

A STUDY AND COMPARISON OF SHRIMP AND SILVER COMMODITY PRICE CHANGES (1994 – 2020)

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OVERVIEW

Silver price has been exceeding at specific timings and gaining back the momentum, despite macroeconomic backdrops with somewhat negative ROC (rate of change) value specifically in 2013 (indexmuni n.d.). Moreover, according to its value protection against inflation and high correlation with gold price, the price growth skyrockets (McGuire 2013; Scottdale n.d.).

Regarding **shrimp** market, it slowly gains impulse where the prices keep climbing in current period of economic recovery. Notwithstanding the harsh-conditioned supply chains during the pandemic (2019-2020) the price is leveraged even higher and cause selling pressure and oversupplying. Or in 2015, shrimp price fell by 15-20% compared to the first six months of 2014 due to supply and demand imbalances in the America, Europe, and Japan (GLOBEFISH n.d.). And since the growth rate is modest so the market is labeled as potential (Adam & Deshmukh 2021).

Overall, two commodities witness dynamic growth rates and have significant impacts on the general trading market.

This report's objective is to illustrate and compare the changes in prices based on the dataset from 1994 to 2020 by International Monetary Fund.

DESCRIPTIVE STATISTICS ANALYSIS

1. Line graph

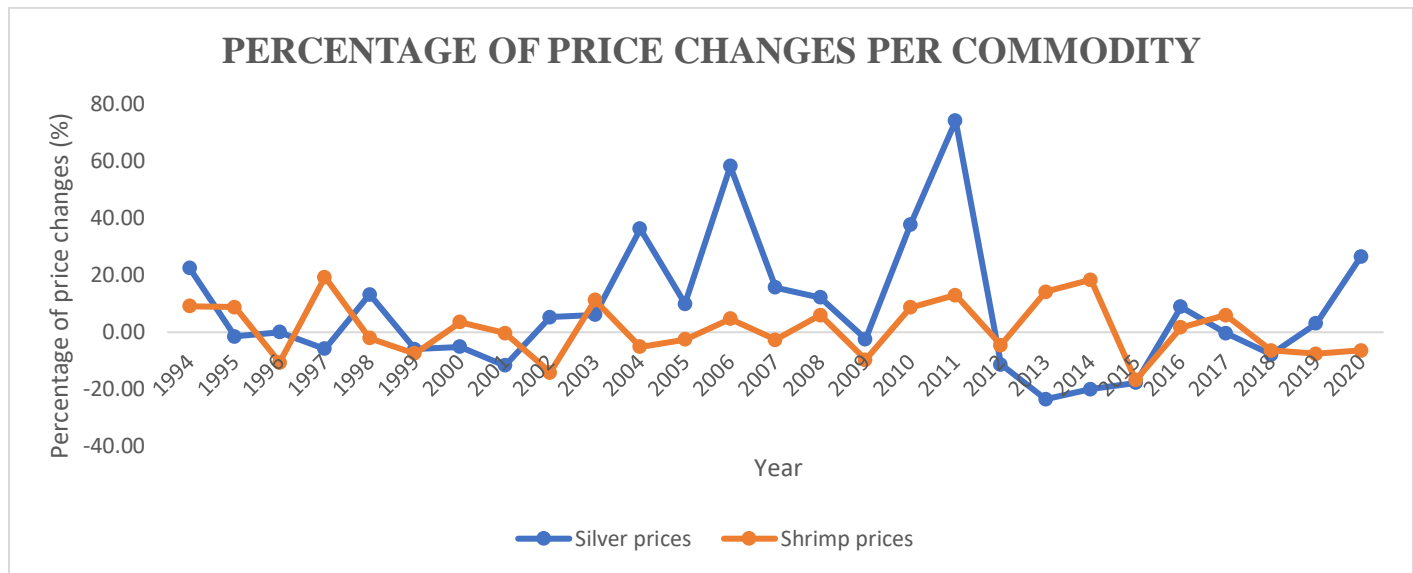


Figure 1. Line graph illustrates the fluctuation in prices of Silver and Shrimp by percentage (1994-2020)

Both commodities are observing violent fluctuation in price growth rate, while silver prices experience more dramatical changes when reached its peaks 3 times and plummeted sharply a year after.

