Can I Beat the Pros at Investing in the Markets?

A study of Financial Stock predicting

What do you think?

- **World's Top 10 Hedge Fund Firms**
- Blackrock Advisors.
- AQR Capital Management.
- Bridgewater Associates.
- Renaissance Technologies.
- Man Group.
- Elliott Management.
- Two Sigma Investments.
- Millennium Management.

Objective

- to develop a model to predict stock movements, either predict stock price level, or identify positive or negative movements. More specifically we'd like to identify when the market might turn.

- Leverage Sentiment Analysis via Twitter data and historical Stock price data
- Turns out this is a lot harder than it looks (duh!).

Twitter Data

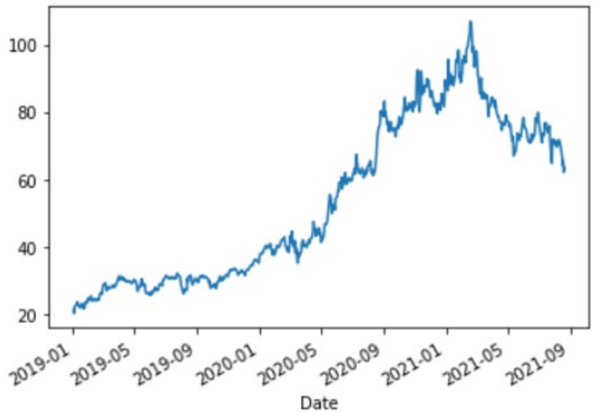
- API does not provide historical data. Need to download manually.

	created_at	text	retweet_count	favourite_count	date	month	week	day	sentiment
0	2021-08-24 21:52:06	The Nasdaq surpassed the 15,000 level for the ...	34	163	2021-08-24 21:52:06	8	34	24	0.7269
1	2021-08-25 09:31:14	US stock futures tread water after S&P 500...	9	14	2021-08-25 09:31:14	8	34	25	0.0000
2	2021-08-25 15:30:06	Join me & my @cfraresearch colleagues for ...	0	0	2021-08-25 15:30:06	8	34	25	0.2960
3	2021-08-25 15:24:51	@MacroAlf @CyberSpaceGal Based on Pe ratios of...	0	0	2021-08-25 15:24:51	8	34	25	0.4215
4	2021-08-25 15:22:56	Excess fiscal and #FederalReserve pumped liqui...	0	1	2021-08-25 15:22:56	8	34	25	-0.1513

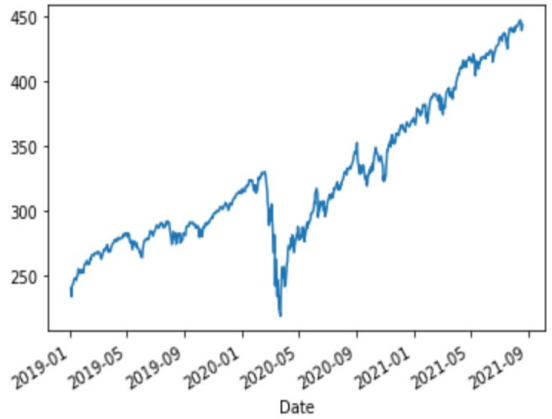
Yahoo Finance Time Series Data

- Yahoo Finance has an API that allows us to extract historical stock price data which we obtained for JD and the S&P500 ETF.

