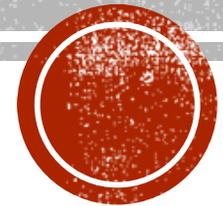


GDP, DEBT, AND THE HEALTH OF THE STOCK MARKET

PY 538 Econophysics

Anthony Cardillo



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.

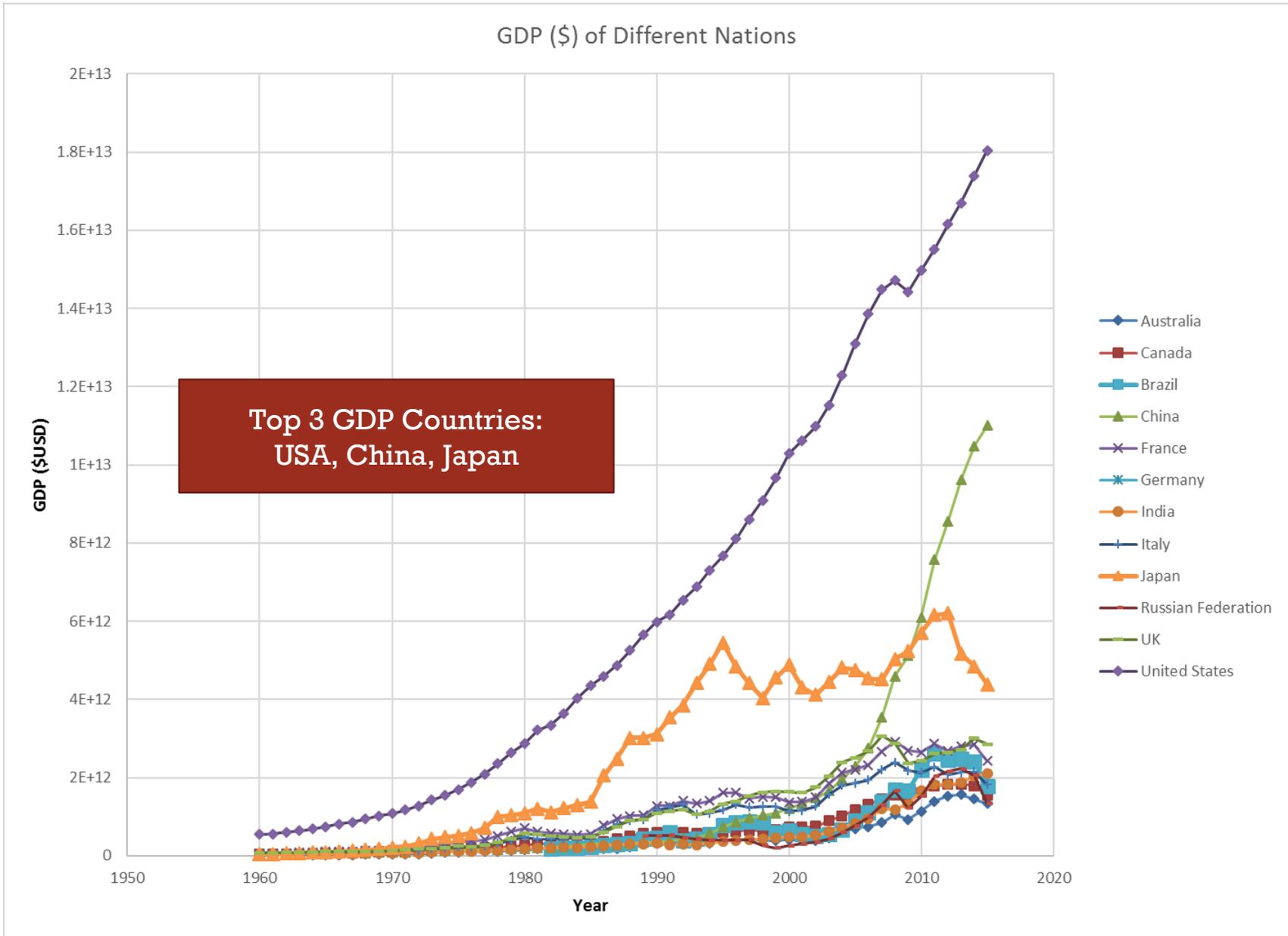


METHODOLOGY

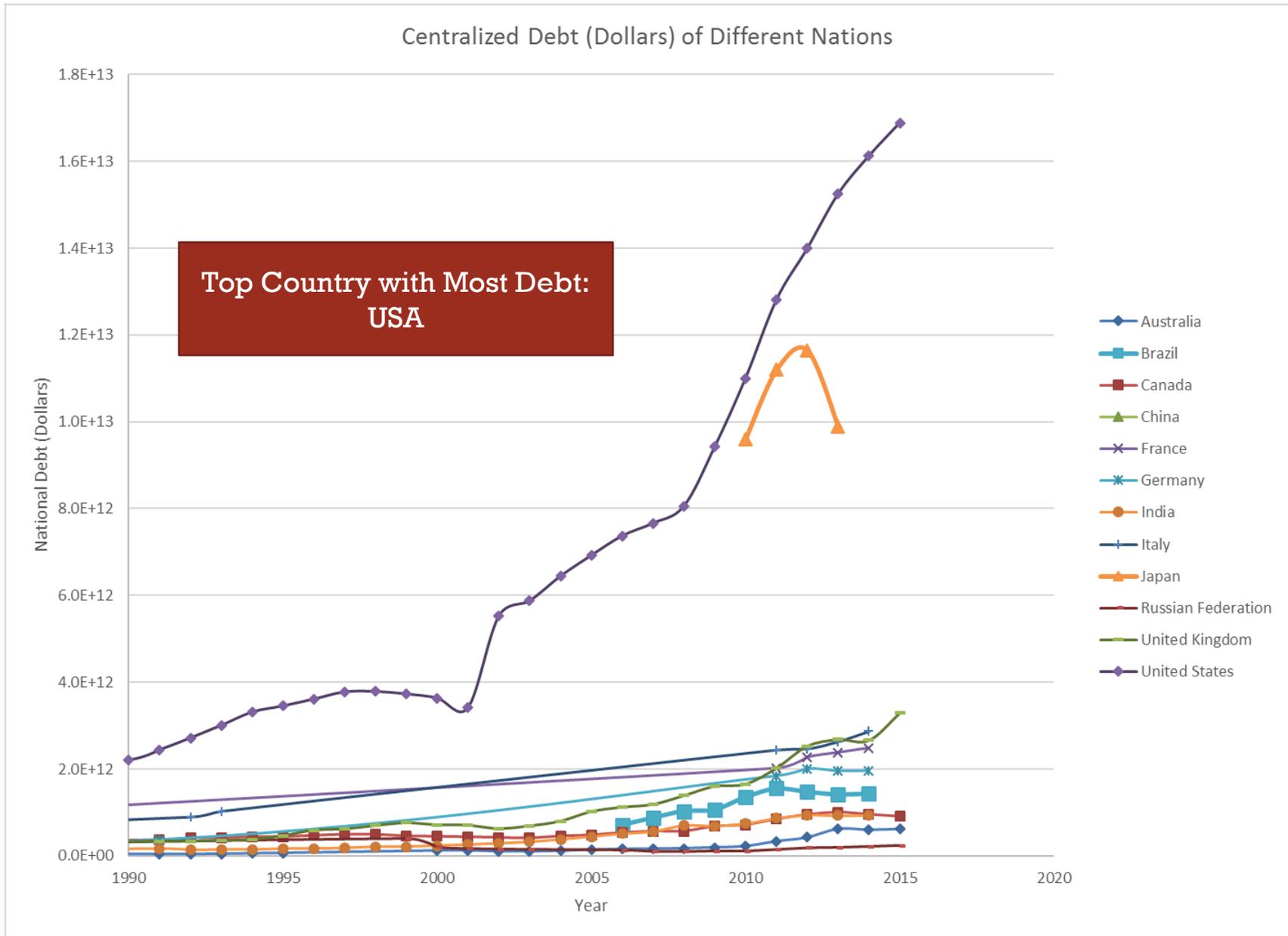
- WHO: Top Ten GDP countries + Australia and Russia
- WHAT: GDP, Central Government Debt, Major Stock Market Index for that Country
- WHEN: Data for GDP available from 1960, Debt from 1990, and varying times for indices.
- WHERE: Microsoft Excel
- WHY: To find possible relationship between Debt/GDP ratio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



