

Finding Stock Market Inefficiencies

ANALYSIS BY BRIAN BENTSON

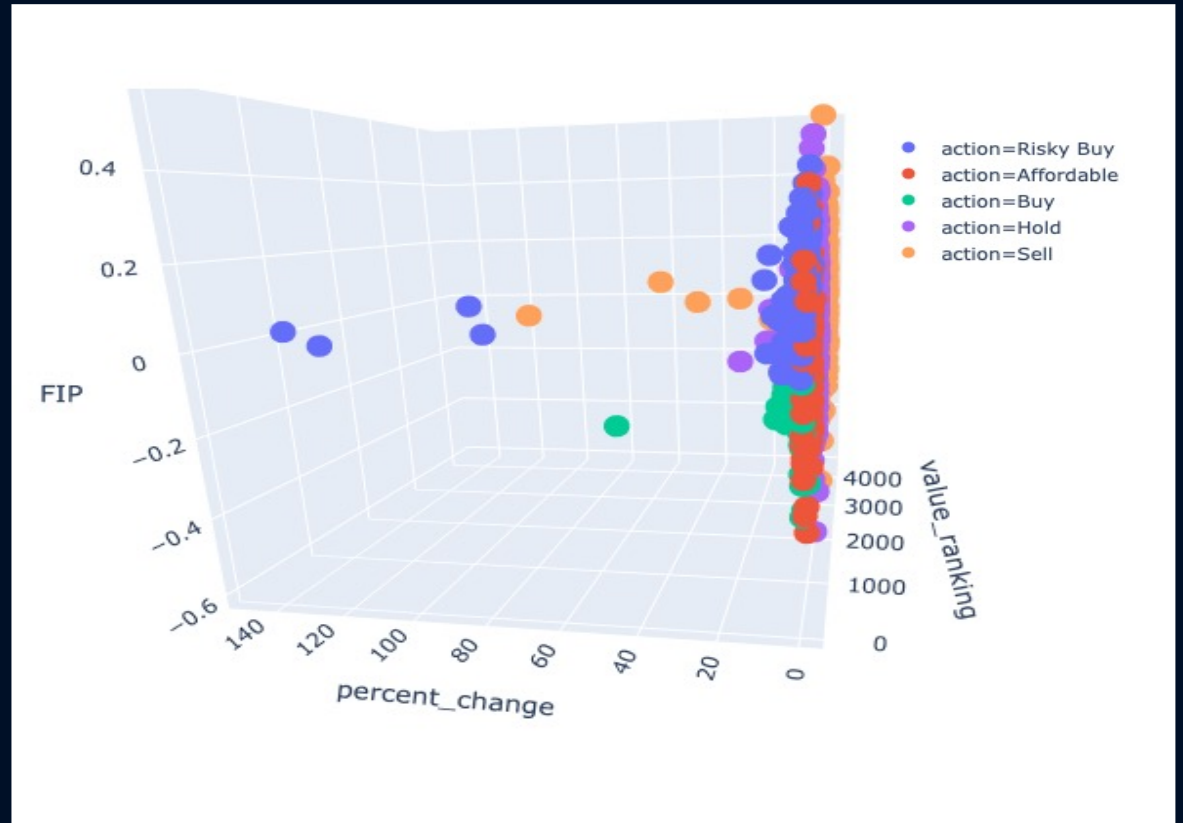
Finding Stock Market Inefficiencies

This analysis focuses on finding which stocks offer the unique combination of low cost and low volatility growth in the stock price.

1 Use machine learning to find which companies to Buy

2 Use anomaly detection to find data quality issues

3 Visually interact with KPI's to research potential stock purchases and sales



Stocks Grouped by Recommended Action after analysis of 3 key factors:

1. The value of the stock which is its price relative to its performance
2. The percent change of a stocks price over the past 1 year
3. The price momentum or volatility (FIP metric) over the past 1 year

Machine Learning Results

Two algorithms were used to solve separate problems. Classification was used to identify inefficient stocks (Buy) and anomaly detection was used to identify questionable data quality.