JD.com

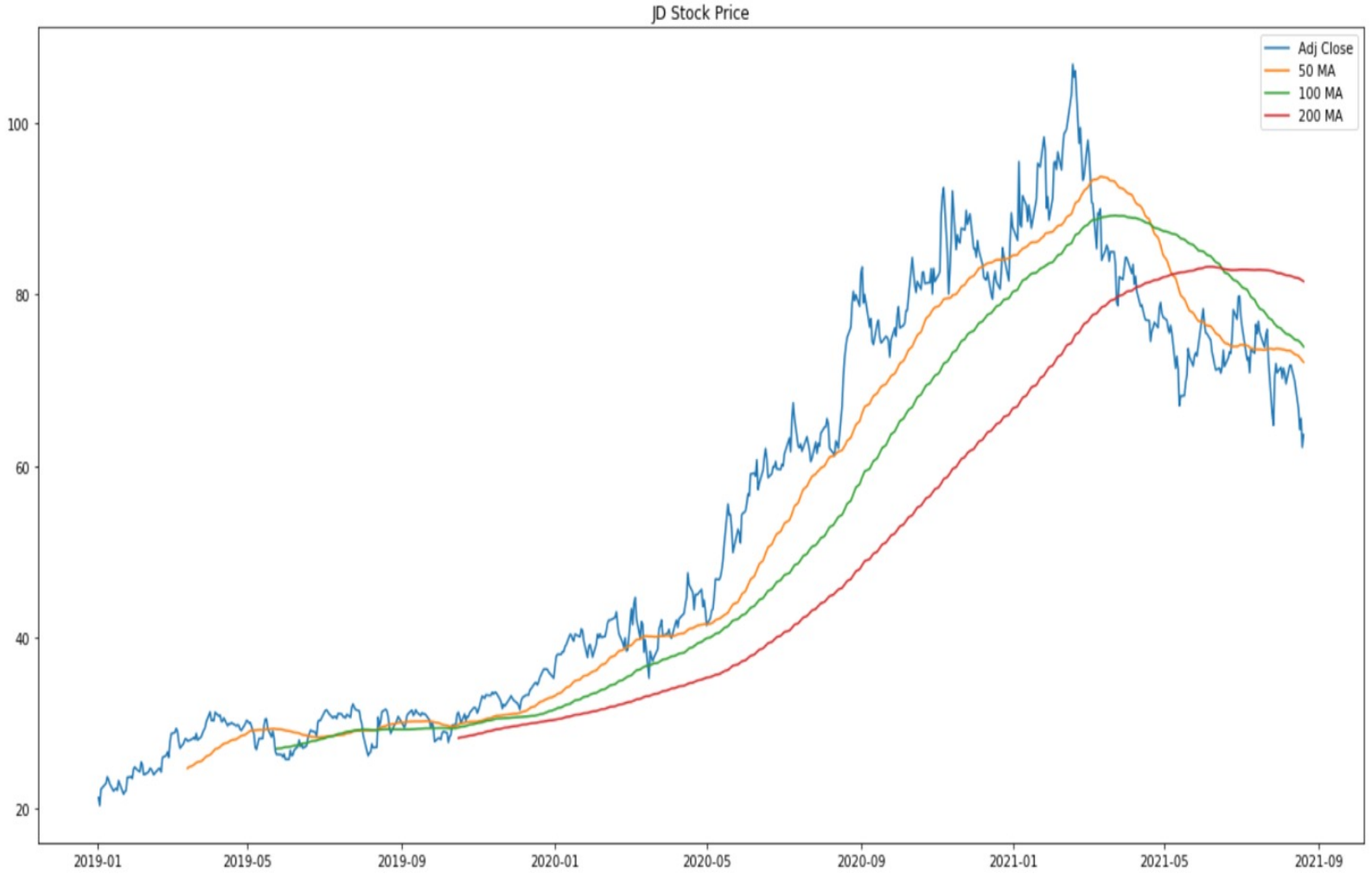


S&P 500 ETF

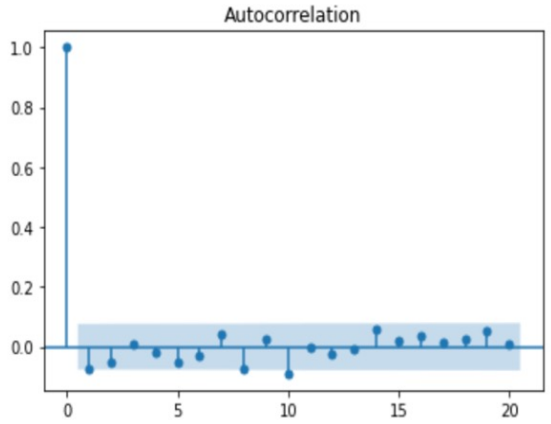


Basic Technical Analysis (for day trading)

