The Variation in Consumer Confidence and Alternative Currencies in the Age of Web 3.0

Yousuf Farhan

4/27/2022

Abstract

The replacement of the Gold Standard with fiat currency was a major change in how the value of gold was perceived. Gold was commonly seen as an alternative currency and store of value that is not subject to inflation and short-term economic booms and downturns. This paper finds that the value of gold increases consistently without any major variations that can be attributed to policy, taxation, consumer confidence or inflation. However, it also finds that gold as an alternative currency and store of value acts very different than Bitcoin. This can be attributed to the latter being subject to speculative bubbles, both short and long-term, being free from supply chain issues and belonging to an immature market with little to no regulation, inconsistent taxation and easy access. These three factors do significantly impact the price of Bitcoin, as this paper clearly shows, it also shows how a change in the levels of consumer confidence often acts as a precursor to significant variation in the price of Bitcoin, which is then amplified by the aforementioned factors.

Introduction

Since fiat currencies first becoming mainstream, consumer confidence in alternative stores of value and currencies has not varied greatly. The price of Gold increased yearly at a relatively fixed rate. In the twenty-first century, the emergence of Web 3.0 technologies such as blockchain and smart contracts has paved the way for new stores of value to enter the arena. In particular, this paper analyses consumer behavior regarding the alternate stores of value of the future and whether consumer confidence regarding them fluctuates just like with traditional stores of value, such as gold and precious stones. The paper tests the following hypothesis; does the level of cumulative consumer confidence influence the value of gold and cryptocurrencies? It then takes a step further and tries to predict future trends by pre-defining values for gold, cryptocurrencies and levels of consumer confidence in OECD member states, using multiple linear regression, followed by how different levels of consumer confidence influence the values of traditional stores of value, in this case represented by the value of gold and technologically savvy ones, measured by the value of Bitcoin.

It should be noted that this paper compares the value of one cryptocurrency and the global value of gold and contrasts it with the levels of consumer confidence among OECD member states to test the aforementioned hypothesis. It will test the relationship that these three objects of interests share with each other individually and as a compounded result.

For practical and readibility reasons, all datasets are analyzed within a time frame of a few years, and monthly averages are compared.

Data

How the data was obtained

This paper uses (R Core Team 2021) for statistical analyses with (Ushey et al. 2020) as the intergrated development environment. Relevant packages include (Wickham 2021), (Wickham, François, et al. 2021) and (Wickham and Miller 2021) for data management, manipulation and analysis.(Wickham, Chang, et al. 2021) is used for the purposes of graphing and data visualization. (Francois 2020) is used to generate a standardized citations that adhere to Bibtex standards. Multiple datasets were used. To analyze value points at various dates for cryptocurrencies a dataset from data.world.com ("Bitcoin USD (BTC-USD) Price History &Amp; Historical Data" 2022) was used. The data for consumer confidence among OECD member states was taken from the OECD website ("Consumer Confidence Index (CCI)" 2022). Gold values were taken from the World Gold Council ("Historical Gold Prices," n.d.).

Cleaning the data

For the dataset for consumer confidence among OECD member states ("Consumer Confidence Index (CCI)" 2022), a three-step cleaning process is applied. First, the Dplyer package (Wickham, François, et al. 2021) is used to select rows which show the cumulative OECD figures. Then the average for each month is calculated. This is followed by removing the figures for the entire OECD to make the dataset specific to OECD member states using the Tidyverse package (Wickham 2021). The data parsing for this dataset is concluded by converting the string values for each month to the date type (Grolemund and Wickham 2011).