Inverse trend of these two commodities is a noticeable point. Take 2013 as an example, shrimp growth rate nearly reaches its summit in 1997 (18.41% vs 19.36%), whereas the silver rate sinks to a trough of -23.50%.

In other words, the graph indicates the economic level is in recovery phase, where silver price increase 4.09% compared to its initial point.

2. Measures of Central Tendency

CENTRAL TENDENCY IN PRICE CHANGES OF SILVER AND SHRIMP			
TYPES	SILVER	COMPARISON	SHRIMP
Mean	8.03	>	1.062
Median	3.12	>	-0.27

Mode	NONE	#N/A	NONE
Outlier	Observation value <-38.46 > 48.24		Observation value <-29.28 >31.70
Result	2		0

Figure 2. Table comparison the Central Tendency measurement in price changes between Silver and Shrimp (1994-2020)

Among three practices of measuring central tendency **Mean** and **Median** are applied in favor of mean, while **Mode** is invalid. Although outliers are detected, mean measure helps the results more informative when all values are counted, including outliers. Besides, accuracy can be supported by median measure since extreme values make no effects on the results. Combining 2 practices, silver rate outweighs shrimp rate at (8.03 – 3.12 versus 1.062 - -0.27). That comes with a deduction, silver prices have a more rapid growth pace.

3. Measures of Variation

VARIATION IN PRICE CHANGES OF SILVER AND SHRIMP			
TYPES	SILVER	COMPARISON	SHRIMP
Range	97.66	>	36.196
Interquartile Range	21.676	>	15.245
Variance	523.748	>	95.022
Standard Deviation	22.886	>	9.748
Coefficient of Variation	285%	<	918.0%

Figure 3. Table comparison of Variation in price changes of Silver and Shrimp (1994-2020)

Coefficient of Variation (CV) is the only measure where shrimp price rate is higher than that of silver. Like Mean, CV involves all values from the mean in its calculations. Therefore, it is the main measure for Variation. Firstly, higher CV value of shrimp indicates the relative between Standard Deviation and the Mean, therefore, it costs silver more stability to narrow down the

dispersion around the mean. In other words, the higher variation measures are, the more data spreads making the market, here is silver, witness more dynamic and dramatic changes over a period (Gordon 2021). This explains for the violently fluctuating line graph. And this measure in real-life practice helps corporations detect the risk levels between different choices to minimize the risk costs.

