



Financial and Accounting Analytics of Stock Returns during Covid-19 Pandemic

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A decorative graphic on the left side of the slide consisting of two overlapping squares. The bottom-left square is a dark blue, and the top-right square is a lighter blue, creating a cross-like shape.

The Problem

The novel coronavirus 2019 (COVID-19) disease has led to an unprecedented disruption to the U.S. economy and also an unparalleled slump in the U.S. stock market. This presentation uses the 2019 accounting ratios to explain the varying exposures to covid-19 market shock.

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01

Data Import

Data Import



**Retearly2020 &
Retlate2020**



**13 WRDS
Compustat
financial ratios**

Price/Book; P/E; P/EBIT;
P/SALES; Cash to total asset;
Cash to current liabilities;
Cash to interest expense;
Current ratio; Quick Ratio;
Inventory turnover; Long-term
debt to total asset; EBIT to
interest expense; Net
sales/#employee



**2673 Entries;
17 Columns**

02

EDA & Data Preprocessing



Checking null values

Drop:

- Cash to interest expense
- EBIT to interest expense

Data columns (total 17 columns):

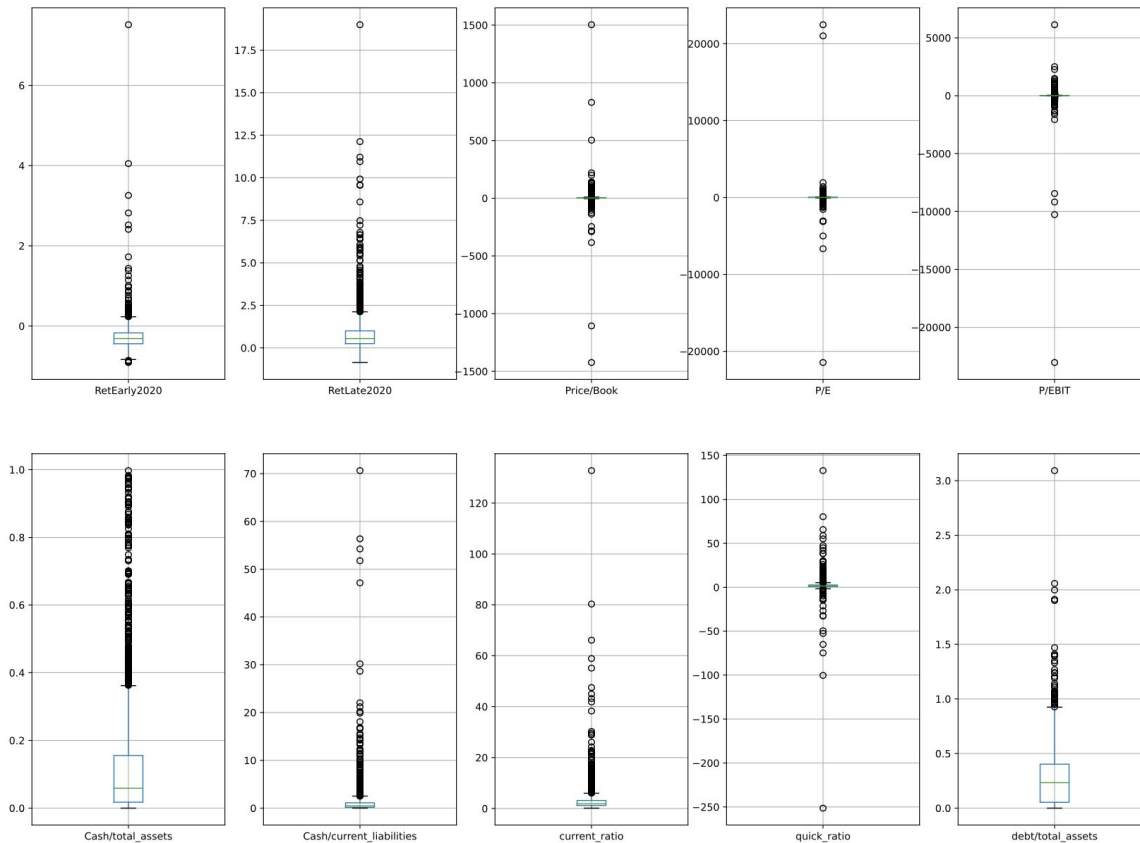
#	Column	Non-Null Count	Dtype
0	tic	2673 non-null	object
1	RetEarly2020	2673 non-null	float64
2	RetLate2020	2673 non-null	float64
3	city	2672 non-null	object
4	Price/Book	2664 non-null	float64
5	P/E	2664 non-null	float64
6	P/EBIT	2664 non-null	float64
7	P/SALES	2664 non-null	float64
8	Cash/total_assets	2631 non-null	float64
9	Cash/current_liabilities	1979 non-null	float64
10	Cash/interest	285 non-null	float64
11	current_ratio	2007 non-null	float64
12	quick_ratio	1980 non-null	float64
13	inventory_turnover	2545 non-null	float64
14	debt/total_assets	2662 non-null	float64
15	EBIT/interest	285 non-null	float64
16	SALES/employee	2647 non-null	float64