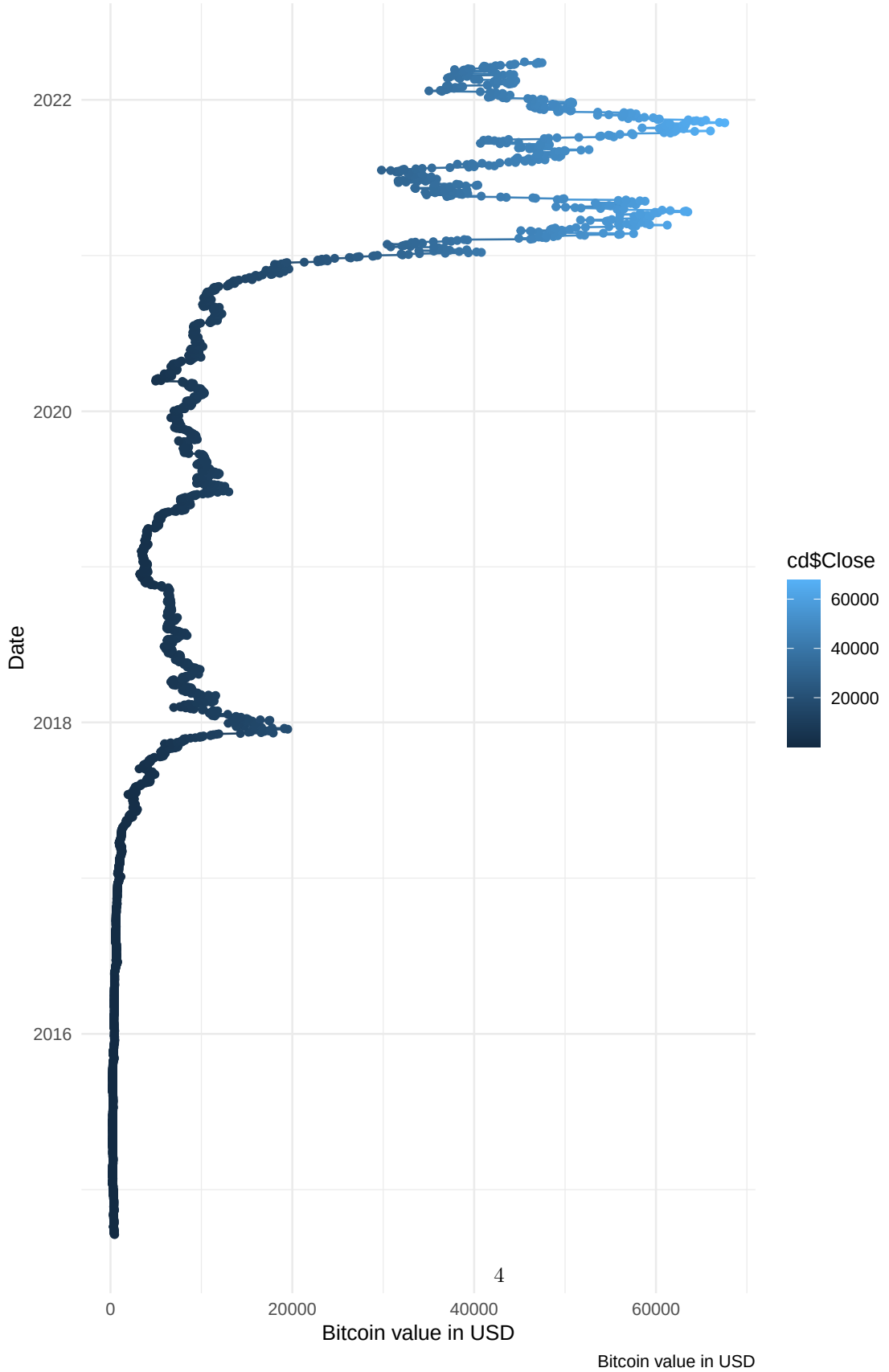
The dataset used for cryptocurrencies ("Bitcoin USD (BTC-USD) Price History &Amp; Historical Data" 2022) is subject to only one data cleaning process, which consists of grouping rows by month to compare and contrast data from multiple datasets better. For gold, the dataset from the World Gold Council ("Historical Gold Prices," n.d.) is has two columns selected, one depicting the date and the other the value in United States' dollars. Then only the rows from the end of 2013 upto March 2022 are selected for further analysis.

All three datasets' subset containing dates after September 2014 are then used for further analysis using the Tidyverse package (Wickham 2021). The default value for consumer confidence is 100. Lower than 100 resembles falling consumer confidence levels, and vice versa.