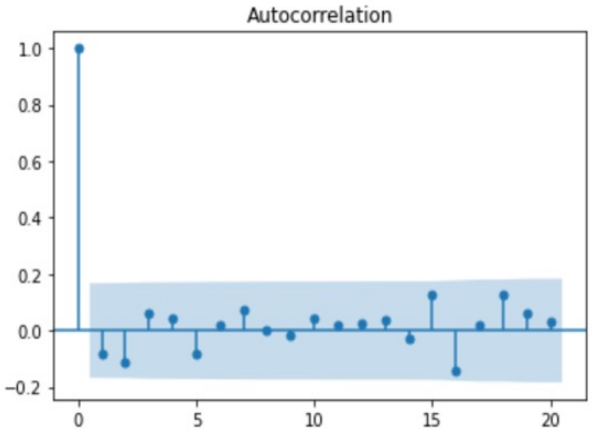
Technical Analysis for JD.com



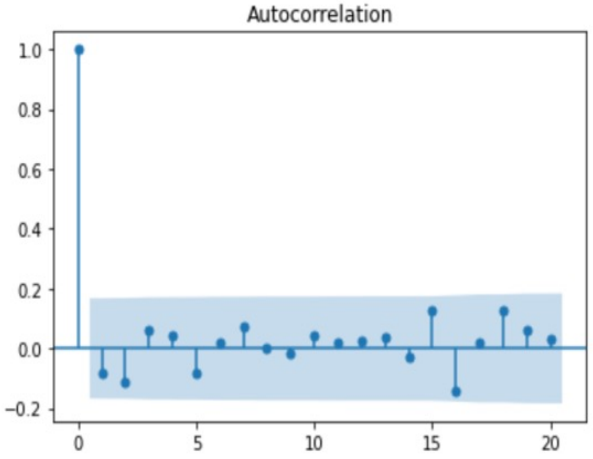
ARIMA Modeling: JD.com



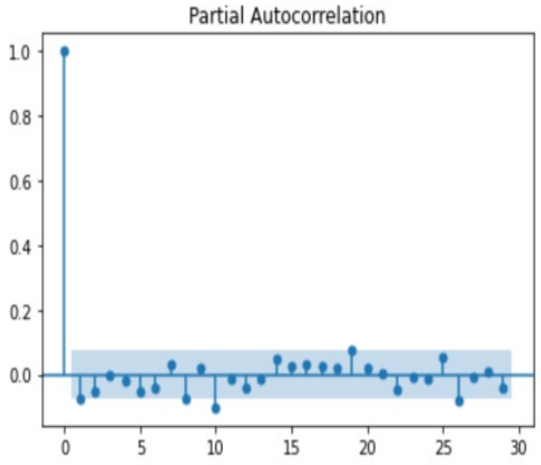
Daily returns do not appear to have any autocorrelation for JD.com