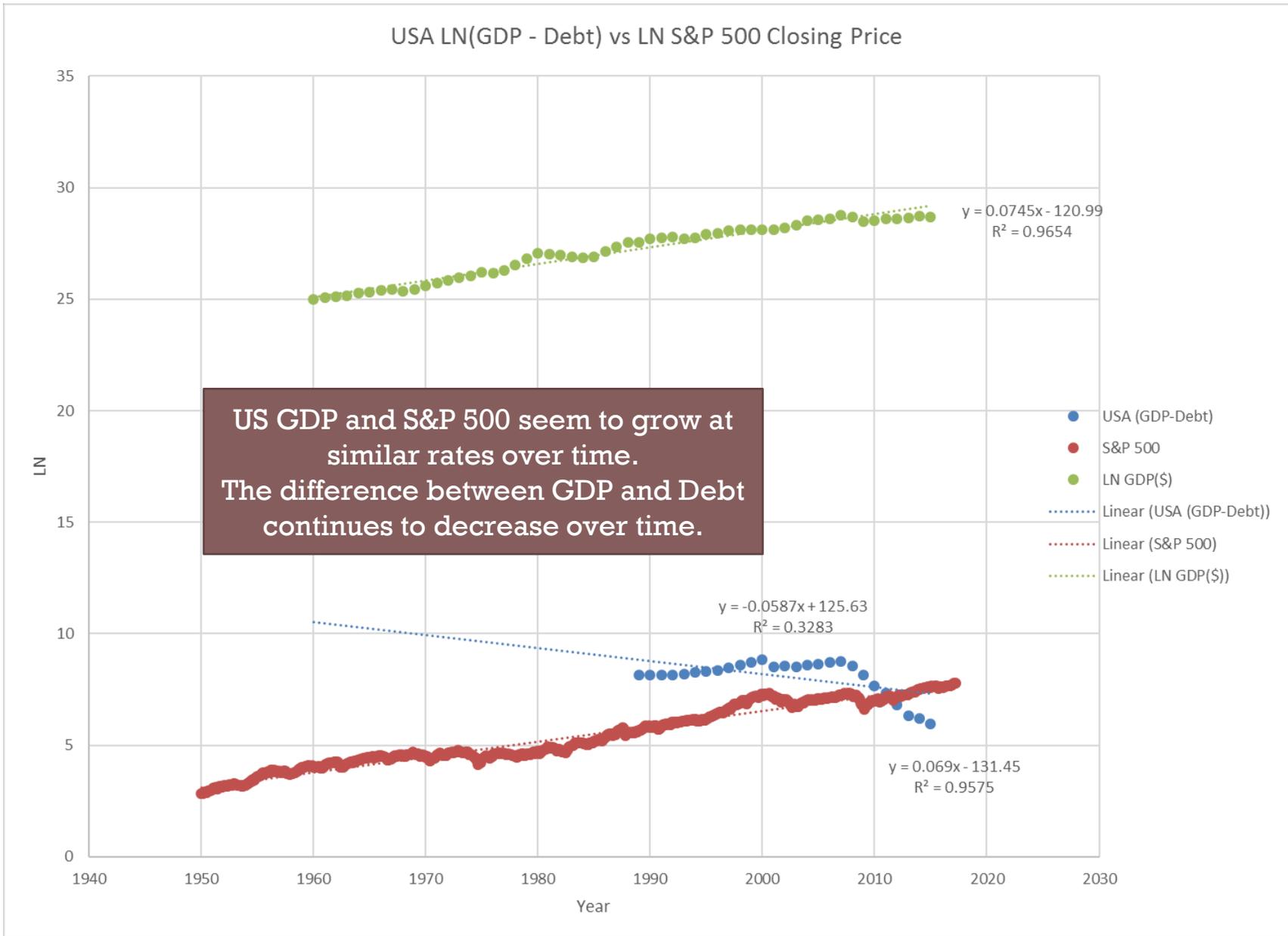
RESULTS



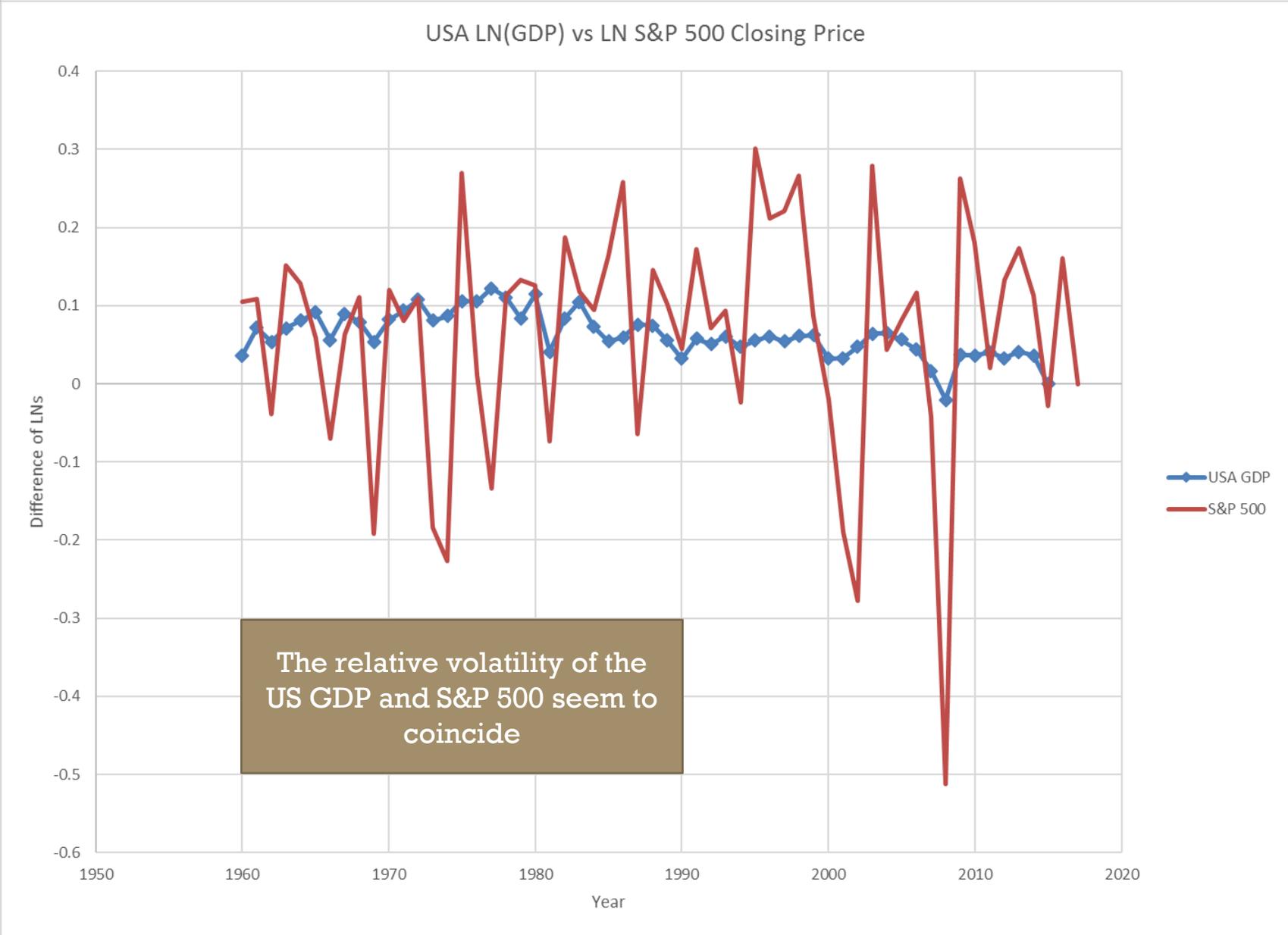
RESULTS



