

Stock Market vs. GDP Growth

Martina Stieger, Flurina Schneider,
Luis Escobar, Till Furger

December 19, 2022

Introduction

- ▶ Examine whether the stock market capitalization grows faster than the GDP
- ▶ Focus on United States and compare with Indonesia and Mexico
- ▶ Ratio between a country's market capitalization and its GDP: "Buffet Indicator"; provides insight about under-/overvaluation of stock market
- ▶ Over the long-term expected to move in sync
- ▶ Several explanations for stock market growing at a faster rate:
 - ▶ Favorable conditions for certain companies
 - ▶ Investors optimistic, expect future growth
 - ▶ Stock market overvalued, potential for a bubble

Introduction

- ▶ Research gap
 - ▶ Current research compares corporate earnings or absolute values of market capitalization
 - ▶ Those who do examine growth rates only focus on developed countries or countries of a specific region
- ▶ We compare three different countries across the globe at three different development stages (high income, upper middle and lower middle income)

Literature Review

- ▶ Support of supply-side models: In the long-run, aggregate corporate earnings tend to grow at the same pace as GDP [1].
- ▶ Advanced economies: Stock market capitalization and GDP growth in congruence from 1870 to 1980s, ratio tripled after (analysis of 17 advanced economies, 1870-2016). Expansion due to rising equity prices. Profit shift towards listed firms is main driver [2].
- ▶ Relationship between GDP and stock market capitalization for Central and Eastern European countries: "Two-way causality link" between stock market cap and GDP [3].
- ▶ For selected Latin American countries: Economic growth negatively impacted by banking spread, positively impacted by stock market cap [4].

Methodology

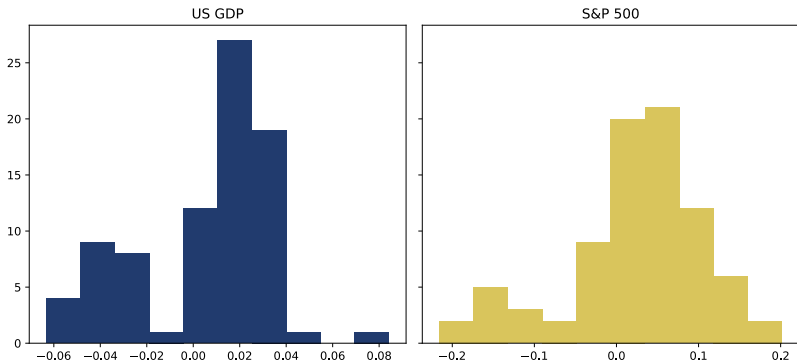
- ▶ Quantitative part
 - ▶ Pull data from Alphavantage, World Bank API, FRED API, Yahoofinance (for years 2000-2022)
 - ▶ Provide summary statistics, line plots, box plots, regress SPY on GDP
 - ▶ Develop Rshiny app to compare GDP to the stock market data for the US, Indonesia and Mexico over different time intervals and date ranges
- ▶ Qualitative part
 - ▶ Comparison with selected papers

Findings - US

- ▶ Positive correlation when we regress SPY on US GDP
- ▶ Average US GDP growth rate lies below the average growth rate of the SPY
- ▶ Median growth rate of the US GDP lies below the median growth rate of the stock market capitalization
- ▶ Volatility of SPY growth larger

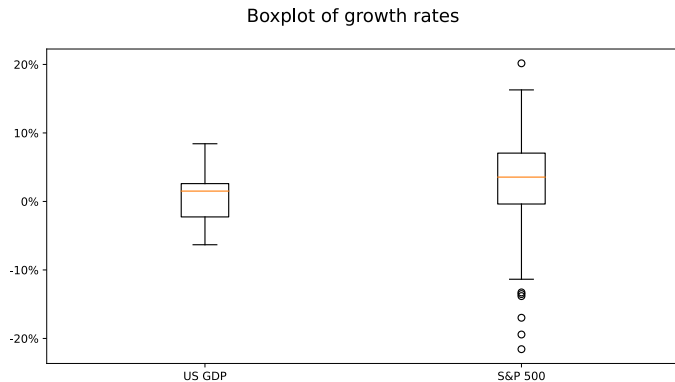
Findings - US

Histograms of growth rates



Histograms

Findings - US



Findings - US

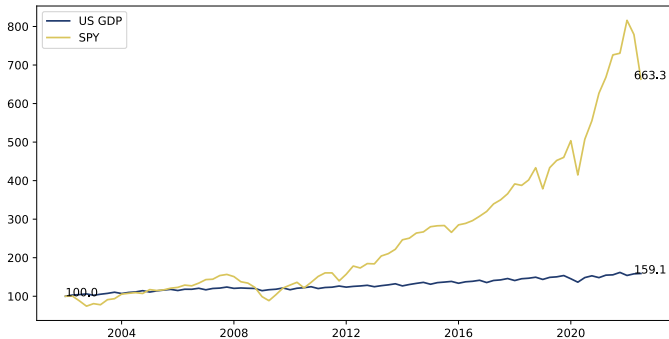
	US GDP	SPY	GDP Growth	SPY Growth
Count	82.00	82.00	81.00	81.00
Mean	4128.13	160.36	0.01	0.03
Std.	452.13	101.01	0.03	0.08
Minimum	3263.87	55.68	-0.06	-0.22
25%	3824.75	87.52	-0.02	-0.00
50%	4036.64	112.79	0.02	0.04
75%	4487.54	211.11	0.03	0.07
Maximum	5110.95	469.53	0.08	0.20

