%	0.33%	74.55%
T&B	9.83%	-0.69%	37.78%	T&B	3.59%	-0.72%	59.98%

Part II – Market beta analysis and small firm effect

- It can be observed that the CAPM doesn't hold for any group, indicating that beta fails to account for the average returns among groups. One possible explanation is that other factors exist besides beta.

- However, according to calculations based on the table below, the time-weighted average return for small firms is approximately 3.6%, about 2% higher than that for large firms. This result supports the existence of the long-term Small Firm Effect and violates the semi-strong form of the Efficient Market Hypothesis.

Average return, β, α for C&S, C&B, T&S, and T&B Groups Before and After the Event

Before	Average Return	β	α	After	Average Return	β	α
C&S	5.92%	97.82%	4.84%	C&S	-2.28%	94.02%	-3.76%
C&B	0.28%	58.11%	-0.41%	C&B	0.56%	57.64%	-0.51%
T&S	0.23%	109.59%	-0.97%	T&S	1.10%	125.72%	-0.72%
T&B	1.20%	110.28%	-0.01%	T&B	1.40%	123.70%	-0.40%

Part II – Investment strategy recommendation

1. Since CAPM is invalid in this case, the alpha calculated based on it may include errors that are not captured by beta. Therefore, using the CAPM's alpha for long-short strategies may be ineffective, as there is bias in alpha itself. (Other factors? Factor investing in quantitative finance)

2. Although there's small firm effect during the whole period, small-cap strategy doesn't perform well after the event.

3. If investors are optimistic about the value enhancement that Microsoft's acquisition of Activision Blizzard will bring to the treatment group (i.e. they want to hold some of stocks from the treatment group), A natural and simple strategy is recommended by this report as follows:

    1. Use the monthly data before the event to find the Sharpe ratio for each stock in Treatment group. (The Sharpe ratio is $[E(r_i)\text{-}E(r_f)]$ divided by SD(r_i))

    2. Select those with higher Sharpe ratio than market and form a portfolio with weights that maximize the Sharpe ratio of the portfolio (Assume momentum effect is valid).

Part II – Investment strategy recommendation

New Portfolio

Tickers	2357.TW	3293.TWO	9766.T
Weights	0.2402	0.3218	0.3218

New Portfolio Performance after the event

After	Average Return	Standard Deviation	Sharpe Ratio
New Portfolio	0.05764	0.06842	0.77921
^GSPC	0.01538	0.03812	0.29003
Treatment Group	0.00362	0.04550	-0.01537

- The newly constructed portfolio shows that the strategy performs well in this case.

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https://github.com/xuanay/AF3316-Group-Project