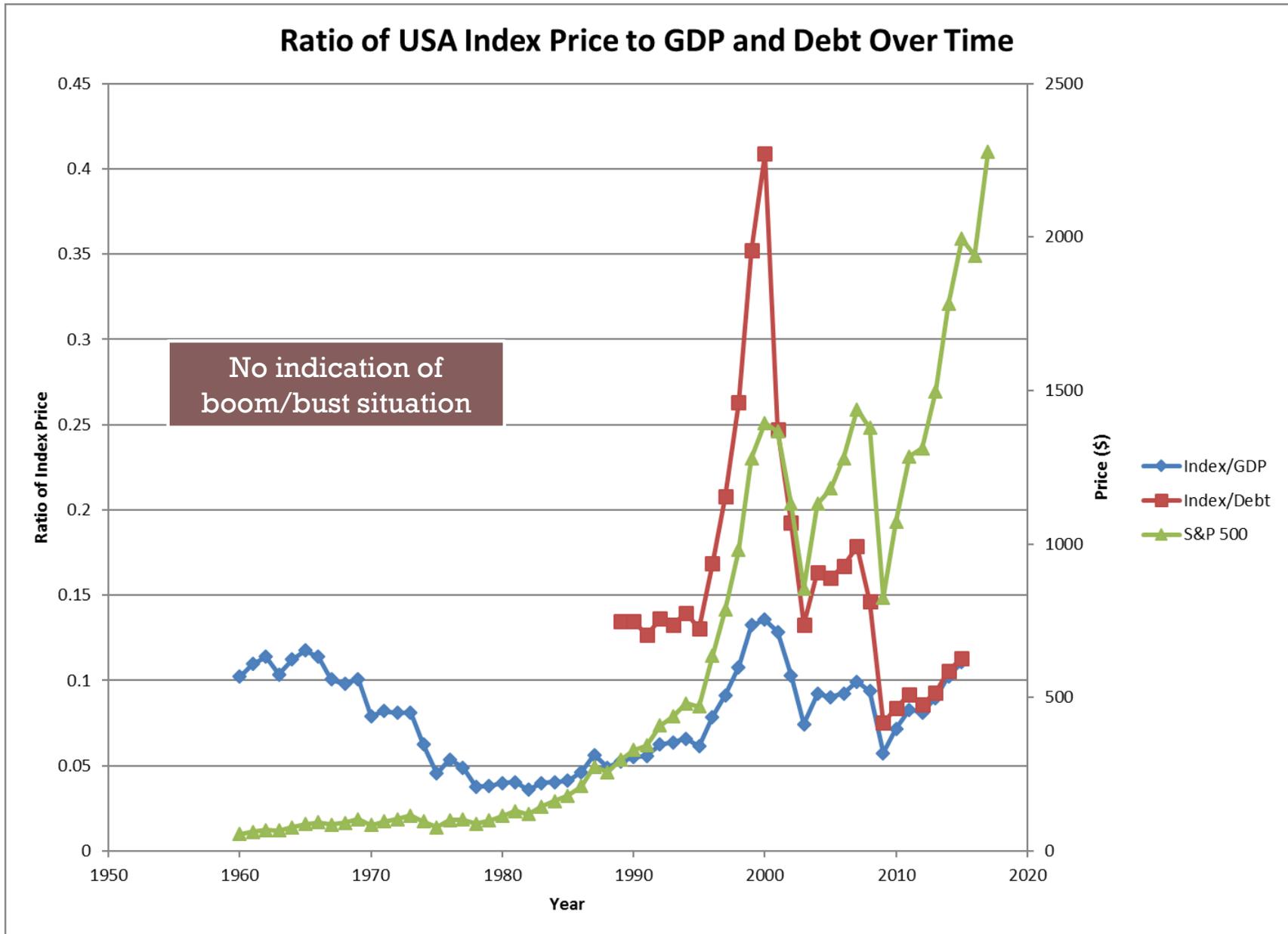
RESULTS: US GDP VS INDEX GROWTH



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