Findings - US

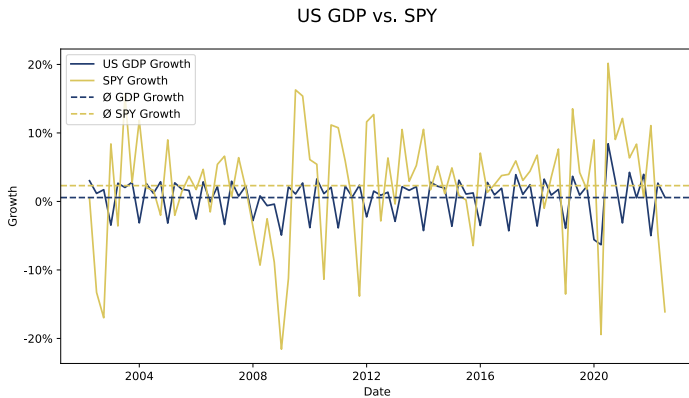


Findings - US

US GDP vs. SPY



Findings - US



Findings - Global

- ▶ For considered time period (2000-2022), stock market growth is larger in Indonesia and Mexico compared to the US
- ▶ Both Indonesia's mean stock index growth rate and GDP growth rate exceed the respective ones of the United States
- ▶ Mexico's mean GDP growth rate is below the US mean growth GDP rate, while its mean stock index growth rate above the one of the US

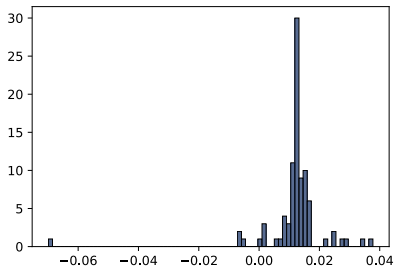
Findings - Global

- ▶ Stock market peaks
 - ▶ 2009 for all 3 countries, highest for Indonesia
 - ▶ 2020/07 for all 3 countries, highest for US
- ▶ Stock market troughs
 - ▶ 2008 for all 3 countries, Indonesia lowest (Financial Crisis)
 - ▶ 2020/04 for all 3 countries, Indonesia lowest (Covid)
- ▶ GDP peaks
 - ▶ 2020/07 for all 3 countries, most extreme for Mexico
- ▶ GDP troughs
 - ▶ 2020/04 for all 3 countries, most extreme for Mexico (Covid)