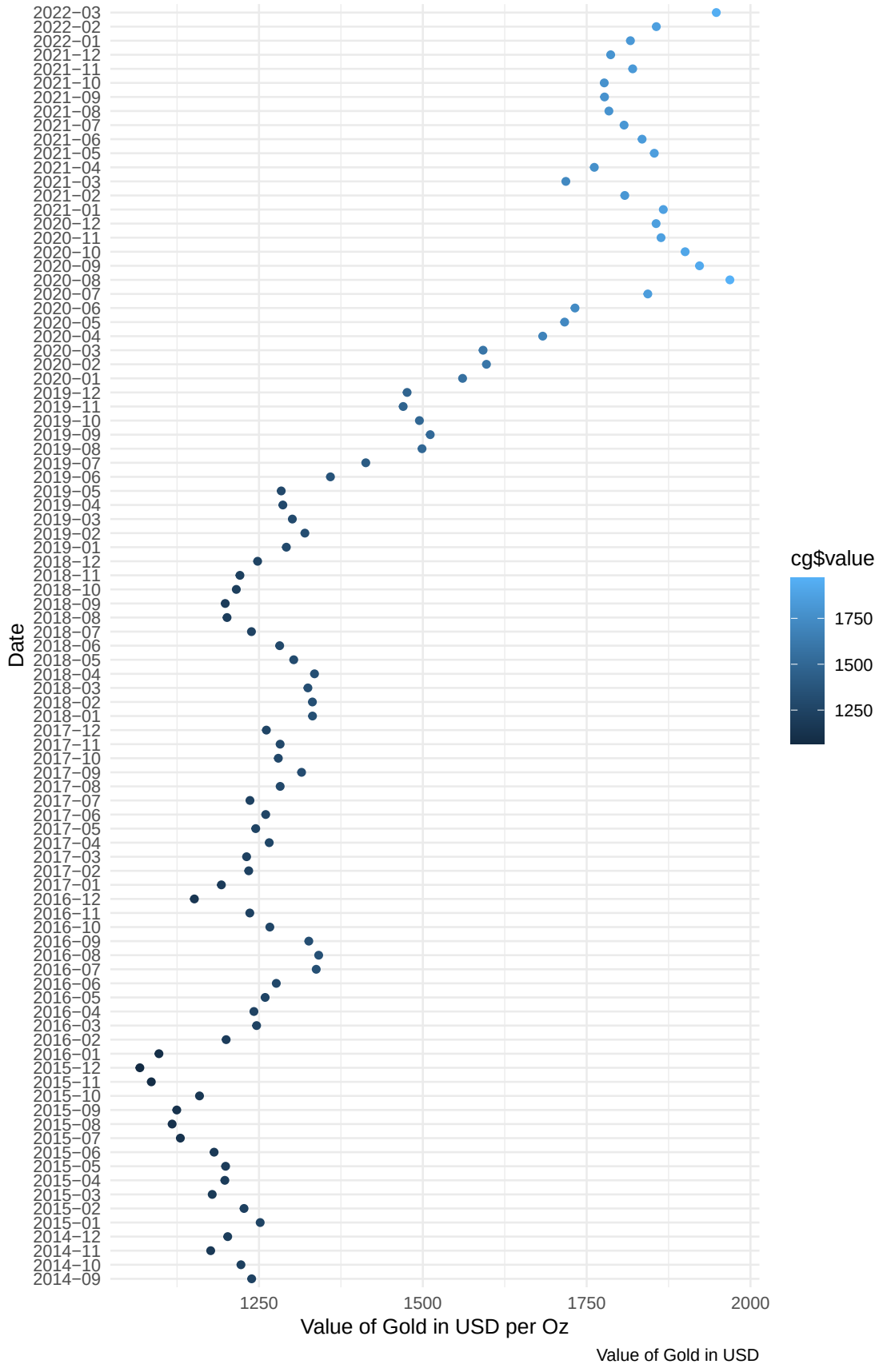
Results

Comparing results from each dataset with another individually

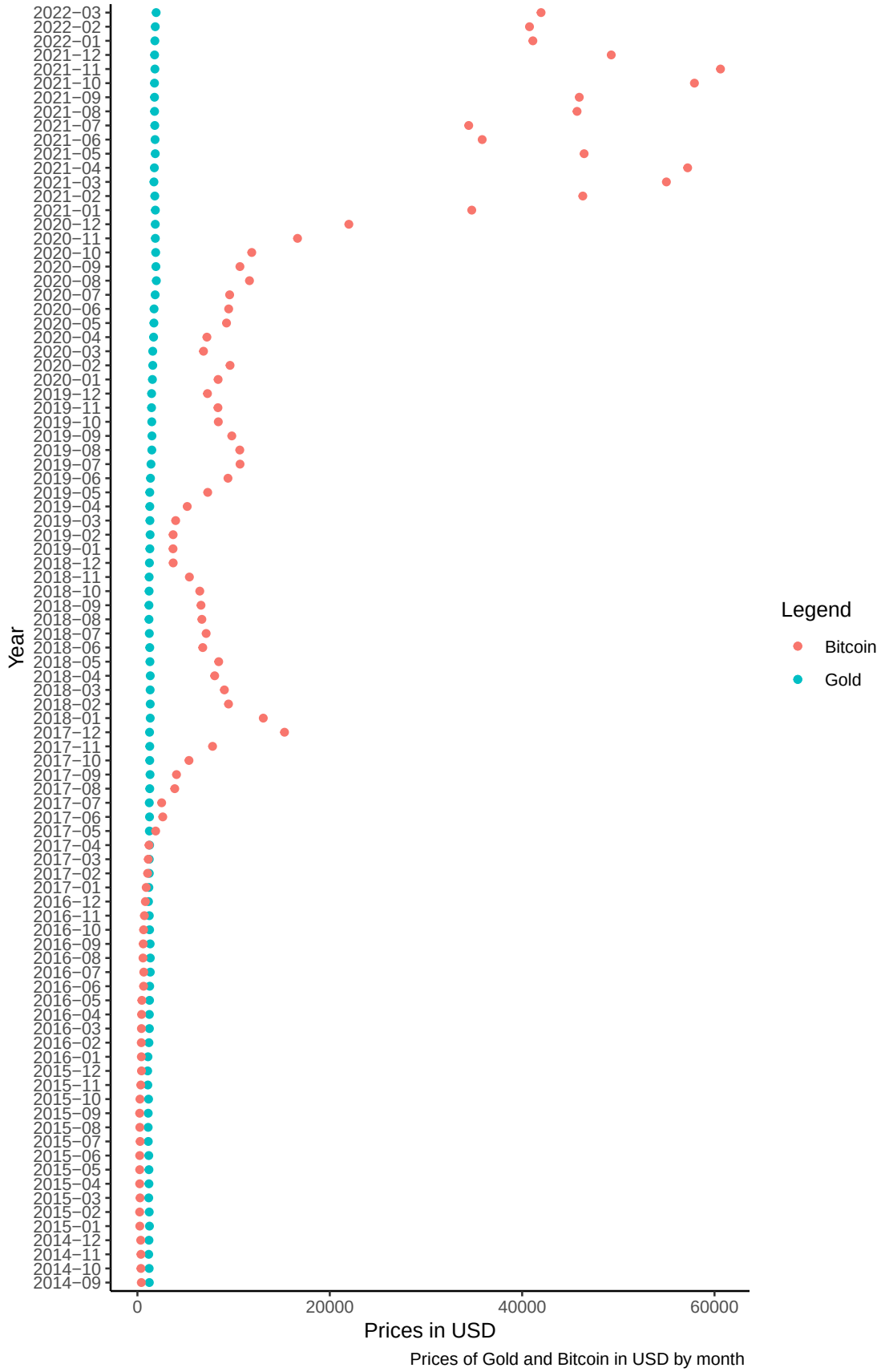
A comparison between gold and Bitcoin



Bitcoin value in USD

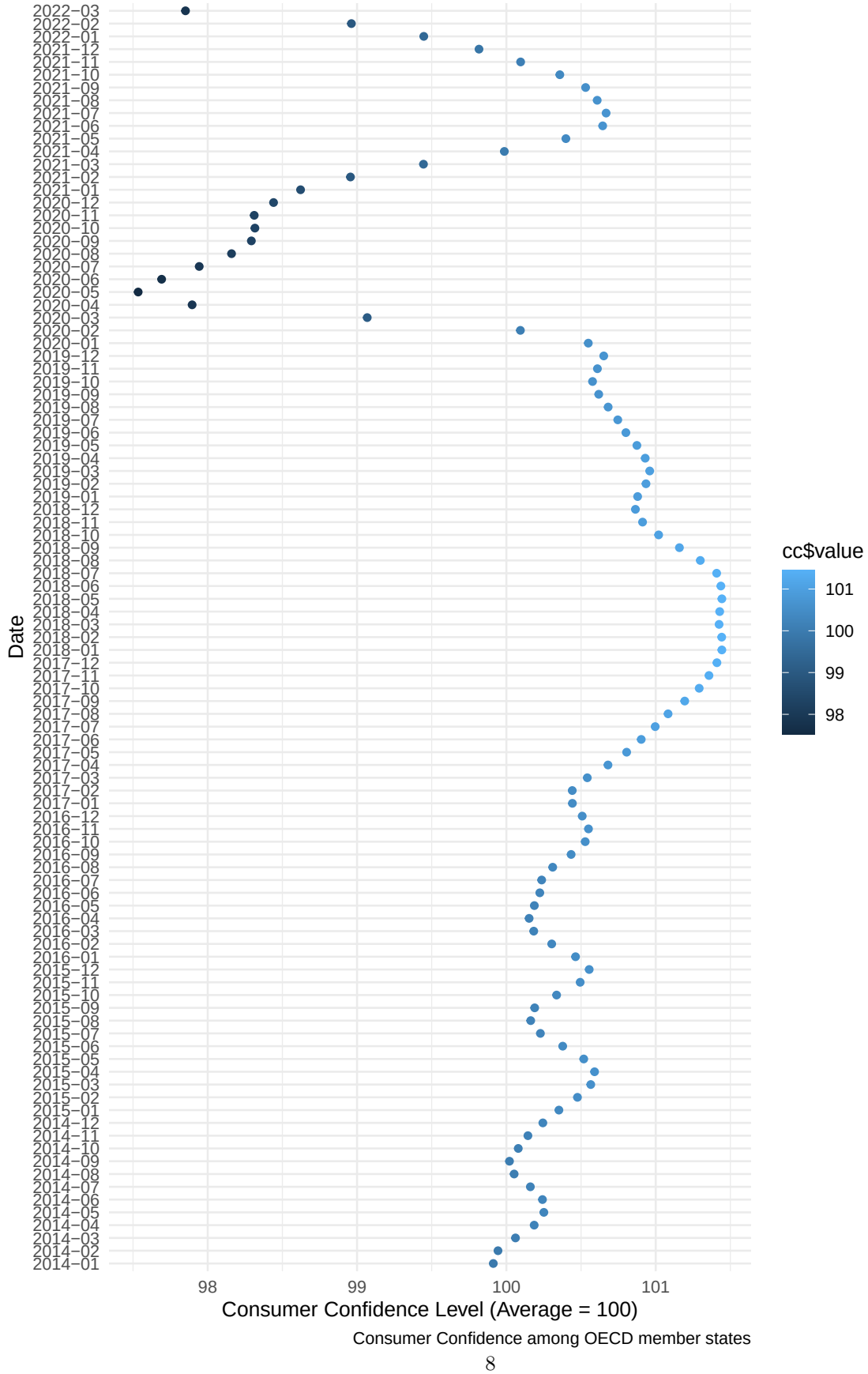

Date
2022–03
2022–02
2022–01
2021–12
2021–11
2021–10
2021–09
2021–08
2021–07
2021–06
2021–05
2021–04
2021–03
2021–02
2021–01
2020–12
2020–11
2020–10
2020–09
2020–08