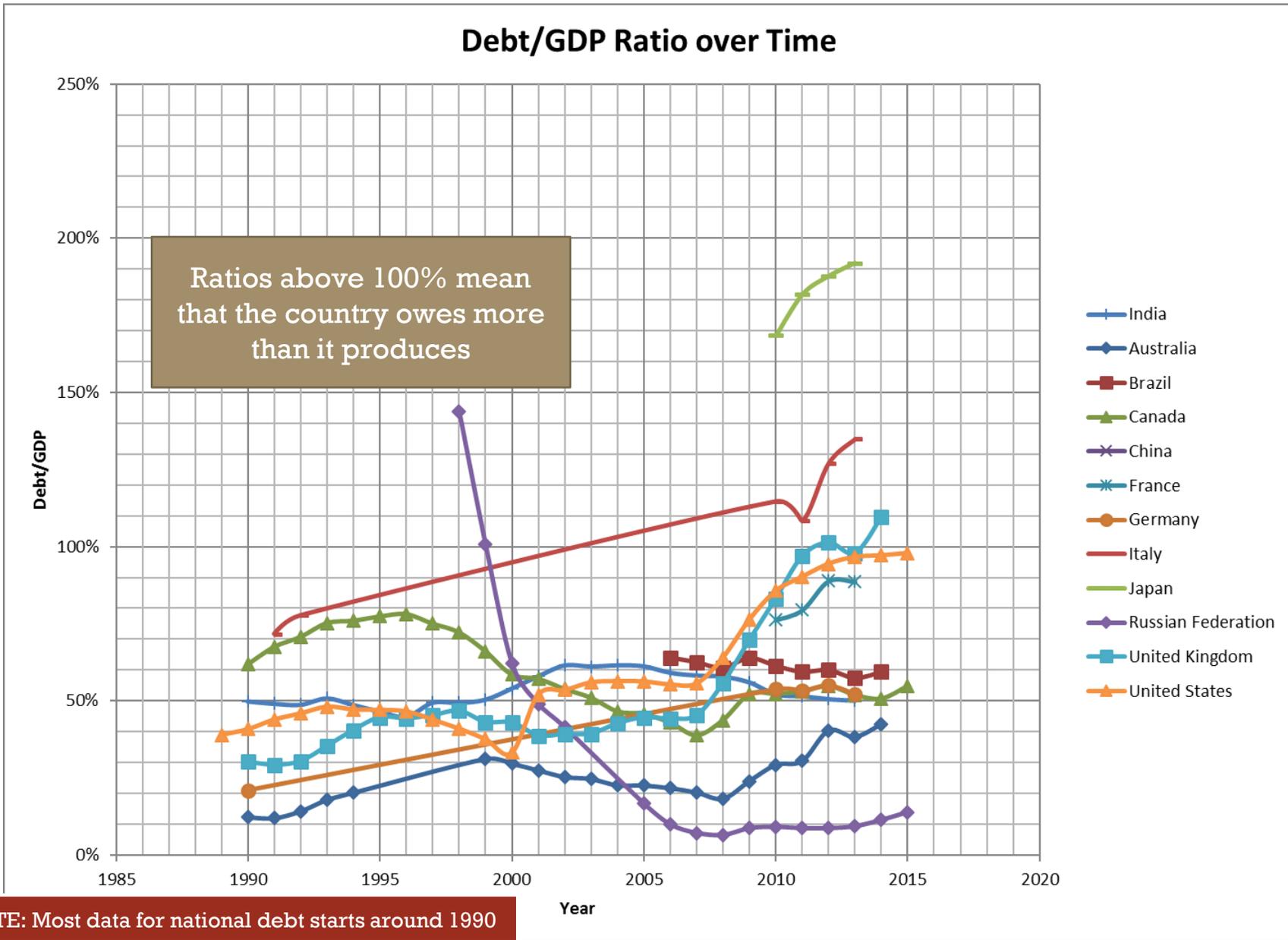


DEFINITION: DEBT/GDP RATIO

- 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.