Classification

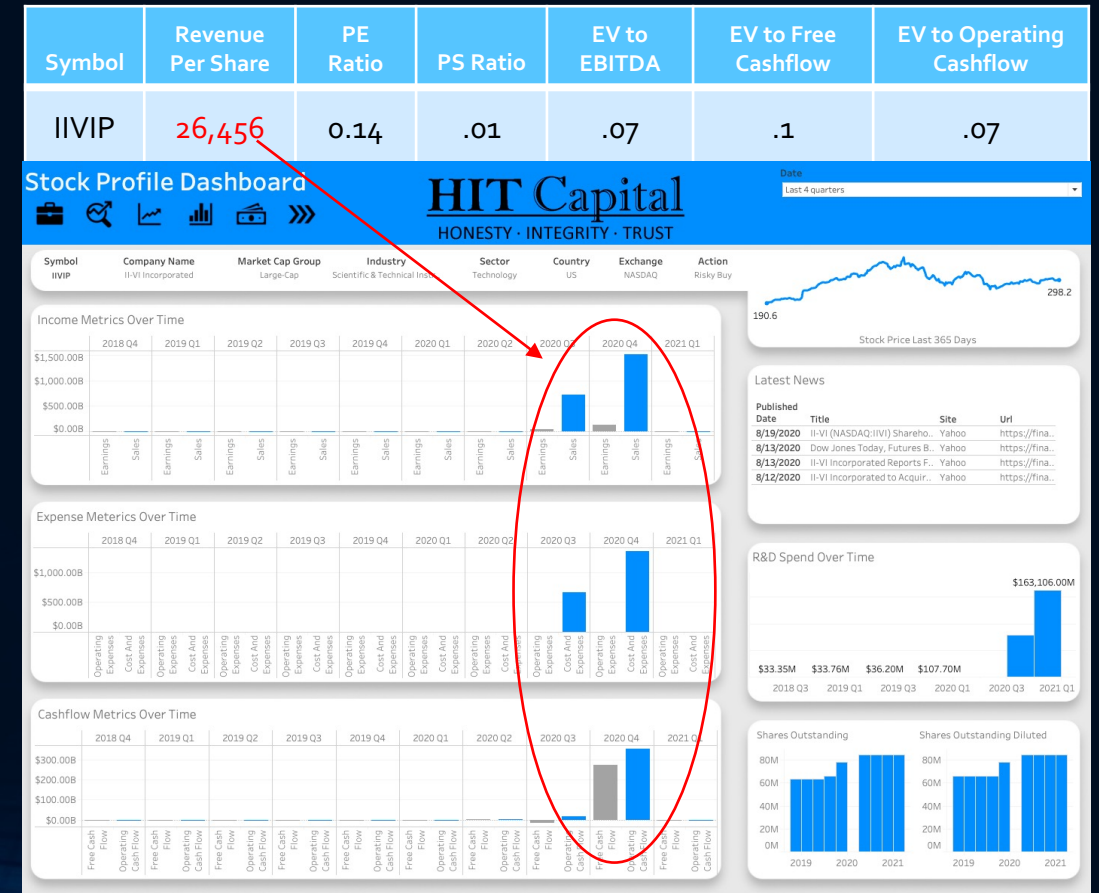
Percentage Correctly Classified



Model Feature Importances

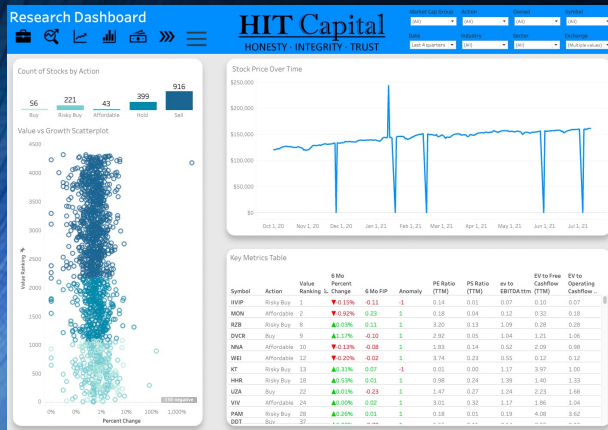
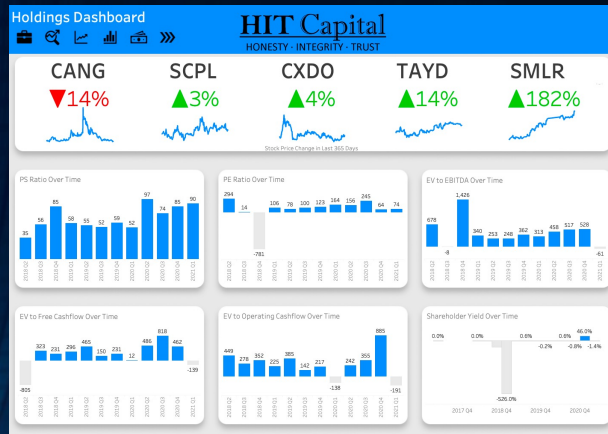


Anomaly Detection



Stock Performance Dashboard

A Tableau dashboard was built to aid in the discovery of inefficient stocks. The dashboard allows a user to explore key stock information in an interactive visual experience.



The Key Metrics Statement Table displays financial data for various quarters. The table includes columns for data, quarterly key metrics, average inventory, average payables, average receivables, book value per share, cash per share, cash to depreciation, cash to operating cash flow, cash to revenue, and current ratio. The data is organized by quarter, with rows for each quarter from 2000 Q1 to 2007 Q4.

data	Quarterly Key Metrics	Average Inventory	Average Payables	Average Receivables	Book Value Per Share	Cash Per Share	Cash To Depreciation	Cash To Operating Cash Flow	Cash To Revenue	Current Ratio
2000 Q1	18,982,000	20,384,000	1	0	-2	-35	258	0	0	0
2000 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2000 Q3	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2000 Q4	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2001 Q1	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2001 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2001 Q3	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2001 Q4	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2002 Q1	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2002 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2002 Q3	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2002 Q4	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2003 Q1	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2003 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2003 Q3	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2003 Q4	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2004 Q1	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2004 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
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2006 Q1	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2006 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2006 Q3	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2006 Q4	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2007 Q1	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2007 Q2	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2007 Q3	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0
2007 Q4	20,384,000	20,384,000	1	0	-2	-35	258	0	0	0

3 Main Dashboard Functions:

1 View performance of current holdings for potential sale

2 Research new companies to buy

3 Validate underlying data quality

Dashboard

Demo

Recommendations & Improvements

Based on analysis findings, it is possible to utilize historical stock metrics to prioritize which stocks to further evaluate for investment.

Recommendations

- ➡ **Utilize anomaly detection results**
Quickly know which stocks to dive deeper into their data to ensure quality
- ➡ **Focus on Enterprise Value to Free Cashflow**
This metric provided a great metric to the classification algorithm to group the stocks into their respective categories
- ➡ **Explore the Dashboard**
The dashboard integrates many important stock metrics in an interactive way that should speed up evaluation

Future Improvements

- ➡ **Make a Live Connection**
Create a live pipeline which feeds refreshed data to the dashboard automatically



Thank you

Questions?

Appendix

Data Overview

FMP

Financial Modeling Prep

- Sourced data from FMP's API
- 4311 stocks after removing null or negative values and removing highly volatile sectors
- Pulled company profile information, historical performance metrics and stock price