GDP, DEBT, AND THE HEALTH OF THE STOCK MARKET

PY 538 Econophysics

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OUTLINE

- Motivation
- Definition of Terms
- Methodology
- Results
- Conclusions
- Further Considerations
**MOTIVATION**

- Investigate how the values of GDP and Central Government Debt affect the national indices traded in the national market.
- Look at the sustainability of an index based on the ratio of debt to GDP of a country.
- Ultimately investigate, whether debt to GDP ratio can be used as an indicator to possible boom or bust scenarios.
DEFINITIONS: GDP

- GDP (Gross Domestic Product) is the monetary value of all the finished goods and services produced within a country’s borders in a specific time period.
- Usually is calculated on an annual basis
- Used as a broad measurement of a nation’s overall economic activity, health, and standard of living.
DEFINITION: CENTRAL GOVERNMENT DEBT

- Central government debt is the total amount owed by a government to its creditors.
- Internal debt is debt owing to national creditors.
- External debt is debt owing to foreign creditors.
- Central government debt plays a crucial role in a country’s financial.
DEFINITION: INDEX

- An index is an indicator or statistical measure of change in a securities market.
- Indices consist of a portfolio of securities representing a particular market or portion of it.
- Each index has its own calculation methodology.
**METHODOLOGY**

- **WHO:** Top Ten GDP countries + Australia and Russia
- **WHAT:** GDP, Central Government Debt, Major Stock Market Index for that Country
- **WHEN:** Data for GDP available from 1960, Debt from 1990, and varying times for indices.
- **WHERE:** Microsoft Excel
- **WHY:** To find possible relationship between Debt/GDP ratio and stock market index price.
- **HOW:** Data sources include:
  - The World Bank Group (GDP, Debt)
  - Yahoo Finance (Indices)
Top 3 GDP Countries: USA, China, Japan
RESULTS

Top Country with Most Debt: USA
RESULTS: US GDP VS INDEX GROWTH

US GDP and S&P 500 seem to grow at similar rates over time. The difference between GDP and Debt continues to decrease over time.
RESULTS: US GDP VS INDEX GROWTH

The relative volatility of the US GDP and S&P 500 seem to coincide.
RESULTS: US GDP VS INDEX GROWTH

No indication of boom/bust situation
DEFINITION: DEBT/GDP RATIO

- Ratio of a country’s public debt to its gross domestic product.
- Indicates the country’s ability to pay back its debt.
- High debt/GDP ratio may make it more difficult for the country to pay its external debts, and may lead creditors to seek higher interest rates when lending.
- Higher ratios also tend to carry higher risks of default.
RESULTS: DEBT/GDP RATIO

NOTE: Most data for national debt starts around 1990

Ratios above 100% mean that the country owes more than it produces.
RESULTS: DEBT/GDP RATIO

Appears that Debt/GDP ratio local minimums prelude local minimums of the index.
RESULTS: DEBT/GDP RATIO NORMALIZED

Normalized Debt/GDP ratio local minimums still prelude local minimums of the normalized index.
RESULTS: DEBT/GDP RATIO NORMALIZED

3 Consecutive Decreasing points on the debt/GDP plot prelude local minimum on the index line.
RESULTS: DEBT/GDP RATIO NORMALIZED

NOT JUST THE UNITED STATES MARKET

Percent Change in Debt/GDP Ratio Since 1990

Normalized Debt/GDP ratio local minimums still prelude local minimums of the normalized index
RESULTS: DEBT/GDP RATIO NORMALIZED

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Percent Change in Debt/GDP Ratio Since 1990

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CONCLUSIONS

✓ GDP and Central Government Debt are good indicators to health of a country’s economy

✓ Sustainability of an index based on debt/GDP ratio is inconclusive
  ➢ Further investigation to be made on sustainability of debt/GDP ratio in comparison to the index market capitalization.

✓ Local minimum in index prices appear to be determined preemptively by local minimum in the normalized debt/GDP ratio.
FURTHER INVESTIGATION

- Market Capitalization to GDP Ratio
  - Based off historic ratios can forecast busts.

- Other Economic factors
  - Employment Rate, Wages, etc.

- Global interconnectedness
  - How different countries economies are interconnected?
QUESTIONS?

IF YOU ASK ME QUESTIONS

THAT'D BE GREAT
## REFERENCES

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