2020–07
2020–06
2020–05
2020–04
2020–03
2020–02
2020–01
2019–12
2019–11
2019–10
2019–09
2019–08
2019–07
2019–06
2019–05
2019–04
2019–03
2019–02
2019–01
2018–12
2018–11
2018–10
2018–09
2018–08
2018–07
2018–06
2018–05
2018–04
2018–03
2018–02
2018–01
2017–12
2017–11
2017–10
2017–09
2017–08
2017–07
2017–06
2017–05
2017–04
2017–03
2017–02
2017–01
2016–12
2016–11
2016–10
2016–09
2016–08
2016–07
2016–06
2016–05
2016–04
2016–03
2016–02
2016–01
2015–12
2015–11
2015–10
2015–09
2015–08
2015–07
2015–06
2015–05
2015–04
2015–03
2015–02
2015–01
2014–12
2014–11
2014–10
2014–09
1250
1500
1750
2000
Value of Gold in USD per Oz
cg$value
1750
1500
1250
Value of Gold in USD

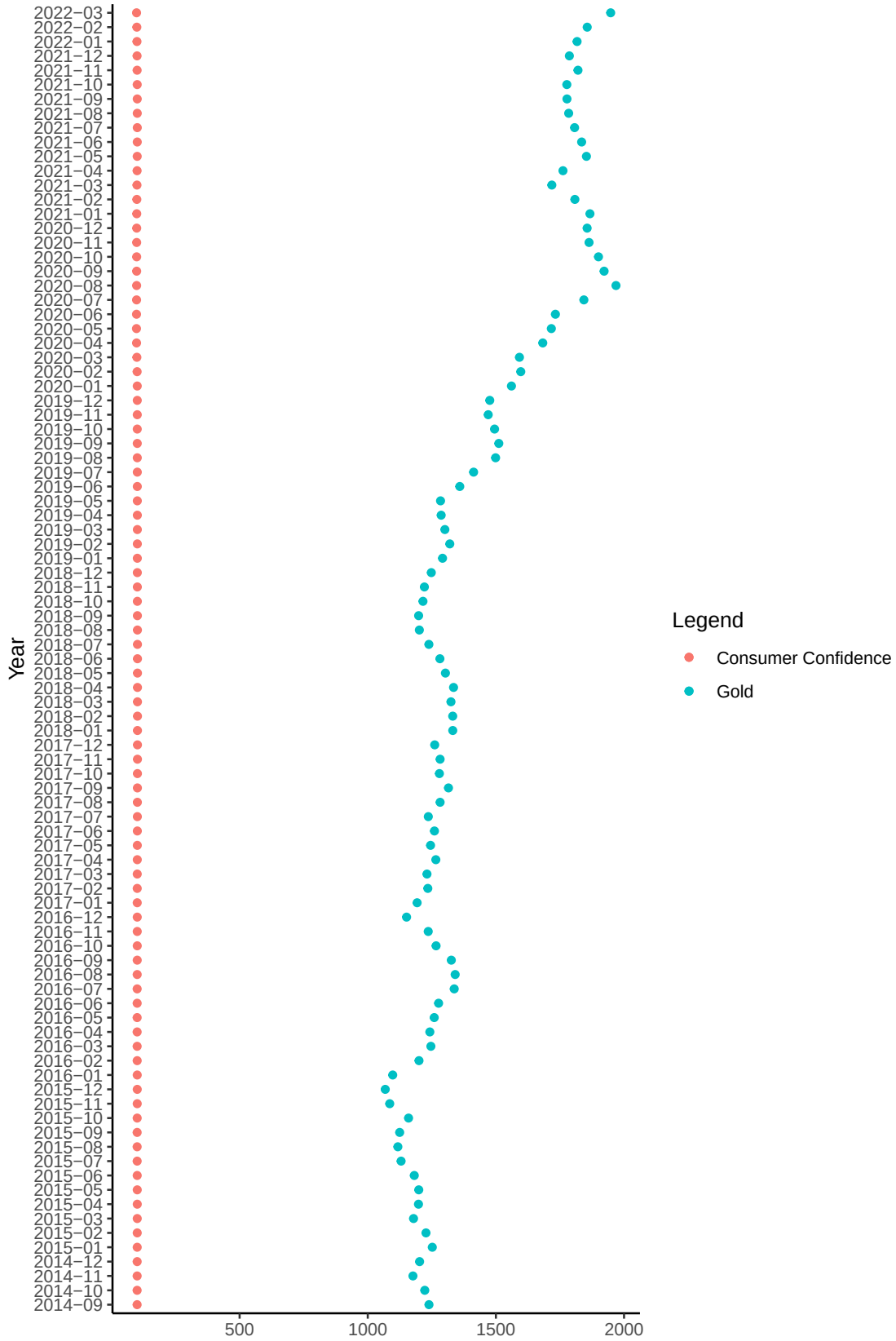
Lets combine the results to see if any significant correlation exists. We begin by combining the two datasets, creating a new one in the process.