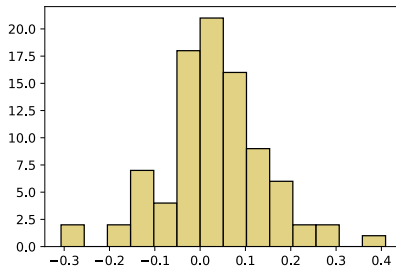
Findings - Global

Histograms of quarterly growth rates

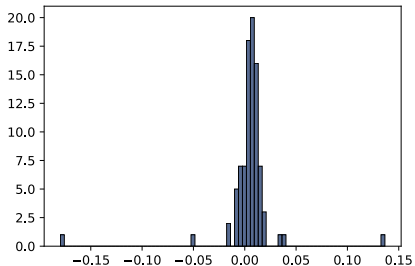
Indonesia GDP



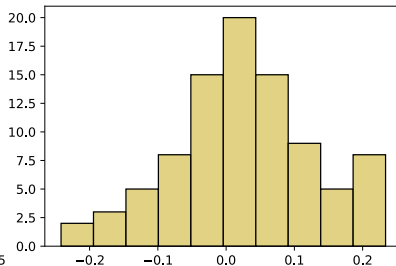
Indonesia Stock Index



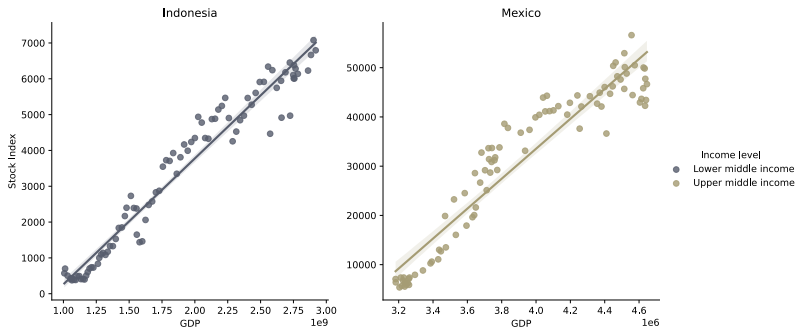
Mexico GDP



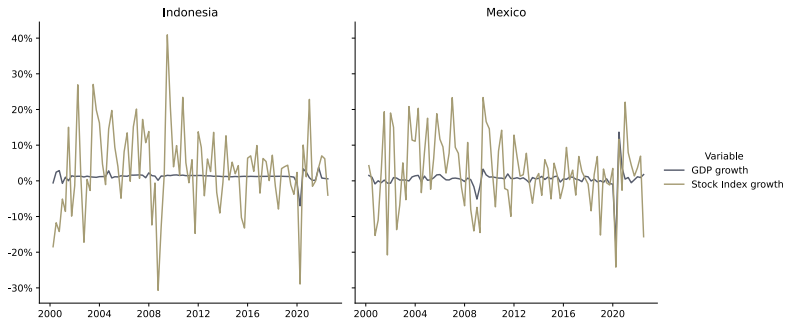
Mexico Stock Index



Findings - Global

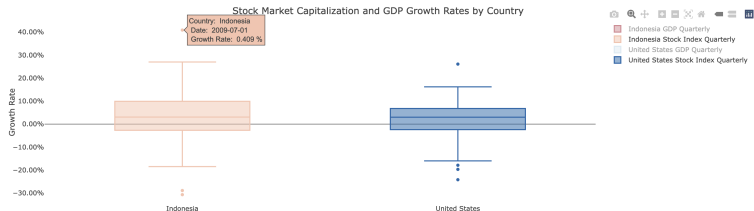


Findings - Global



Robustness Checks

- To check the robustness of our findings, we have created an **interactive app**



Results and Discussion

- ▶ In all examined countries, stock market is growing at a faster rate than GDP
- ▶ The magnitude of the results differ depending on development stage and selected frequency
- ▶ Interpretation according to Buffet Indicator - indication of a potential bubble?

Results and Discussion

► Limitations

- We only look at the aggregate
- We are not differentiating between industries
- Take SP500 and SPY as proxy for US (limited selection of companies)
- Did not control for region-specific factors

► Outlook

- Increase sample size, include more countries at different development stages to cross-reference
- Increase time span (provide historical context)
- Control for additional factors (e.g. region-specific factors)

Data Sources

- ▶ For US alone, data for stock market capitalization (using the SPY ETF as a proxy for the S&P 500) and GDP from <https://www.alphavantage.co>.
- ▶ Income-level at the country level: **World Bank API**¹.
- ▶ GDP quarterly data: **FRED API**² using the **fredapi** python package³.
- ▶ Stock Indices data: **Yahoo Finance**⁴ using the **yfinance** python package⁵.

¹ Documentation: <https://datahelpdesk.worldbank.org/knowledgebase/articles/889392-about-the-indicators-api-documentation>

² <https://fred.stlouisfed.org/docs/api/fred/>

³ <https://github.com/mortada/fredapi>

⁴ <https://finance.yahoo.com/>

⁵ <https://pypi.org/project/yfinance/>

References I

- [1] Inc. MSCI. *Is There a Link between GDP Growth and Equity Returns?* en. SSRN Scholarly Paper. Rochester, NY, May 2010. DOI: [10.2139/ssrn.1707483](https://doi.org/10.2139/ssrn.1707483). URL: <https://papers.ssrn.com/abstract=1707483> (visited on 12/18/2022).

- [2] Dmitry Kuvshinov and Kaspar Zimmermann. “The big bang: Stock market capitalization in the long run”. en. In: *Journal of Financial Economics* 145.2, Part B (Aug. 2022), pp. 527–552. ISSN: 0304-405X. DOI: [10.1016/j.jfineco.2021.09.008](https://doi.org/10.1016/j.jfineco.2021.09.008). URL: <https://www.sciencedirect.com/science/article/pii/S0304405X21003962> (visited on 12/18/2022).

References II

- [3] María A. Prats and Beatriz Sandoval. “Does stock market capitalization cause GDP? A causality study for Central and Eastern European countries”. en. In: *Economics* 14.1 (Dec. 2020). Publisher: De Gruyter Open Access. ISSN: 1864-6042. DOI: 10.5018/economics-ejournal.ja.2020-17. URL: <https://www.degruyter.com/document/doi/10.5018/economics-ejournal.ja.2020-17/html> (visited on 12/18/2022).

References III

- [4] Ali Aali-Bujari, Francisco Venegas-Martínez, and Gilberto Pérez-Lechuga. “Impact of the stock market capitalization and the banking spread in growth and development in Latin American: A panel data estimation with System GMM”. en. In: *Contaduría y Administración* 62.5 (Dec. 2017), pp. 1427–1441. ISSN: 0186-1042. DOI: 10.1016/j.cya.2017.09.005. URL: <https://www.sciencedirect.com/science/article/pii/S018610421730102X> (visited on 12/18/2022).