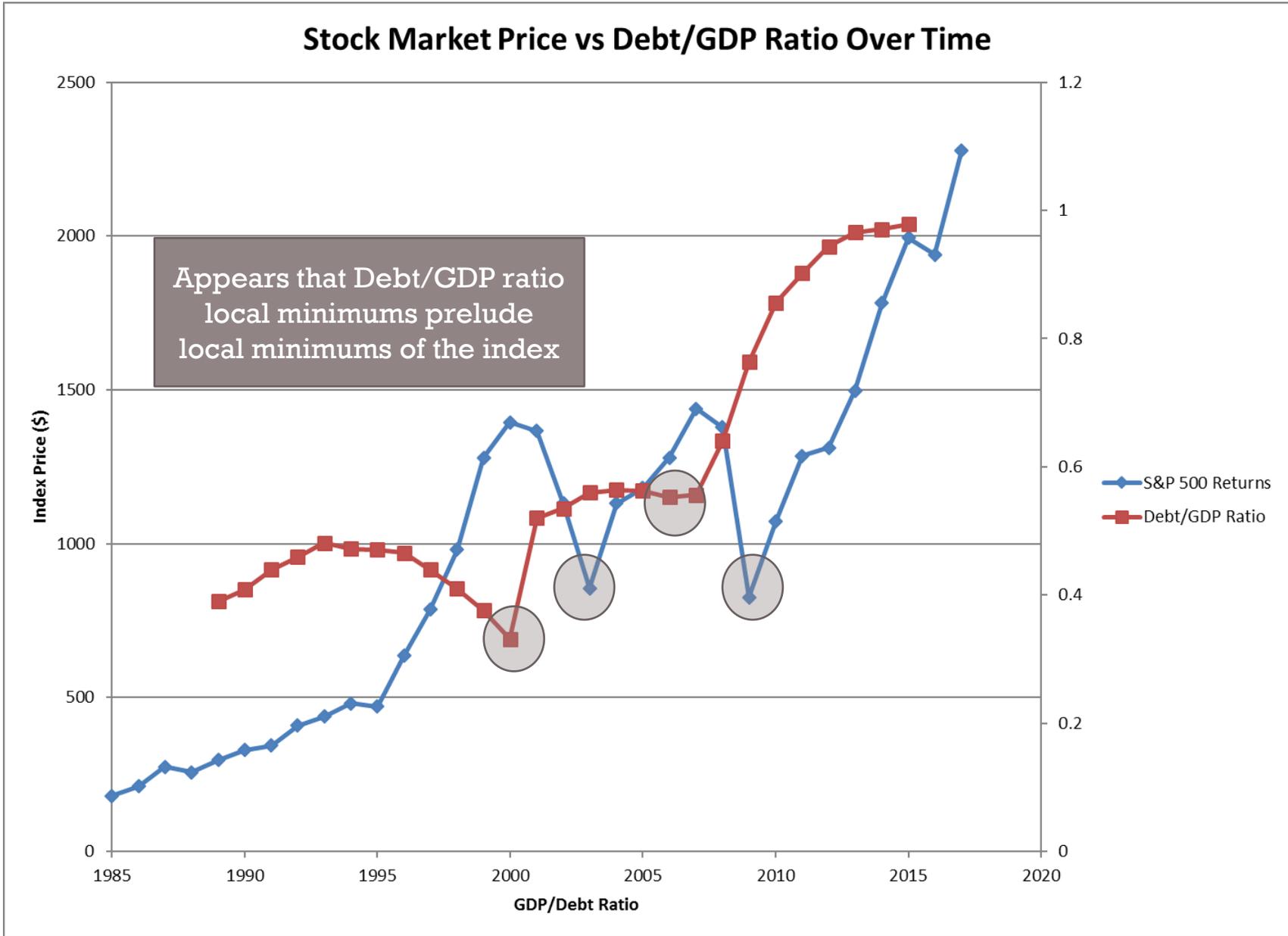
RESULTS: DEBT/GDP RATIO



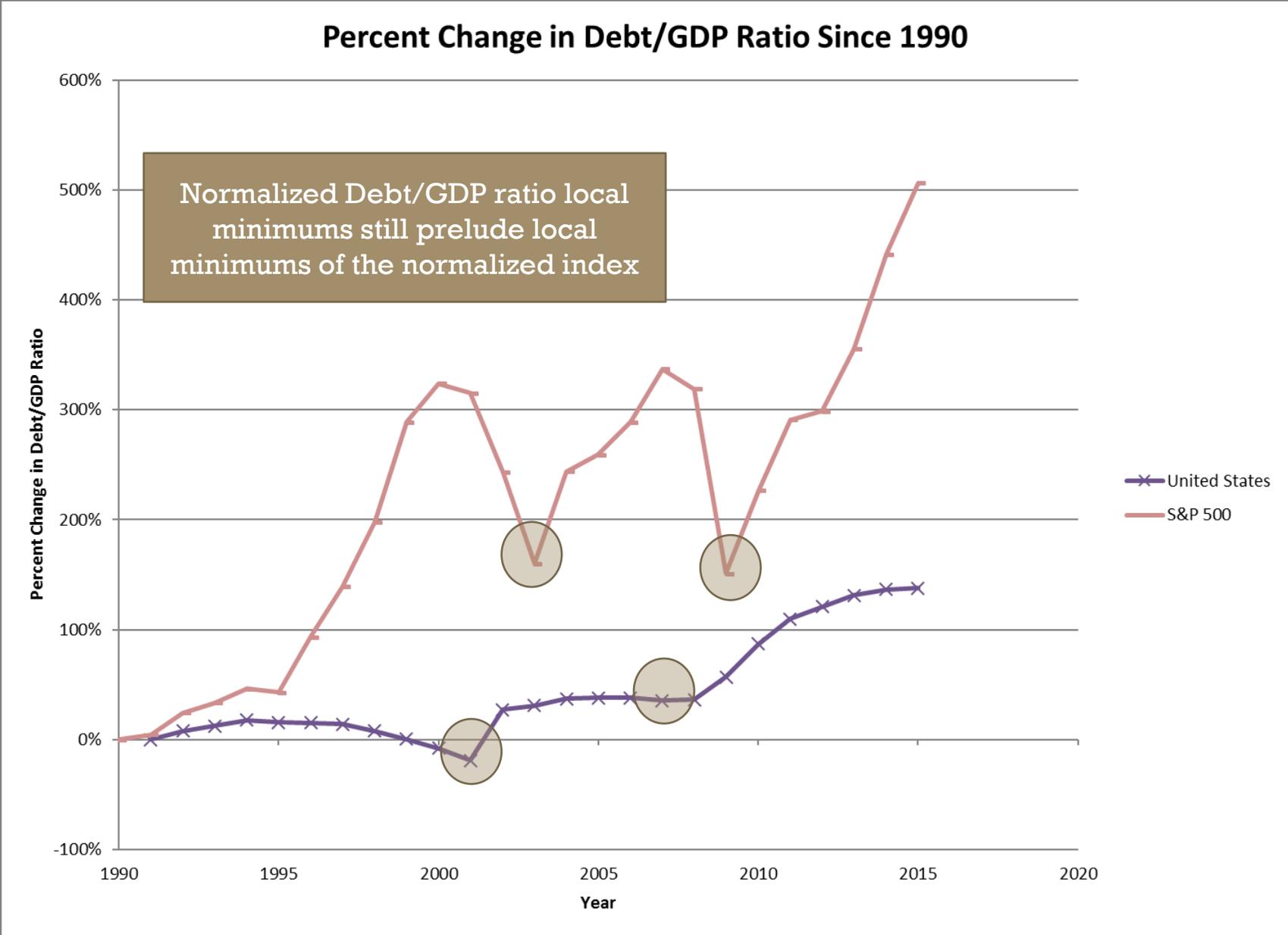
NOTE: Most data for national debt starts around 1990



