

# Today's Agenda

Using OLS regressions to analyze the stock market

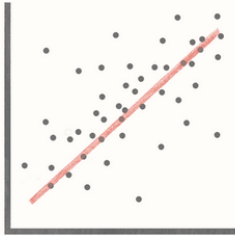
- Download the stock market data from Moodle

Justin Leinaweaver (Spring 2022)

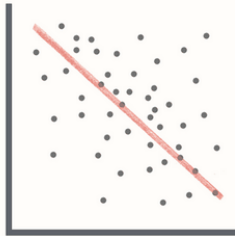
# Analyzing the Stock Market with OLS



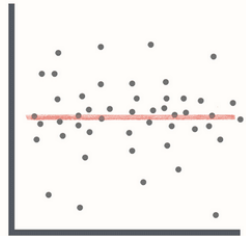
# Analyzing the Stock Market with OLS



**Positive Correlation**



**Negative Correlation**



**No Correlation**

# Analyzing the Stock Market with OLS

What does the 'beta' tell us about a stock?

# Analyzing the Stock Market with OLS

## KEY TAKEAWAYS

- Beta indicates how volatile a stock's price is in comparison to the overall stock market.
- A beta greater than 1 indicates a stock's price swings more wildly (i.e., more volatile) than the overall market.
- A beta of less than 1 indicates that a stock's price is less volatile than the overall market.
- A beta of 1 indicates the stock moves identically to the overall market.

# Analyzing the Stock Market with OLS

What does the 'alpha' tell us about a stock?

# Analyzing the Stock Market with OLS

## KEY TAKEAWAYS

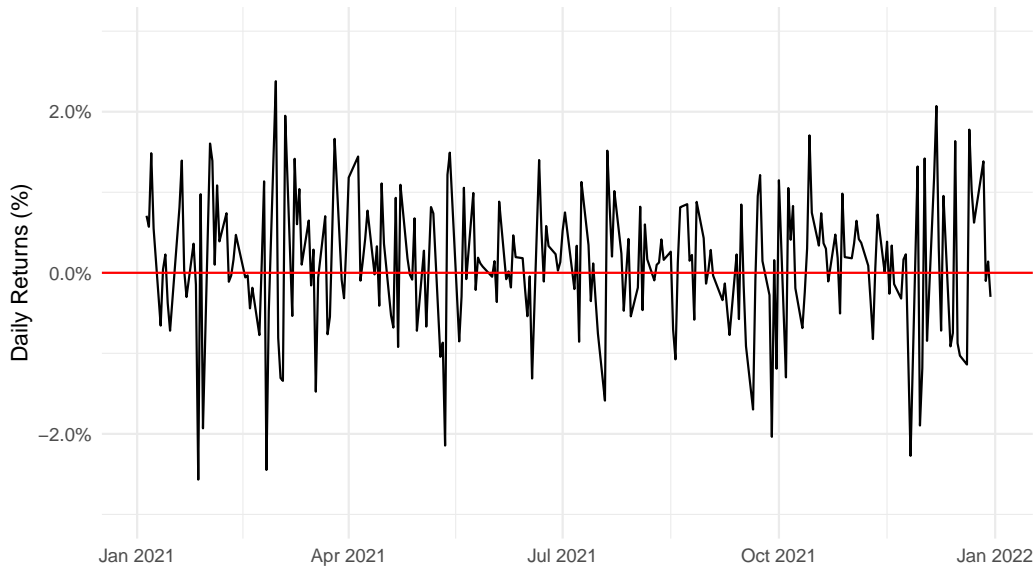
- Alpha refers to excess returns earned on an investment above the benchmark return.
- Active portfolio managers seek to generate alpha in diversified portfolios, with diversification intended to eliminate unsystematic risk.
- Because alpha represents the performance of a portfolio relative to a benchmark, it is often considered to represent the value that a portfolio manager adds to or subtracts from a fund's return.

# Let's Analyze the Market in 2021

	A	B	C	D	E	F
1	date	SP500	WMT	ZM	SIX	YETI
2	2021-01-04	3700.649902	144.236267	359.980011	33.189999	68.480003
3	2021-01-05	3726.860107	143.468491	360.829987	33.209999	69.620003
4	2021-01-06	3748.139893	144.364258	344.410004	36	71.290001
5	2021-01-07	3803.790039	144.354401	342.5	35.790001	72.559998
6	2021-01-08	3824.679932	144.334702	349.609985	35.57	73.480003
7	2021-01-11	3799.610107	144.984375	337.709991	35.560001	75.949997
8	2021-01-12	3801.189941	146.638107	356.809998	35.82	78.040001
9	2021-01-13	3809.840088	145.141876	364.630005	36.02	77.839996
10	2021-01-14	3795.540039	144.669388	383.23999	36.689999	77.5
11	2021-01-15	3768.25	142.37587	384.529999	36.509998	74.010002
12	2021-01-19	3798.909912	141.145447	393.869995	37.209999	69.169998
13	2021-01-20	3851.850098	143.232239	382.799988	37.619999	71.349998
14	2021-01-21	3853.070068	142.582596	382.809998	36.720001	71.650002
15	2021-01-22	3841.469971	144.039413	383.399994	35.360001	70.209999
16	2021-01-25	3855.360107	143.911453	391.829987	35.139999	70.059998