Prices of Gold and Bitcoin in USD by month

Consumer confidence in OECD member states relative to the price of gold

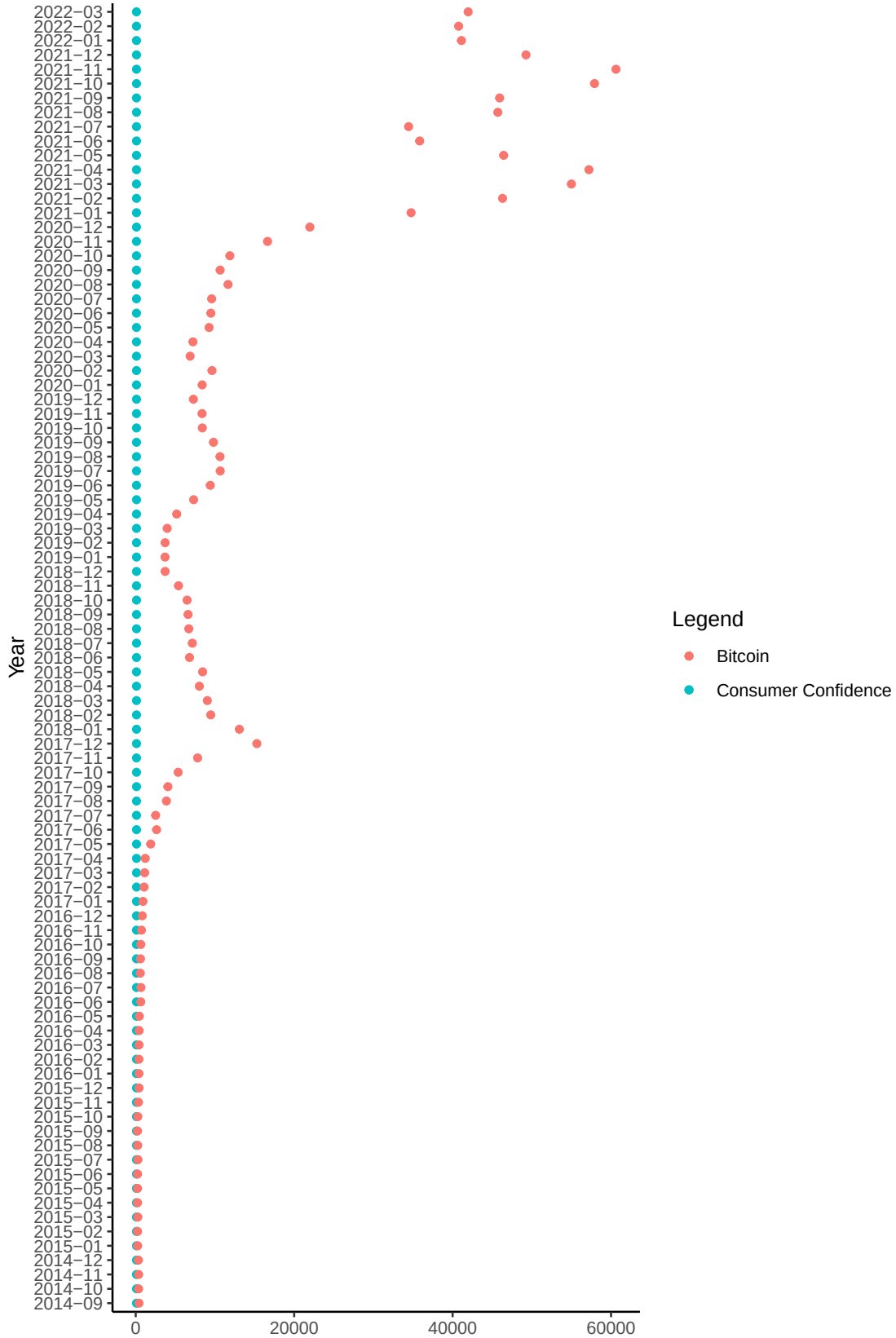




s for the price of Gold in USD and consumer