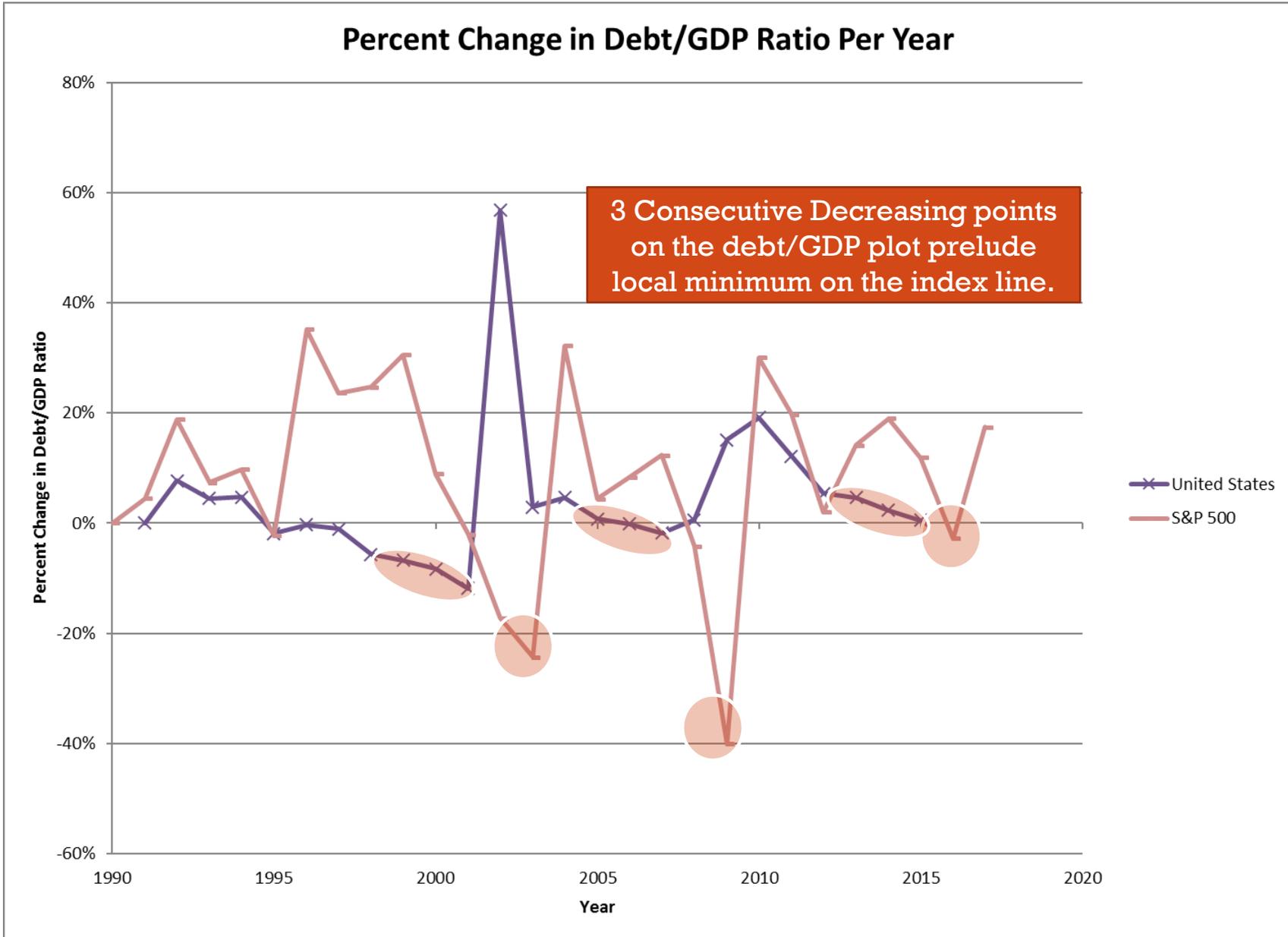
RESULTS: DEBT/GDP RATIO



RESULTS: DEBT/GDP RATIO NORMALIZED

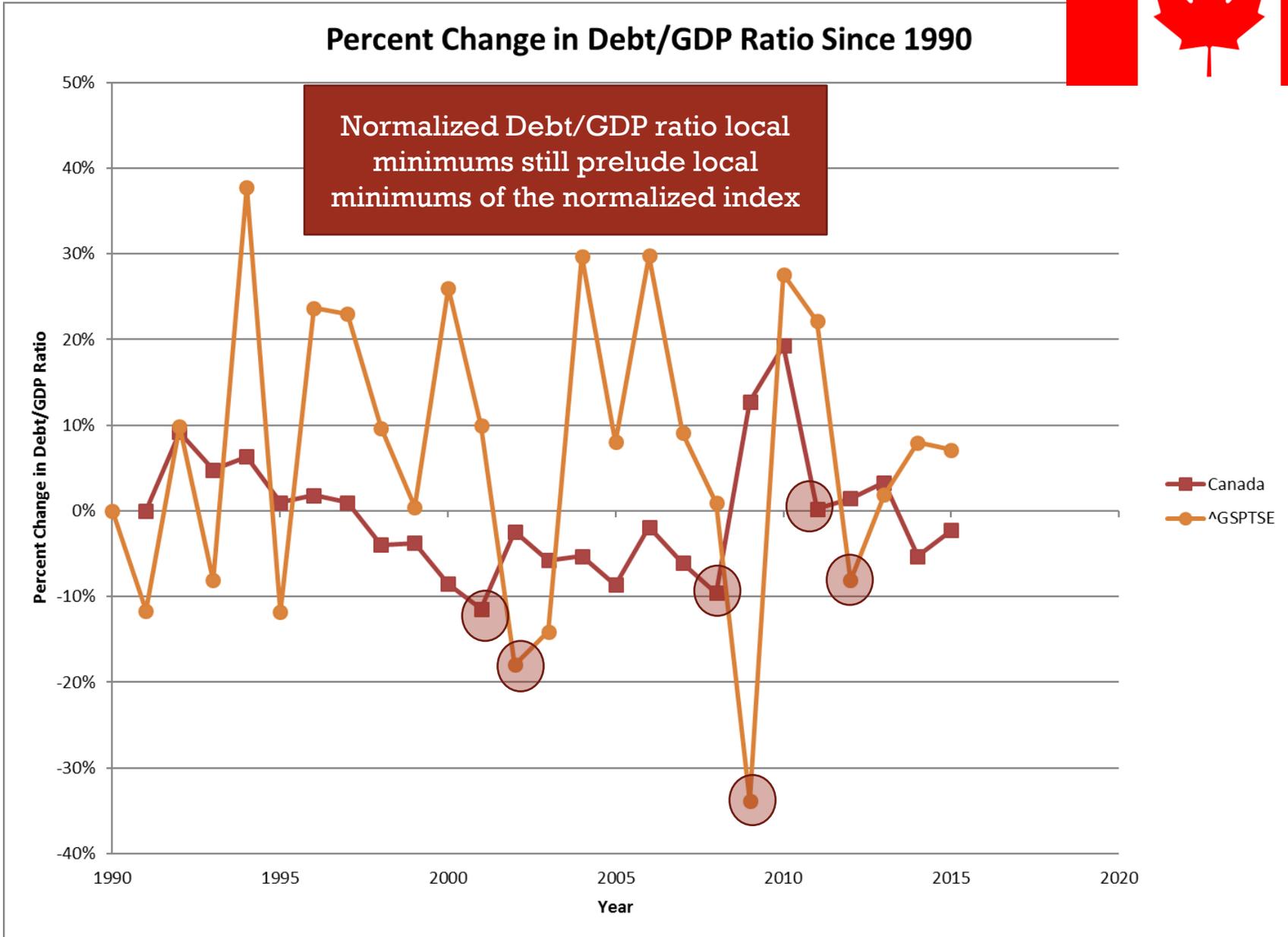


RESULTS: DEBT/GDP RATIO NORMALIZED



RESULTS: DEBT/GDP RATIO NORMALIZED

NOT JUST THE UNITED STATES MARKET

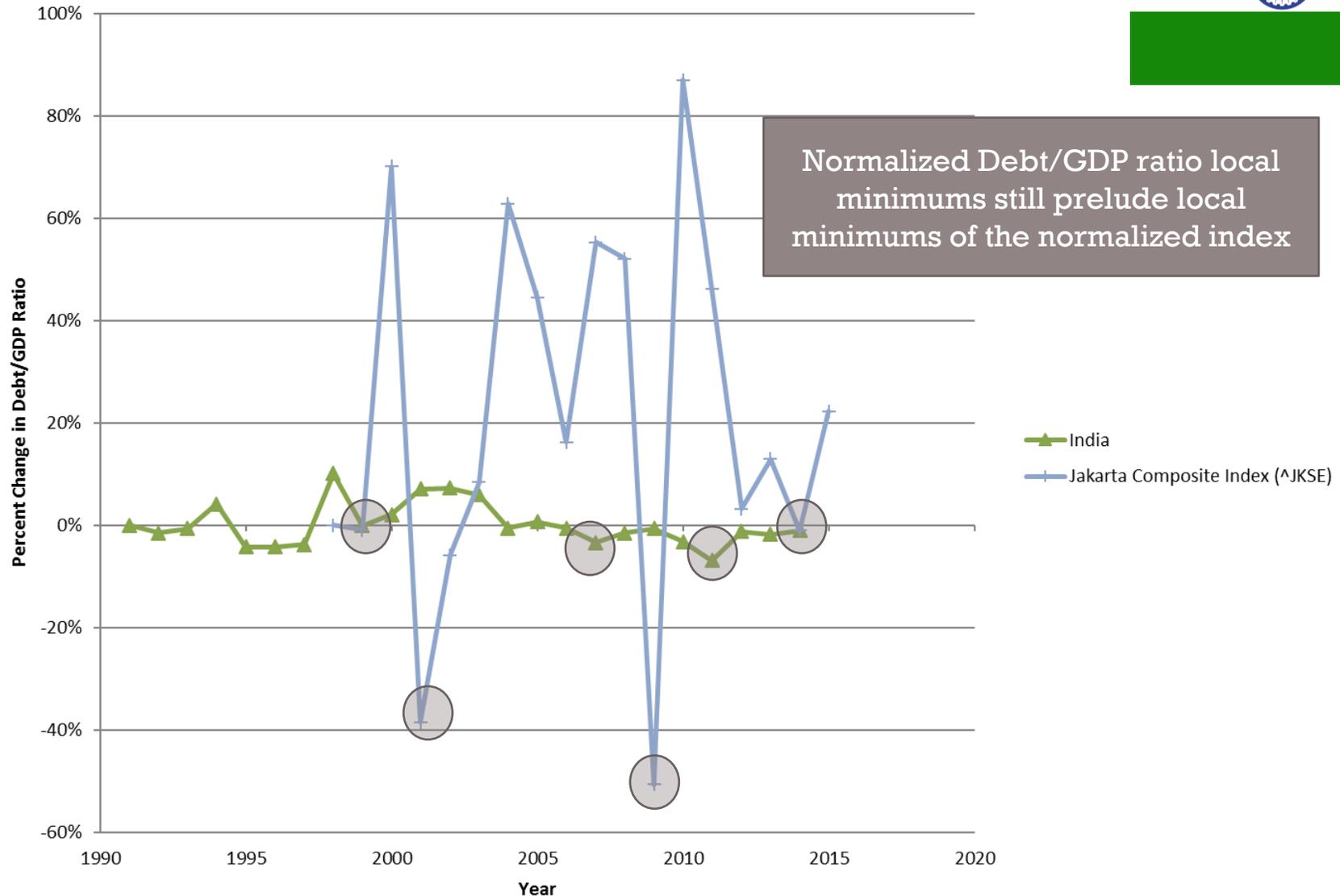


RESULTS: DEBT/GDP RATIO NORMALIZED

NOT JUST THE UNITED STATES MARKET



Percent Change in Debt/GDP Ratio Since 1990



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