Plotting distribution

Check
distribution of
values:
Infinite values

	count	mean	std	min	25%	50%	75%	max
RetEarly2020	2673.0	-0.290638	0.313193	-0.908665	-0.440494	-0.312085	-0.170593	7.512067e+00
RetLate2020	2673.0	0.804096	1.073392	-0.858458	0.252399	0.546460	1.000473	1.899385e+01
Price/Book	2664.0	3.823617	52.686755	-1423.217345	1.321887	2.345062	4.700172	1.503128e+03
P/E	2664.0	13.241793	763.284866	-21456.838040	-2.718839	14.616061	27.293262	2.247225e+04
P/EBIT	2664.0	-5.526611	573.266634	-23037.700770	4.839963	10.233583	19.737916	6.129584e+03
P/SALES	2664.0	inf	NaN	0.021662	1.139382	2.590081	5.374129	inf
Cash/total_assets	2631.0	0.126276	0.175842	0.000000	0.017569	0.058903	0.155531	9.973521e-01
Cash/current_liabilities	1979.0	1.307235	3.615904	0.000000	0.179040	0.478380	1.120724	7.063185e+01
current_ratio	2007.0	3.196440	5.554320	0.146189	1.227300	1.855734	3.174488	1.327606e+02
quick_ratio	1980.0	2.356662	8.963229	-251.356854	0.889587	1.438089	2.659187	1.327606e+02
inventory_turnover	2545.0	inf	NaN	0.000000	3.701563	10.836083	NaN	inf
debt/total_assets	2662.0	0.263848	0.243351	0.000000	0.053425	0.232944	0.402576	3.092259e+00
SALES/employee	2647.0	inf	NaN	0.000000	174.205105	361.802649	996.892880	inf

Plotting distribution



City difference on stock return

	RetEarly2020	RetLate2020	difference
city			
Saint Louis Park	4.049931	2.225995	-1.823936
Gaithersburg	0.553496	-0.072377	-0.625873
Lubbock	0.198314	-0.326705	-0.525018
Bethlehem	0.339975	-0.016264	-0.356239
Singapore	0.169058	-0.160086	-0.329144
...
West Reading	-0.668750	3.542452	4.211202
Las Cruces	-0.146274	4.141488	4.287763
New Hartford	-0.581653	3.882583	4.464235
Bellingham	-0.253310	6.460989	6.714299
Golden Valley	-0.636760	6.391083	7.027843