confidence among OECD member states

Prices of Gold in USD per Oz and consumer confidence in the OECD

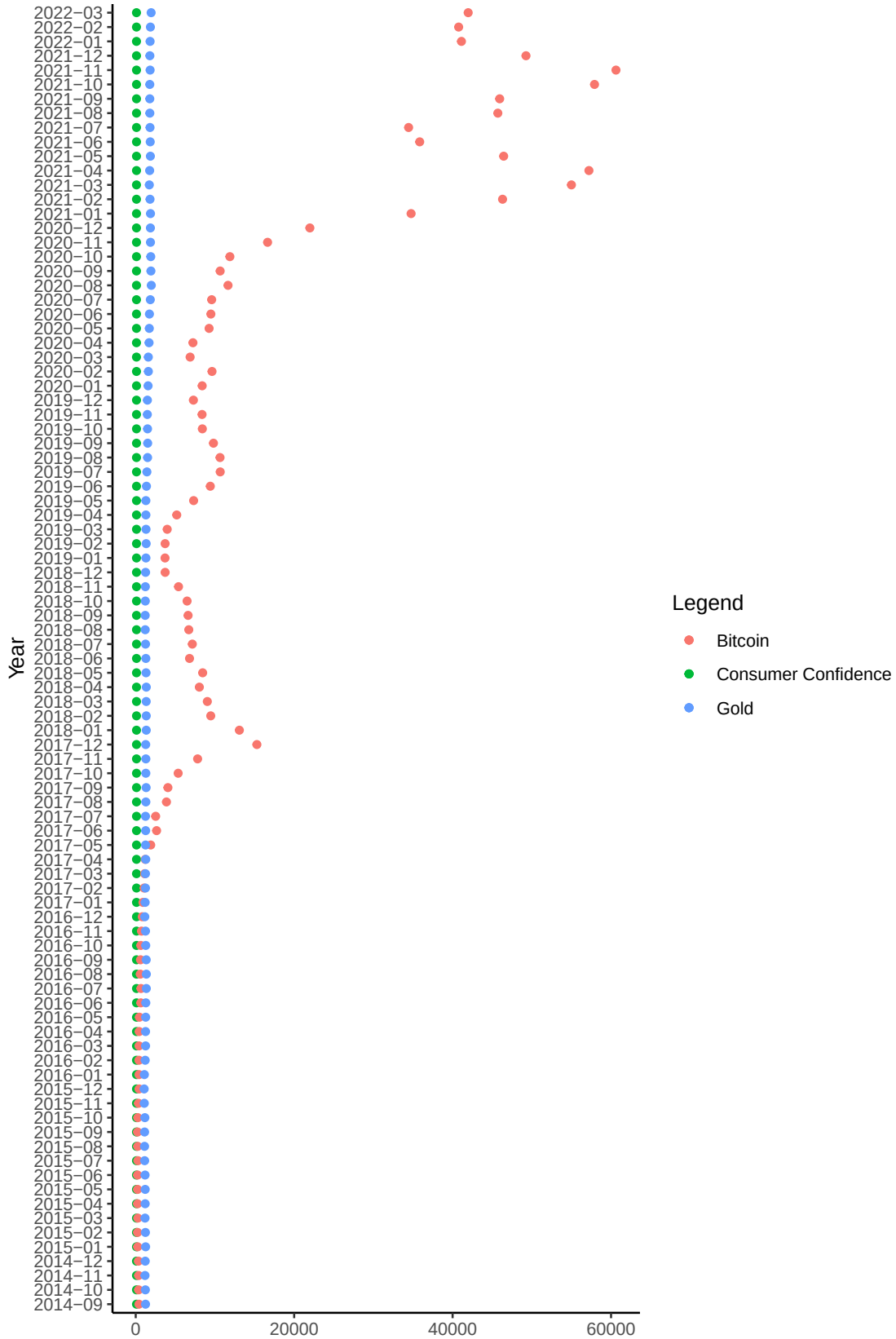
Consumer Confidence in the OECD and the price of Bitcoin