4. Histogram

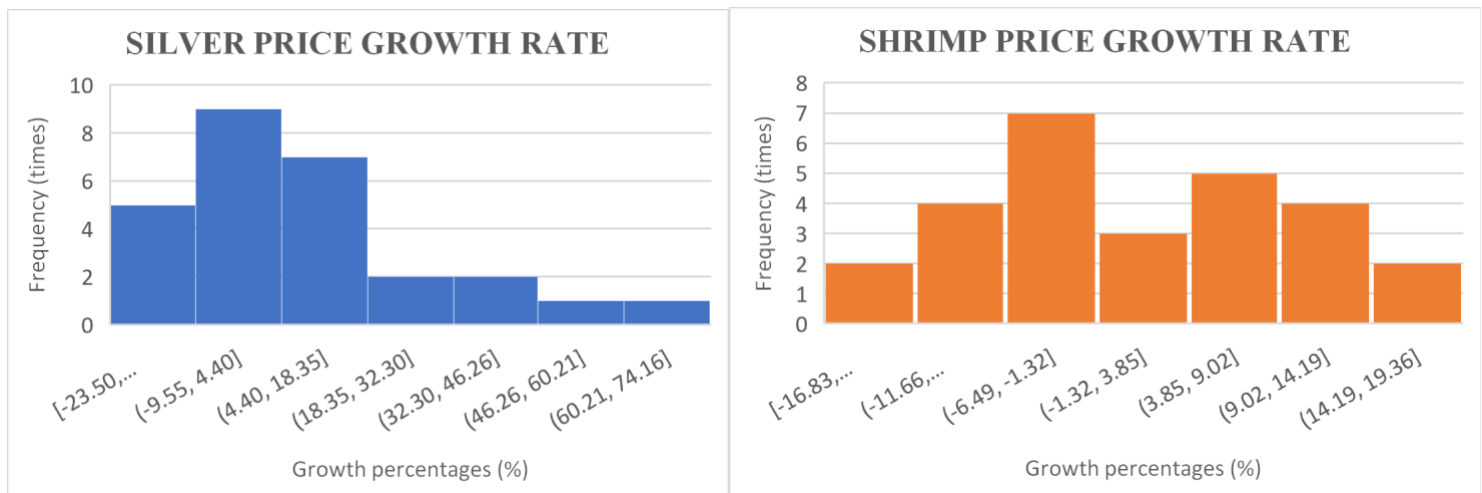


Figure 4. Histogram of price growth rate of Silver and Shrimp (1994-2020)

Both graphs are right skewed shape. However, silver's graph is less demanding to detect the skewness side since there are two outliers making the graph have more layered distribution in terms of frequency and value.

In contrast, the highest frequency of silver is the range from -9.55% to 4.40% with 9 times appear on the array and for shrimp the range is from -6.49% to -1.32% with 7 times appear. This comparison again emphasizes the dominate growth rate of silver over shrimp.