## S&P 500



# Let's Analyze Four Stocks

	A	B	C	D	E	F
1	date	SP500	WMT	ZM	SIX	YETI
2	2021-01-04	3700.649902	144.236267	359.980011	33.189999	68.480003
3	2021-01-05	3726.860107	143.468491	360.829987	33.209999	69.620003
4	2021-01-06	3748.139893	144.364258	344.410004	36	71.290001
5	2021-01-07	3803.790039	144.354401	342.5	35.790001	72.559998
6	2021-01-08	3824.679932	144.334702	349.609985	35.57	73.480003
7	2021-01-11	3799.610107	144.984375	337.709991	35.560001	75.949997
8	2021-01-12	3801.189941	146.638107	356.809998	35.82	78.040001
9	2021-01-13	3809.840088	145.141876	364.630005	36.02	77.839996
10	2021-01-14	3795.540039	144.669388	383.23999	36.689999	77.5
11	2021-01-15	3768.25	142.37587	384.529999	36.509998	74.010002
12	2021-01-19	3798.909912	141.145447	393.869995	37.209999	69.169998
13	2021-01-20	3851.850098	143.232239	382.799988	37.619999	71.349998
14	2021-01-21	3853.070068	142.582596	382.809998	36.720001	71.650002
15	2021-01-22	3841.469971	144.039413	383.399994	35.360001	70.209999
16	2021-01-25	3855.360107	143.911453	391.829987	35.139999	70.059998

$$\text{Rate} = (\text{Current} / \text{Last}) - 1$$

C6		$f_x \Sigma$	=	=B6/B5 - 1
	A	B	C	
1	date	SP500	SP_rate	
2	2021-01-04	3700.649902		
3	2021-01-05	3726.860107	0.0070826	
4	2021-01-06	3748.139893	0.00570984	
5	2021-01-07	3803.790039	0.0148474	
6	2021-01-08	3824.679932	0.00549186	
7	2021-01-11	3799.610107		
8	2021-01-12	3801.189941		

$$\text{Rate} = (\text{Current} / \text{Last}) - 1$$

	A	B	C	D	E	F	G	H	I	J	K
1	date	SP500	sp_rate	WMT	wmt_rate	ZM	zm_rate	SIX	six_rate	YETI	yeti_rate
2	2021-01-04	3700.65		144.24		359.98		33.19		68.48	
3	2021-01-05	3726.86	0.007	143.47	-0.005	360.83	0.002	33.21	0.001	69.62	0.017
4	2021-01-06	3748.14	0.006	144.36	0.006	344.41	-0.046	36.00	0.084	71.29	0.024
5	2021-01-07	3803.79	0.015	144.35	0.000	342.50	-0.006	35.79	-0.006	72.56	0.018
6	2021-01-08	3824.68	0.005	144.33	0.000	349.61	0.021	35.57	-0.006	73.48	0.013
7	2021-01-11	3799.61	-0.007	144.98	0.005	337.71	-0.034	35.56	0.000	75.95	0.034
8	2021-01-12	3801.19	0.000	146.64	0.011	356.81	0.057	35.82	0.007	78.04	0.028
9	2021-01-13	3809.84	0.002	145.14	-0.010	364.63	0.022	36.02	0.006	77.84	-0.003
10	2021-01-14	3795.54	-0.004	144.67	-0.003	383.24	0.051	36.69	0.019	77.50	-0.004
11	2021-01-15	3768.25	-0.007	142.38	-0.016	384.53	0.003	36.51	-0.005	74.01	-0.045
12	2021-01-19	3798.91	0.008	141.15	-0.009	393.87	0.024	37.21	0.019	69.17	-0.065

$$\text{Rate} = (\text{Current} / \text{Last}) - 1$$

	A	B	C	D
1	date	SP500	sp_rate	sp_investment
2	2021-01-04	3700.65		\$100.00
3	2021-01-05	3726.86	0.007	\$100.71
4	2021-01-06	3748.14	0.006	\$101.28
5	2021-01-07	3803.79	0.015	\$102.79
6	2021-01-08	3824.68	0.005	\$103.35
7	2021-01-11	3799.61	-0.007	\$102.67
8	2021-01-12	3801.19	0.000	\$102.72
9	2021-01-13	3809.84	0.002	\$102.95
10	2021-01-14	3795.54	-0.004	\$102.56
11	2021-01-15	3768.25	-0.007	\$101.83
12	2021-01-19	3798.91	0.008	