829 rows × 3 columns

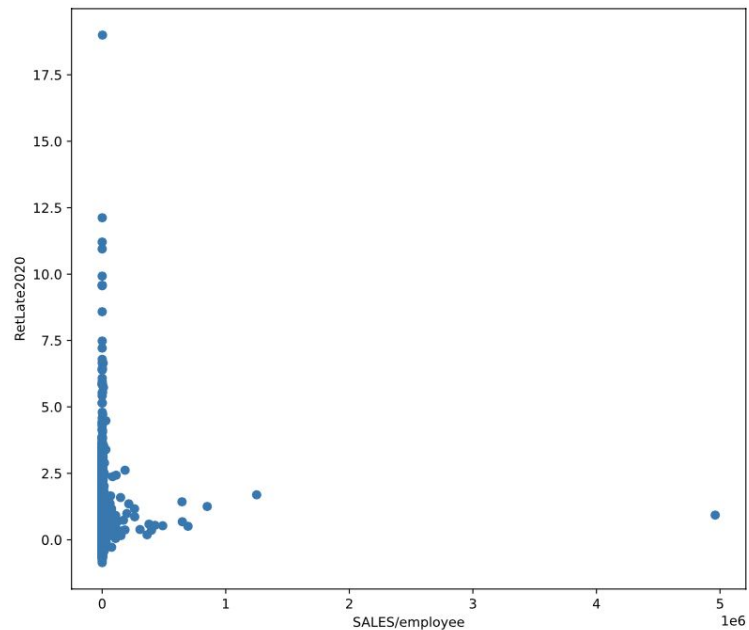
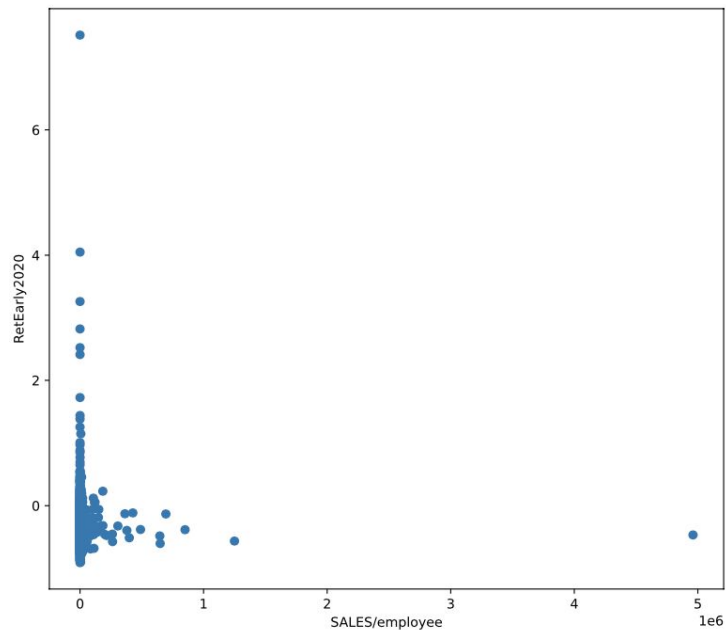
Bottom 5 cities:

- Saint Louis Park
- Gaithersburg
- Lubbock
- Bethlehem
- Singapore

Top 5 cities:

- West Reading
- Las Cruces
- New Hartford
- Bellingham
- Golden Valley

Sales/#employee difference in stock return



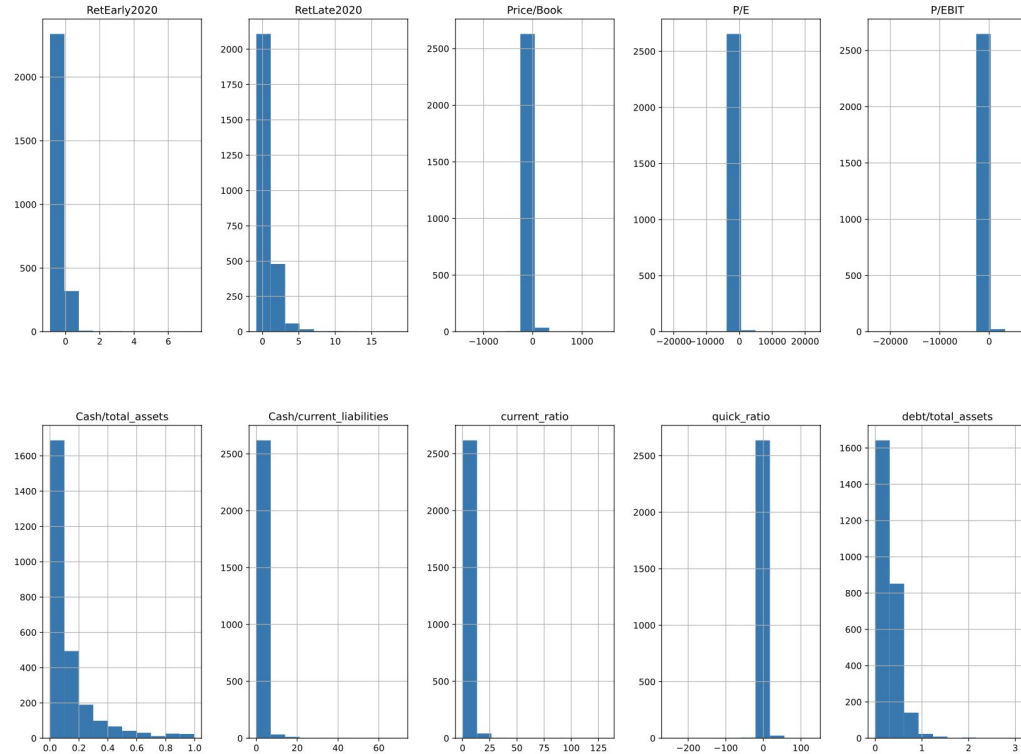
Data Preprocessing

Handling nulls

- Fill in with 0

Winsorizing

- Histogram
- Limit: [0.01, 0.03]