5. Box-and-Whisker plot

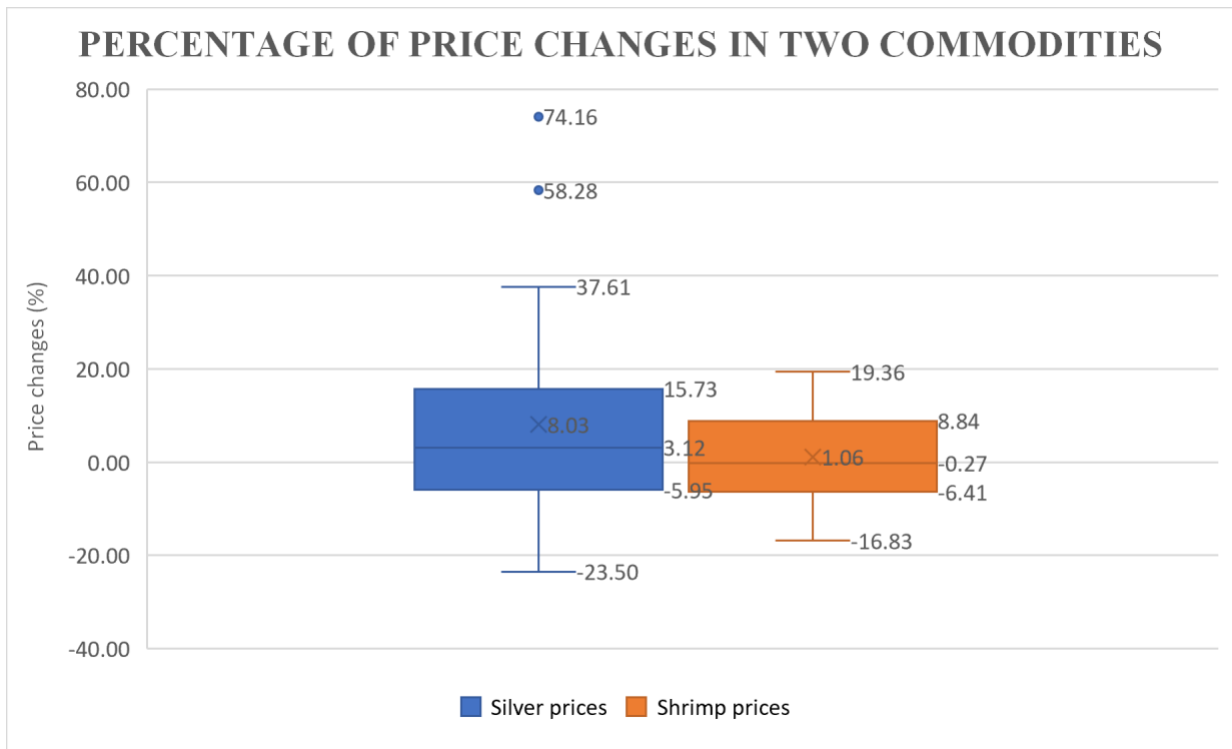


Figure 5. Box-and-Whisker plot of price changes of Silver and Shrimp (1994-2020)

Silver prices (%)

	LEFT SIDE	COMPARISON	RIGHT SIDE	RESULT
Box	9.066	<	12.610	Right-skewed
Whisker	17.553	<	21.881	Right-skewed
Q2 to min/max	26.619	<	71.037	Right-skewed

Shrimp prices (%)

	LEFT SIDE	COMPARISON	RIGHT SIDE	RESULT
Box	6.139	<	9.107	Right-skewed
Whisker	10.423	<	10.528	Right-skewed
Q2 to min/max	16.562	<	19.635	Right-skewed

In contrast, Box-and-Whisker plot provides more determinants to decide the direction of skewness than Histogram.

The Whisker of the shrimp's chart drives the confusion between its distribution since they are approximately equal (10.423% vs 10.528%), whereas the skewness just values 0.105%. In respect of silver's chart, the gap is narrowed but still numerically visible.

Despite having a lower minimum value, silver still experiences higher growth rate accordingly to the maximum value drags the range wider.

6. Conclusion

Reflecting to the line graph, throughout 27-year-period, silver rate takes over the lead and even widens the gap 17-year-timings. Finally, silver price growth rate is 32.99%, meanwhile, shrimp price growth rate plunges to -6.39. For impartiality, the median measure is chosen for not being influenced by extreme values. As the results above, silver rate is 3.12%, 11.55 times higher than shrimp rate at -0.27% in term of absolute calculation. Interquartile Range is also not affected by outliers. The result shows 1.42 times higher in favor of silver price growth rate (21.676% vs 15.245%). That means silver rate values are many times higher excluding extreme values. So, through 3 straightforward results and comparisons, silver has experienced a higher growth rate with a considerable pace.

7. Conclusion versus Overview

Conclusion solves the question of which commodity has the higher growth rate, and that matches with the Overview. From the report's introduction, it indicates that silver market is surging and through many practices, the results emphasize the higher growth rate belongs to silver. And during the pandemic (2020), silver rate still increases meanwhile shrimp market crashes, can be seen with the value from the line graph in (1).

8. Factors

8.1. Demand

Basically, traditional supply and demand considerations drive commodity pricing (Pilar, Eva & Paola 2020). To silver, the demand upsurges as investors pay attention to the low interest rate to purchase silver as safe-haven asset during the pandemic's looser monetary policies (TheSilverInstitute 2021; Gallagher 2021). Moreover, the prices are high but demanding thanks to its unique qualities make it nearly implausible to substitute, and its applications in

manufacturing are diverse varying from solar panels to electromagnetic fields, etc. (SilverInstitute n.d.). Unlike silver, pandemic depression as well as the demand shock from economic collapse drives the demand of shrimp market and the growth down significantly (Fletcher 2020)