# Analyzing the Stock Market with OLS

Market: S&P 500

Analyze: Walmart, Zoom, Six Flags and Yeti

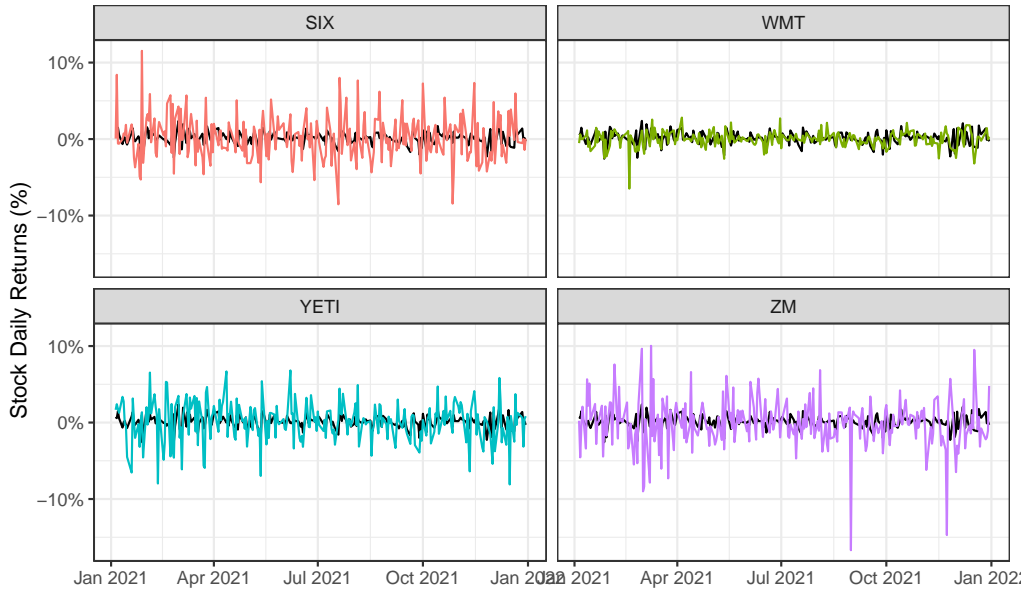
## For Each Stock:

- 1 Regression: Calculate the alpha and the beta
- 2 Line plot: Market vs Stock Returns
- 3 Result of \$100 investment in 2021?

	WMT	ZM	SIX	YETI
	(1)	(2)	(3)	(4)
SP500	0.50* (0.07)	1.00* (0.24)	1.48* (0.20)	1.62* (0.17)
Constant	-0.001 (0.001)	-0.003 (0.002)	-0.0002 (0.002)	-0.001 (0.001)
Observations	250	250	250	250
Adjusted R <sup>2</sup>	0.15	0.06	0.17	0.26
Residual Std. Error (df = 248)	0.01	0.03	0.03	0.02
F Statistic (df = 1; 248)	45.22*	17.69*	52.40*	87.21*

*Note:*

\*p<0.05





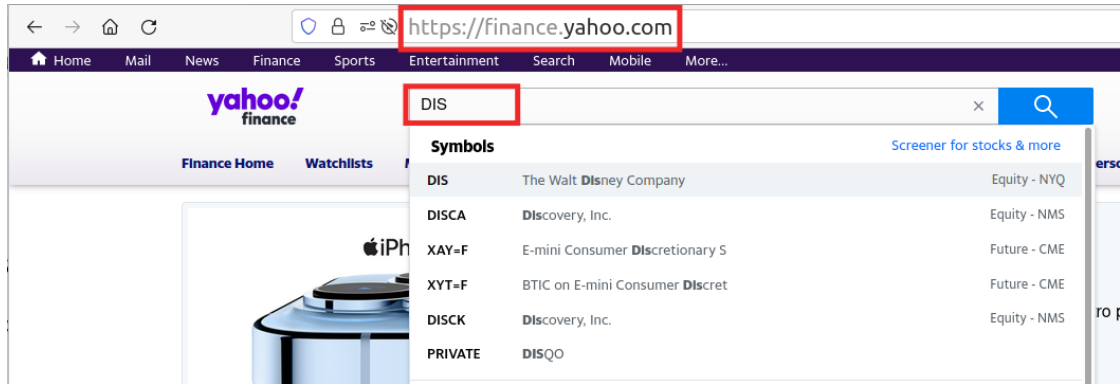
	WMT	ZM	SIX	YETI
	(1)	(2)	(3)	(4)
SP500	0.50* (0.07)	1.00* (0.24)	1.48* (0.20)	1.62* (0.17)
Constant	−0.001 (0.001)	−0.003 (0.002)	−0.0002 (0.002)	−0.001 (0.001)
Observations	250	250	250	250
Adjusted R <sup>2</sup>	0.15	0.06	0.17	0.26
Residual Std. Error (df = 248)	0.01	0.03	0.03	0.02
F Statistic (df = 1; 248)	45.22*	17.69*	52.40*	87.21*