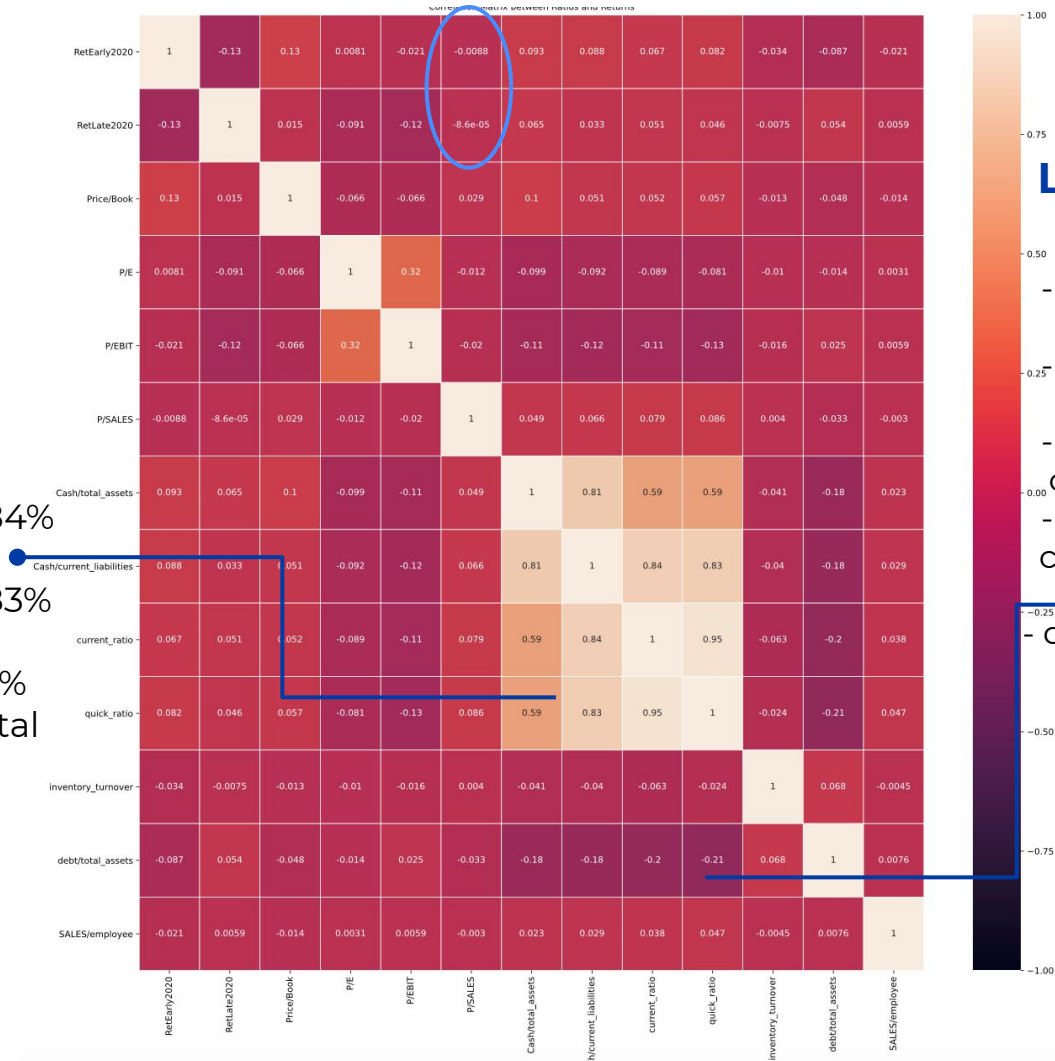
03

Multi-linear Regression

CM

Highly correlated:

- current ratio and quick ratio: 95%
- current ratio and cash/current_liabilities: 84%
- quick ratio and cash/current_liabilities: 83%
- cash/current_liabilities and cash/total_assets: 81%
- quick ratio and cash/total assets: 59%



