

BIG DATA ANALYSIS

Hands-On Data Analysis with Pandas - Second Edition
Chapter 7 : Financial Analysis - Bitcoin and the Stock Market

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How can financial analysis be used to assess a company's financial health ?

- I. Financial statements
- II. Financial ratios
- III. Application : Build an Arima model
- IV. Limitations and Challenges of Financial Analysis

I - FINANCIAL STATEMENTS

- Overview of the three main financial statements: income statement, balance sheet, and cash flow statement

Income statement : Shows a company's revenue and expenses over a specific period.
It starts with the company's revenue minus the cost of goods sold to arrive at the gross profit
The statement takes into account non-operating expenses such as interest and taxes to arrive at the net profit or loss

Balance Sheet : provides a snapshot of a company's financial position at a specific point in time
The balance sheet equation is Assets = Liabilities + Equity

Cash Flow Statement : shows how a company generates and uses cash over a specific period
Divided into three sections: operating activities, investing activities, and financing activities
Helps investors and analysts evaluate a company's ability to generate cash and manage its cash flows

I - FINANCIAL STATEMENTS

- Explanation of how each statement contributes to financial analysis

Income statement : provides insights into a company's revenue and expense trends, as well as its profitability

Is used to assess a company's revenue growth, gross margin, operating expenses, and net income

Balance Sheet : provides insights into a company's assets, liabilities, and equity, which can be used to assess its financial position and liquidity

Is used to evaluate a company's ability to pay off debts, manage its cash flows, and invest in new projects

Cash Flow statement : provides insights into a company's cash flows, which can be used to assess its financial flexibility and solvency.

Is used to evaluate a company's ability to generate cash from its operations, invest in new projects, and pay dividends or buy back stock

I - FINANCIAL STATEMENTS

- Importance of financial statement analysis in assessing a company's financial health

Helps identify financial strengths and weaknesses by examining key metrics

Facilitate decision-making by helping investors and stakeholders to make informed decisions

Assist in forecasting : by examining historical trends and using financial models, analysts can project a company's revenue, expenses, and cash flows, and use this information to estimate the company's future profitability and growth potential

Facilitates effective communication between a company's management and stakeholders

II - FINANCIAL RATIOS

- Explanation of financial ratios and their importance in financial analysis

Financial ratios are quantitative metrics used to evaluate a company's financial performance and health. These ratios provide insight into various aspects of the company, such as profitability, liquidity, solvency, asset utilization, and leverage.

Most important financial ratios in financial analysis :

- Profitability ratios
- Liquidity ratios
- Solvency ratios
- Asset ratios
- Efficiency ratios
- Leverage ratios

II - FINANCIAL RATIOS

- Calculation and interpretation of most important financial ratios :

Financial ratios are used to measure the performance of a company and compare it to other companies in the same industry. Calculating and interpreting financial ratios is an important part of financial analysis. Financial ratios are used to measure the performance of a company and to compare it to other companies in the same industry. For example, internal and external stakeholders use financial ratios for competitor analysis, market valuation, benchmarking, and performance management. Here are some of the most important financial ratios and how to calculate and interpret them:

- Ratios on equity
- Profit margin
- Debt to equity
- Current ratio :
- Price to earnings
- Earnings per share

III-APPLICATION : BUILD ARIMA MODEL

OBJECTIVE : BUILD AN ARIMA MODEL FOR HSI

PREDICT FUTURE VALUE WITH HISTORICAL VALUE

REVIEW THE PERFORMANCE , AND COMPARE REAL AND PREDICT VALUE

STEP 1 : Import data on the Jupiter notebook

STEP 2 : Examine the Stationarity

STEP 3 : Define ARIMA and his components

"AUTOREGRESSIVE INTEGRATED MOVING AVERAGE"

"p" = AR represents the order of the autoregressive term

"d" = I represents the order of differencing

"q" = MA represents the order of the moving average term in the ARIMA model.

III- BUILD ARIMA MODEL

STEP 4 : Create the fit Arima and the graph

The screenshot shows a Jupyter Notebook interface with a toolbar at the top and two code cells below.

Cell 1 (Top):

```
In [67]: print(result.summary());
```

SARIMAX Results

	coef	std err	z	P> z	[0.025	0.975]
ar.L1	0.9887	0.009	114.988	0.000	0.972	1.006
ar.L2	0.5545	0.007	77.477	0.000	0.540	0.569
ar.L3	-0.5530	0.008	-66.002	0.000	-0.569	-0.537
ar.L4	-0.9914	0.006	-160.864	0.000	-1.004	-0.979
ar.L5	0.9973	0.007	138.807	0.000	0.983	1.011
ma.L1	0.4166	0.017	23.910	0.000	0.382	0.451
ma.L2	-0.4175	0.017	-24.053	0.000	-0.452	-0.383
ma.L3	-0.9991	0.019	-53.118	0.000	-1.036	-0.962
sigma2	2716.4829	9.38e-06	2.9e+08	0.000	2716.483	2716.483

Ljung-Box (L1) (Q): 0.77 Jarque-Bera (JB): 0.51
Prob(Q): 0.38 Prob(JB): 0.77
Heteroskedasticity (H): 1.08 Skew: 0.42
Prob(H) (two-sided): 0.94 Kurtosis: 3.48

Warnings:
[1] Covariance matrix calculated using the outer product of gradients (complex-step).
[2] Covariance matrix is singular or near-singular, with condition number 2.11e+23. Standard errors may be unstable

Cell 2 (Bottom):

```
STEP 5 : DEFINE FUTUR VALUE
```

```
In [ ]: n_periods = 10
future_index = np.arange(len(y), len(y) + n_periods)
```

III- BUILD ARIMA MODEL

STEP 5 : Predict a futur value

```
■start_index = len(train_data)
■end_index = len(data) - 1
■predictions = results.predict(start=start_index, end=end_index, dynamic=False)

future_values = model_fit.forecast(steps=k)
```

STEP 6: Examine the residuals

```
#print(residuals.describe())
```

STEP 7 : Compare the reel and predict value

```
print(residuals.describe())
```

IV - LIMITATIONS AND CHALLENGES OF FINANCIAL ANALYSIS

A - Mostly based on historical data

- Financial analysis is primarily based on historical statements and data, which may not fully reflect the current or future financial situation of the company.
- Financial statements may not be accurate or may be subject to manipulation, such as through creative accounting practices.
-

B - Industry benchmarks and comparisons

- One limitation of industry benchmarks and comparisons is that they may not provide an accurate picture of a company's financial health.
- This practice must be mindful of the limitations of standardized metrics and accounting practices, and they must exercise judgment in their interpretation of financial data.

IV - LIMITATIONS AND CHALLENGES OF FINANCIAL ANALYSIS

C - Incomplete informations

- Incomplete information is a common challenge in financial analysis. However, there are several limitations and challenges associated with incomplete information that can pose significant challenges to financial analysis.
- Financial statements may not reflect a company's future growth potential or market position, particularly if the company is in a rapidly evolving industry or market.

D - Accounting and reporting standards

- Accounting standards are typically updated periodically, which means that they may not always reflect new and emerging trends or technological advancements in the market.
- To do a better analysis it must take account of the unique aspects of a particular company's operations and industry, and they must also consider the potential impact of external factors that may not be captured by financial statements.

CONCLUSION

In summary, this chapter provided us with valuable insights into conducting real-world financial analysis using the Pandas library. We learned how to build a Python package, collect financial data, perform exploratory and technical analysis, and model performance using historical data. Financial ratios are a critical aspect of financial analysis, helping us make informed decisions about companies and assets.