JD.com weekly returns appears to have zero autocorrelation at all lags



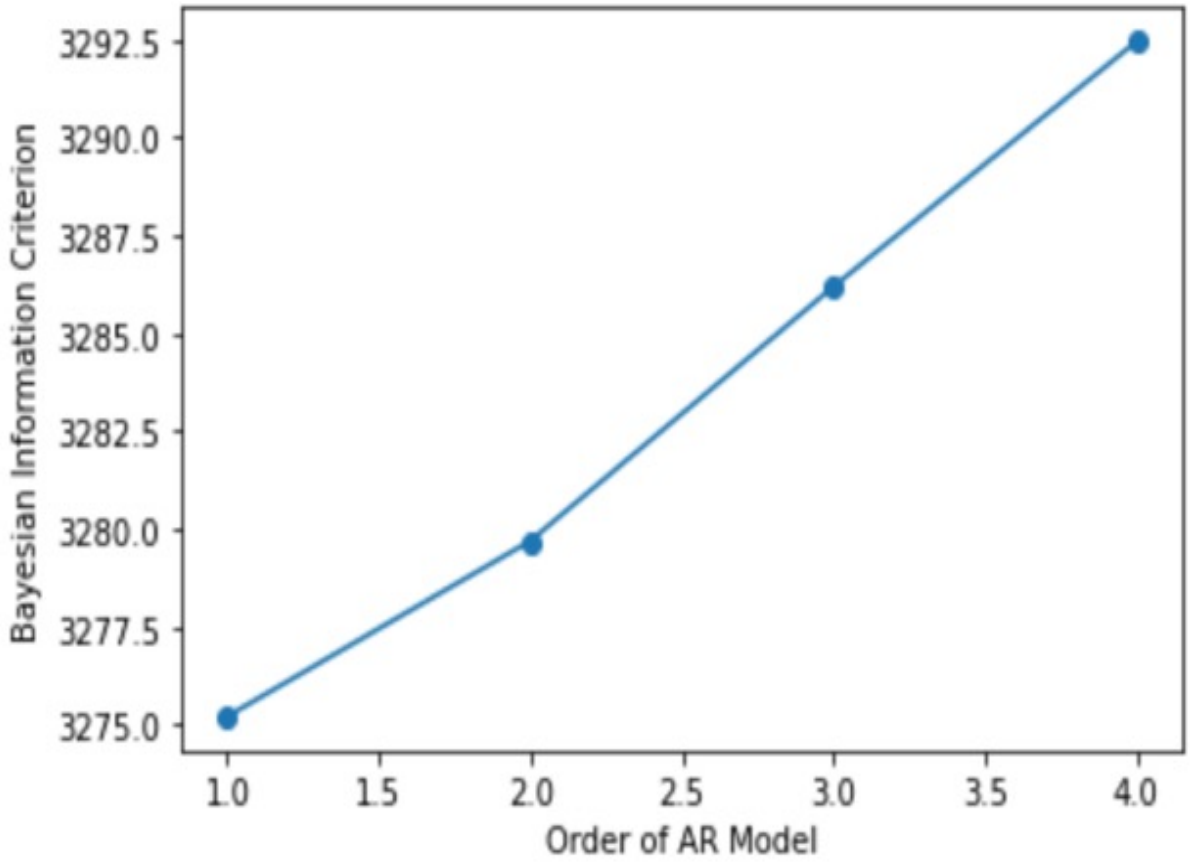
JI



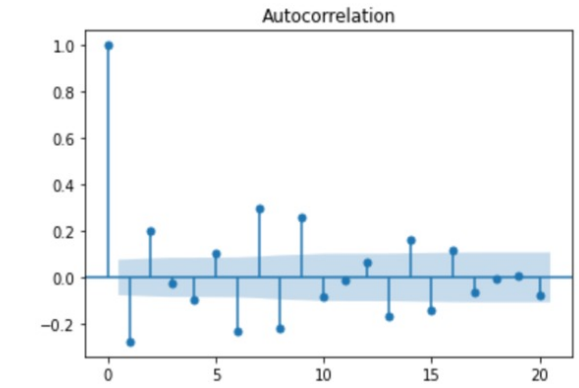
ags

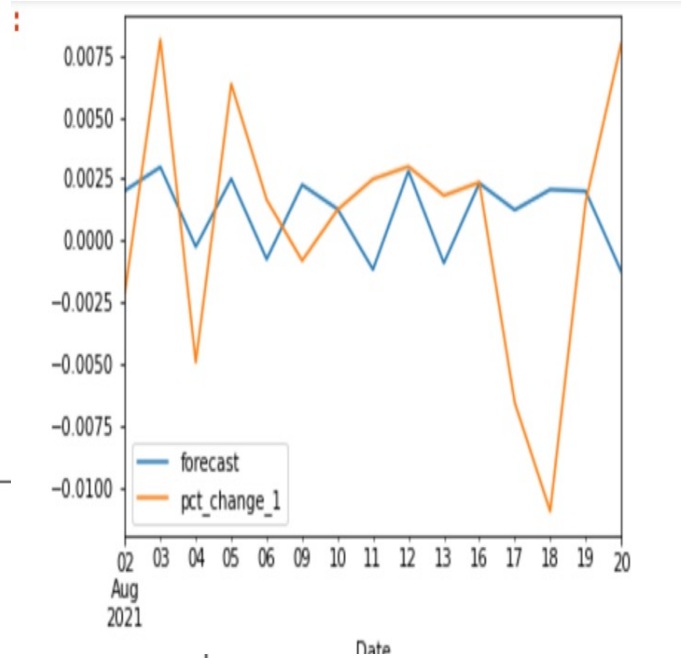
JD 1 day return does not have a significant PACF