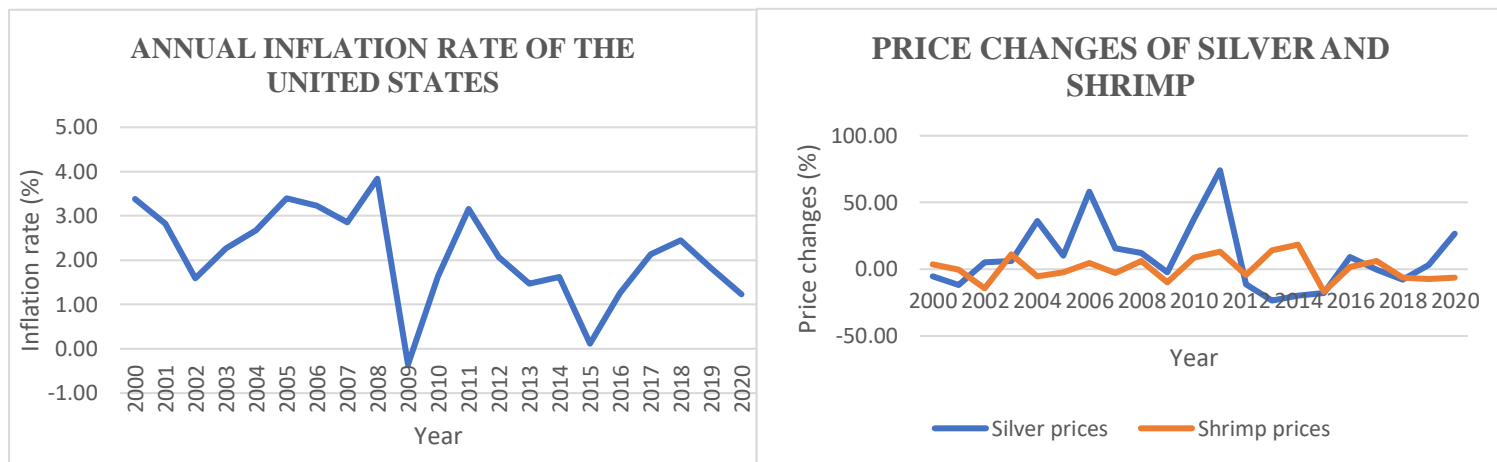
8.2. Taxes

Tax which is one of the supply shock factors motivating the commodity pricing. As proof, India reduces the importing duty on silver from 12.5% to 7.5%, therefore, the domestic competition becomes more dynamic because diaspora can purchase within national market making the price growth decrease (Ghosal 2021). Likewise, the exporting tax seafood from Vietnam to EU is 0% (WTO n.d), this accelerates the exporting procedures and puts less pressure on selling.

8.3. Costs

Silver production costs correlates its price changes since investors consistently demand for a better cost-cutting measure whenever the price declines (American Bullion, Inc. n.d.). This ratio is also true for shrimp. In Vietnam market, the transportation costs are 4 times higher like container freight rates, from \$1800 to \$7100/container for US shipment. And the material and possessing costs are also rising by 10-15% by November 2020 making the price growth also soars. (Duc 2021).

9. US Inflation Rate and Price Changes in Commodities



***Figure 6.** Line graphs for the percentage of Annual Inflation Rate of the United States and Price changes of Silver and Shrimp (2000-2020)*

Inflation is defined as a decline in the purchasing power of currency caused by an increase in prices throughout the economy (Floyd 2021) That means whenever the inflation rises, it puts tension on the purchase norms because the prices also increase and vice versa, as inflation and price share the proportional quantities as well as ratio. For example, in 2015, inflation rate decreases by 1.5% pulling the prices of both silver and shrimp down to negative value at -17.71 and -16.83, respectively. However, the annual inflation rate statistics is based on the U.S market compared to the global scale of price changes in silver and shrimp. Therefore, graphs and changes are unable to align absolutely with the hypothesis of correlation.

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