Least correlated:

- debt/total_assets and quick ratio: -21%
- debt/total_assets and current ratio: -20%
- debt/total_assets and cash/total_assets: -18%
- debt/total_assets and cash/current_liabilities: -18%
- quick ratio and P/EBIT: -13%

For Retearly2020

Multi-variable effects on RetEarly2020

```
=====
Dep. Variable:      RetEarly2020      R-squared:      0.030
Model:              OLS               Adj. R-squared:  0.028
Method:             Least Squares     F-statistic:     10.47
Date:               Thu, 08 Jul 2021   Prob (F-statistic): 1.47e-14
Time:               02:15:31          Log-Likelihood:  -647.75
No. Observations:   2673              AIC:             1313.
Df Residuals:       2664              BIC:             1367.
Df Model:            8
Covariance Type:    nonrobust
=====
```

```
=====
              coef      std err          t      P>|t|      [0.025      0.975]
-----
const          -0.2969      0.013    -22.685      0.000      -0.323      -0.271
Price/Book       0.0058      0.001      6.225      0.000       0.004      0.008
P/E              0.0001      0.000      1.171      0.242     -7.93e-05      0.000
P/EBIT          -5.019e-05      0.000     -0.354      0.723      -0.000      0.000
Cash/total_assets  0.0567      0.071      0.801      0.423      -0.082      0.196
Cash/current_liabilities 0.0156      0.014      1.155      0.248      -0.011      0.042
current_ratio    -0.0181      0.009     -2.133      0.033      -0.035     -0.001
quick_ratio      0.0171      0.008      2.024      0.043       0.001      0.034
debt/total_assets -0.0976      0.029     -3.347      0.001      -0.155     -0.040
=====
```

```
=====
Omnibus:          4033.479      Durbin-Watson:      1.860
Prob(Omnibus):    0.000      Jarque-Bera (JB):   3497766.029
Skew:             8.854      Prob(JB):           0.00
Kurtosis:         179.328      Cond. No.           805.
=====
```

Summary:

- R squared and adjusted r square are respectively 3% and 2.8%.
- RetEarly2020 v current ratio
- RetEarly2020 v Price/book
- RetEarly2020 v quick ratio
- RetEarly2020 v debt/total assets

For Retlate2020

Multi-variable effects on RetLate2020

Dep. Variable:	RetLate2020	R-squared:	0.029			
Model:	OLS	Adj. R-squared:	0.027			
Method:	Least Squares	F-statistic:	10.09			
Date:	Thu, 08 Jul 2021	Prob (F-statistic):	5.80e-14			
Time:	02:15:37	Log-Likelihood:	-3941.7			
No. Observations:	2673	AIC:	7901.			
Df Residuals:	2664	BIC:	7954.			
Df Model:	8					
Covariance Type:	nonrobust					
=====						
	coef	std err	t	P> t	[0.025	0.975]

const	0.6221	0.045	13.861	0.000	0.534	0.710
Price/Book	-0.0005	0.003	-0.165	0.869	-0.007	0.006
P/E	-0.0009	0.000	-2.527	0.012	-0.002	-0.000
P/EBIT	-0.0023	0.000	-4.725	0.000	-0.003	-0.001
Cash/total_assets	1.0435	0.243	4.295	0.000	0.567	1.520
Cash/current_liabilities	-0.1795	0.046	-3.876	0.000	-0.270	-0.089
current_ratio	0.0629	0.029	2.157	0.031	0.006	0.120
quick_ratio	-0.0045	0.029	-0.155	0.877	-0.061	0.052
debt/total_assets	0.3645	0.100	3.647	0.000	0.169	0.561
=====						
Omnibus:	2886.637	Durbin-Watson:	1.988			
Prob(Omnibus):	0.000	Jarque-Bera (JB):	339384.220			
Skew:	5.219	Prob(JB):	0.00			
Kurtosis:	57.206	Cond. No.	805.			
=====						

Summary:

- R squared and adjusted r square are respectively 2.9% and 2.7%.
- RetLate2020 v Price/equity
- RetLate2020 v P/EBIT
- RetLate2020 v cash/total assets
- RetLate2020 v cash/current liabilities
- RetLate2020 v debt/total assets

04

Conclusions



Significant features



Debt/ total assets

Cash/total assets

Cash/current_liabilities

**Price/equity &
P/EBIT**

Thanks

Do you have any questions?