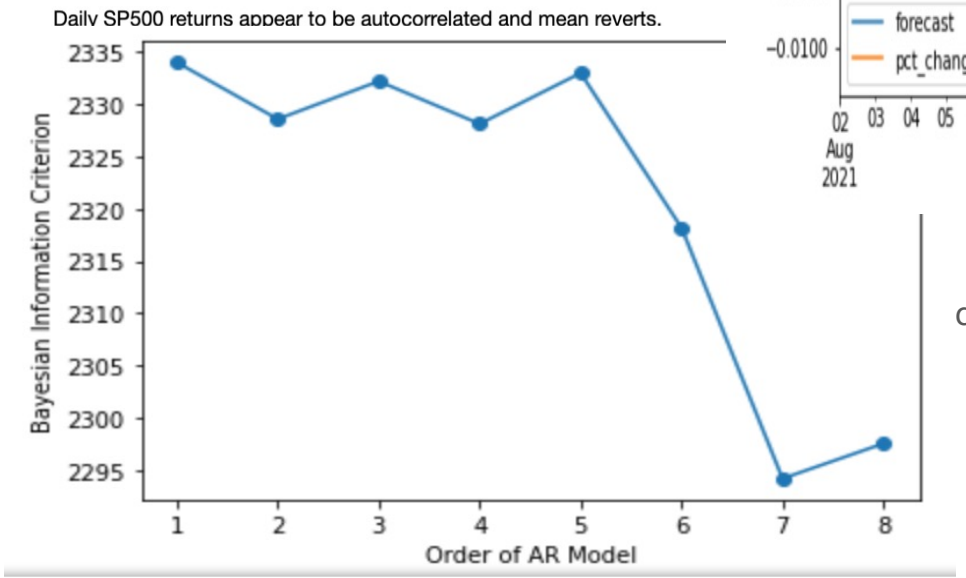
ARIMA Modeling: JD.com



ARIMA Modeling: S&P 500





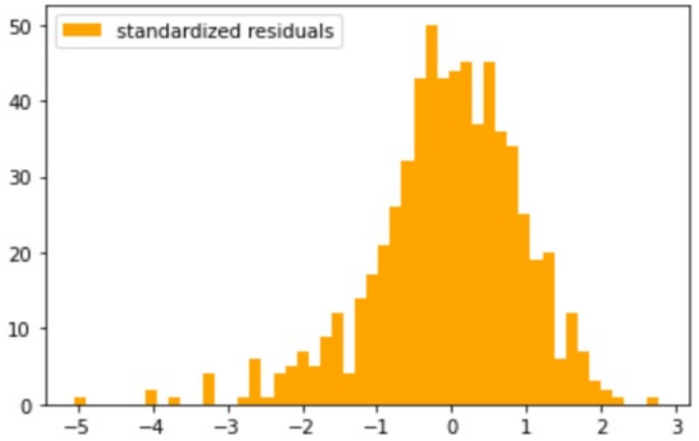


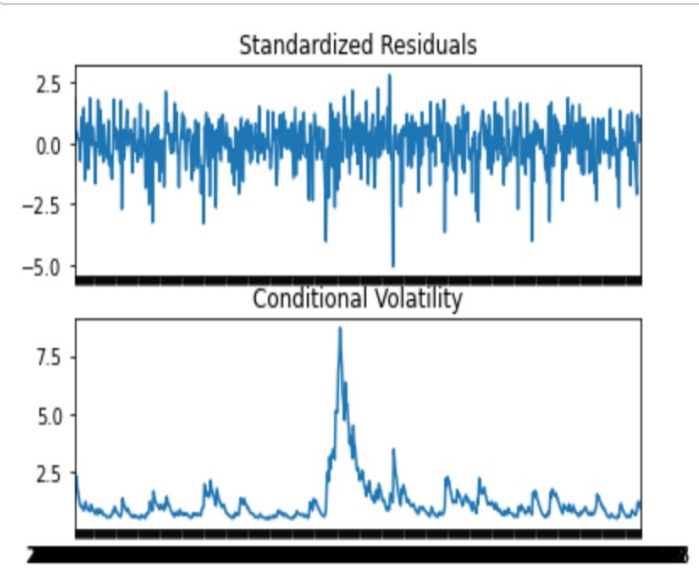
The Mean Absolute Error for del is 0.85%

ARIMAX Model: S&P 500

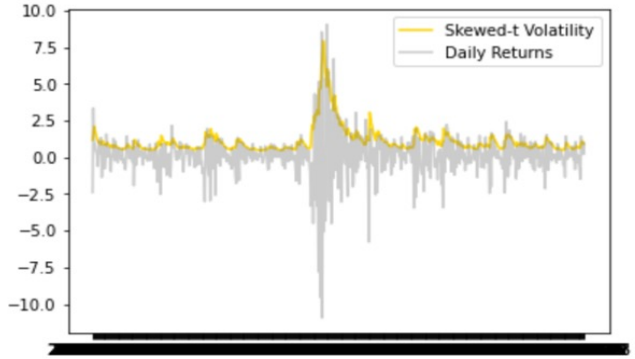
- Slightly better results with ARIMAX

GARCH is the Winner!





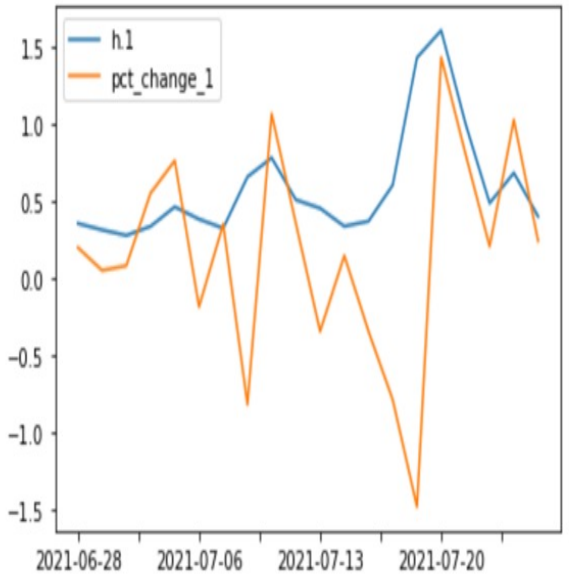
The residuals appear slightly negatively skewed. Let's see if we can improve this.



The skewed Student's t-distribution assumption gives us a GARCH model in line with actual observations

Most practitioners prefer to separate the mean and volatility models. We will not do that here but that is a future step. We also want to address the asymmetry issue with stock market returns since volatility in down markets is higher than in upmarkets.

More GARCH



We can see based on this forecast that there is some asymmetry in volatility that we're not accounting for. It appears that using GARCH to model is very promising. Should explore this further.

Recommendation and Next Steps:

- Going forward, I would recommend that we explore the SP500 time series more with a GARCH model that separates the mean and volatility models. This means we set the mean parameter to zero when performing garch and using an SARIMAX model to estimate the mean.
- I would also recommend that we continue to collect twitter data to see if this is an exogenous variable that we can use to improve the SARIMAX model.
- Even though we may be able to obtain some promising forecasts, it's important to note that markets are highly competitive and that the professional institutional quant traders have far more resources to improve investment performance.