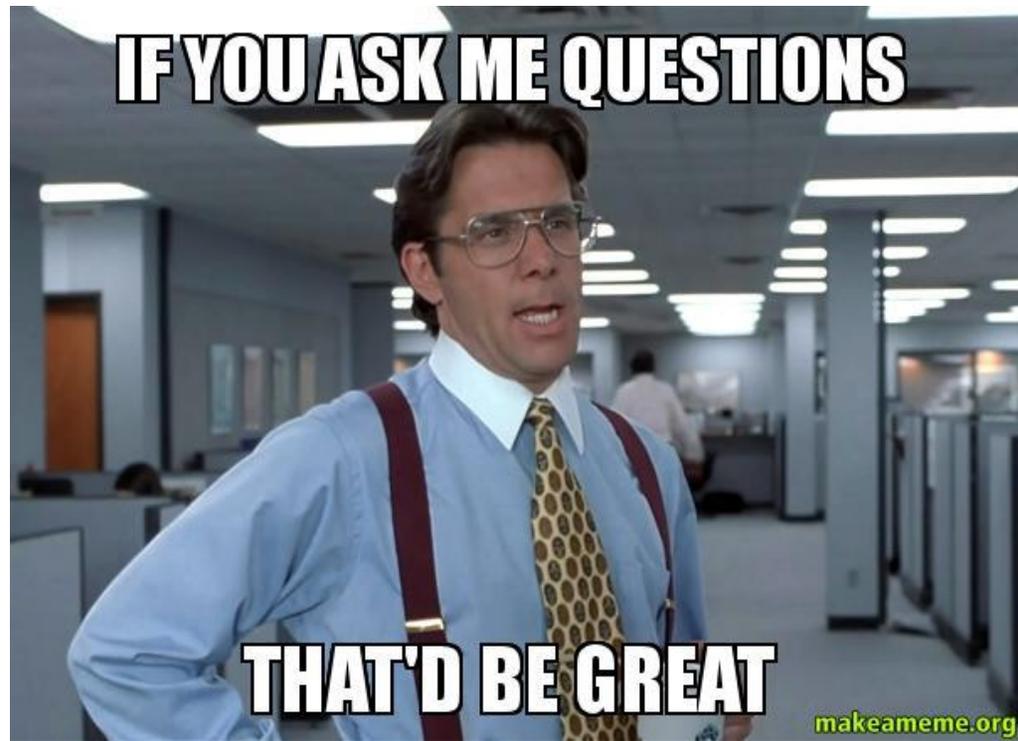
- ❑ Employment Rate, Wages, ect.

❑ Global interconnectedness

- ❑ How different countries economies are interconnected?



QUESTIONS?



REFERENCES

Slide	Object	Reference
4	Definition	http://www.investopedia.com/terms/g/gdp.asp
4	Image	http://www.austindailyherald.com/wp-content/uploads/2014/12/81_157901.jpg
5	Definition	http://study.com/academy/lesson/what-is-national-debt-definition-effects-history.html
5	Image	https://s3.amazonaws.com/lowres.cartoonstock.com/-us_national_debt-u-a-u-national_debt-kfon356_low.jpg
6	Definition	http://www.investopedia.com/terms/i/index.asp
7	Top Ten	http://data.worldbank.org/data-catalog/GDP-ranking-table
7	GDP, Debt Data	http://databank.worldbank.org/data/reports.aspx?source=2&type=metadata&series=NY.GDP.MKTP.CD#
7	Index Data	https://finance.yahoo.com/
13	Definition	http://www.investopedia.com/terms/d/debtgdpratio.asp

With help from: Andrea Fenu, Prof. Stanley, Xiangyi Meng