*Note:*

\*p<0.05

invest_sp500	invest_wmt	invest_zm	invest_six	invest_yeti
\$129.13	\$99.26	\$52.93	\$127.39	\$120.3

# Yahoo Finance: Download Historical Data



The screenshot shows the Yahoo Finance website interface. The browser's address bar displays `https://finance.yahoo.com`. The navigation bar includes links for Home, Mail, News, Finance, Sports, Entertainment, Search, Mobile, and More... The Yahoo Finance logo is visible, along with links for Finance Home and Watchlists. A search bar contains the text 'DIS', and a dropdown menu titled 'Symbols' is open, listing various financial instruments.

Symbols		
DIS	The Walt Disney Company	Equity - NYQ
DISCA	Discovery, Inc.	Equity - NMS
XAY=F	E-mini Consumer Discretionary S	Future - CME
XYT=F	BTIC on E-mini Consumer Discret	Future - CME
DISCK	Discovery, Inc.	Equity - NMS
PRIVATE	DISQO	

# Yahoo Finance: Download Historical Data

## The Walt Disney Company (DIS)

NYSE - Nasdaq Real Time Price. Currency in USD

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**151.94** -0.22 (-0.15%)

As of 01:13PM EST. Market open.

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Time Period: Dec 31, 2020 - Dec 30, 2021 ▾

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Frequency: Daily ▾

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Currency in USD

Date	Open	High	Low	Close*	Adj Close**	Volume
Dec 30, 2021	155.71	157.07	155.51	155.93	155.93	7,228,400

# Prep the New Data

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Adj Close	Volume
2	2021-01-04	182.259995	182.589996	174.729996	177.679993	177.679993	13426600
3	2021-01-05	176.199997	180.339996	176.199997	178.440002	178.440002	7771800
4	2021-01-06	178.320007	181.610001	177.279999	179.119995	179.119995	7517800
5	2021-01-07	179.5	179.949997	177.580002	178.580002	178.580002	7300800
6	2021-01-08	178.809998	180.020004	176.600006	178.690002	178.690002	7894500
7	2021-01-11	177.75	181.259995	177.350006	179.089996	179.089996	6461300
8	2021-01-12	177.300003	178.320007	174.860001	175.990005	175.990005	8349800
9	2021-01-13	174.399994	177.729996	173.740005	176.119995	176.119995	6839500
10	2021-01-14	177.009995	178.350006	173.399994	173.429993	173.429993	8951200
11	2021-01-15	172.949997	174.190002	170.169998	171.440002	171.440002	12232500
12	2021-01-19	172.100006	173.710007	171.440002	172.259995	172.259995	7834700
13	2021-01-20	175.220001	177.880005	173	173.639999	173.639999	9809200
14	2021-01-21	173.240005	175	171.020004	171.279999	171.279999	8416400

# Prep the New Data

	A	B	C
1	Date	Adj Close	DIS_rate
2	2021-01-04	177.679993	
3	2021-01-05	178.440002	0.004277403
4	2021-01-06	179.119995	0.003810765
5	2021-01-07	178.580002	-0.0030147
6	2021-01-08	178.690002	0.00061597
7	2021-01-11	179.089996	0.00223848
8	2021-01-12	175.990005	-0.01730968
9	2021-01-13	176.119995	0.000738621
10	2021-01-14	173.429993	-0.01527369
11	2021-01-15	171.440002	-0.01147432
12	2021-01-19	172.259995	0.004782974
13	2021-01-20	173.639999	0.008011169

# Prep the New Data

	A	B	C	D
1	date	SP500	sp_rate	DIS_rate
2	2021-01-04	3700.65		
3	2021-01-05	3726.86	0.007	0.004
4	2021-01-06	3748.14	0.006	0.004
5	2021-01-07	3803.79	0.015	-0.003
6	2021-01-08	3824.68	0.005	0.001
7	2021-01-11	3799.61	-0.007	0.002
8	2021-01-12	3801.19	0.000	-0.017
9	2021-01-13	3809.84	0.002	0.001
10	2021-01-14	3795.54	-0.004	-0.015
11	2021-01-15	3768.25	-0.007	-0.011
12	2021-01-19	3798.91	0.008	0.005
13	2021-01-20	3851.85	0.014	0.008
14	2021-01-21	3853.07	0.000	-0.014
15	2021-01-22	3841.47	-0.003	0.009
16	2021-01-25	3855.36	0.004	-0.005