for the price of Bitcoin in USD and consumer confidence among OECD member states

Prices of Bitcoin in USD and consumer confidence in the OECD

Cumulative comparisons

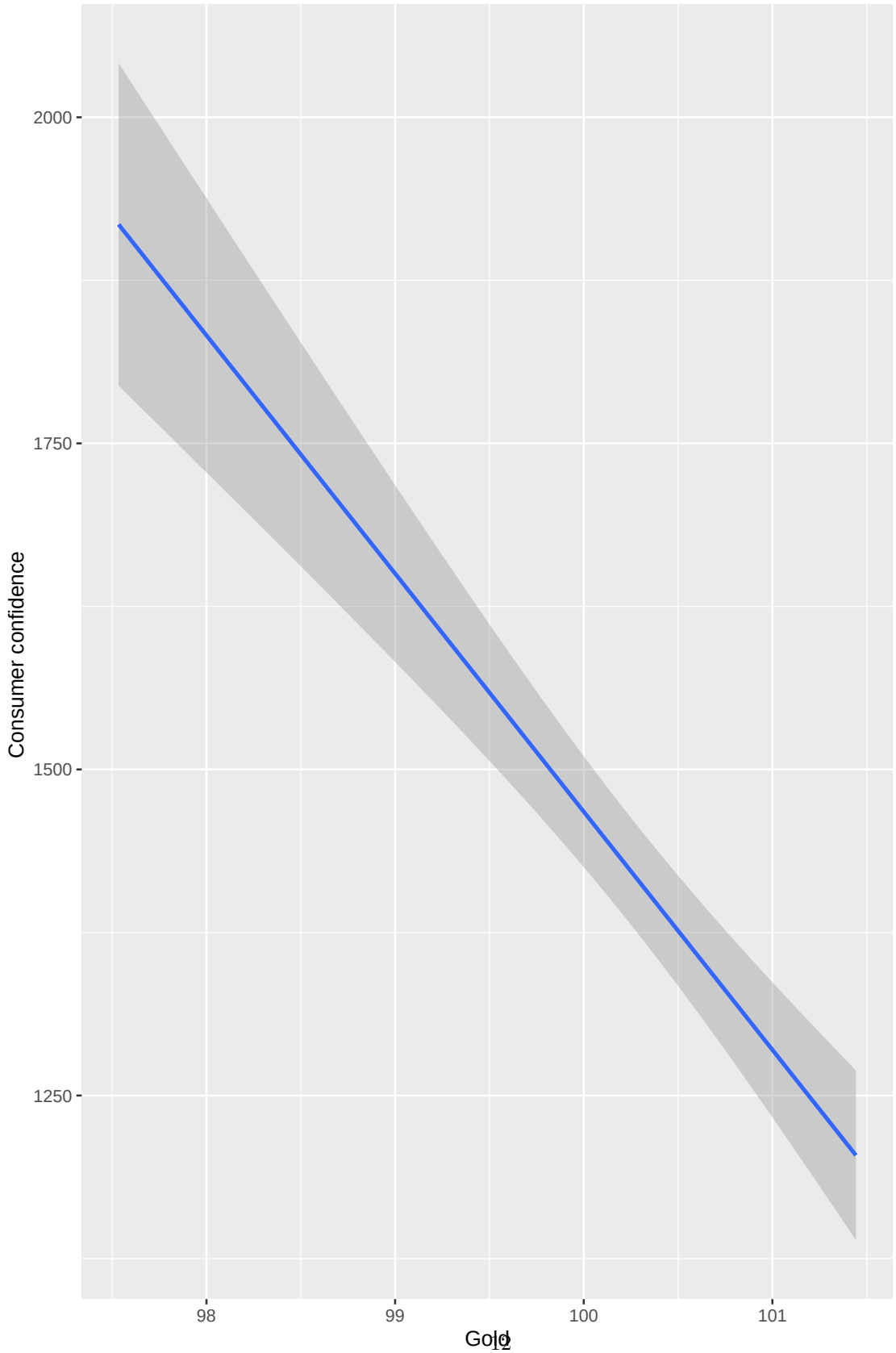


rice of Bitcoin and gold per Oz in USD and consumer confidence among OECD member states

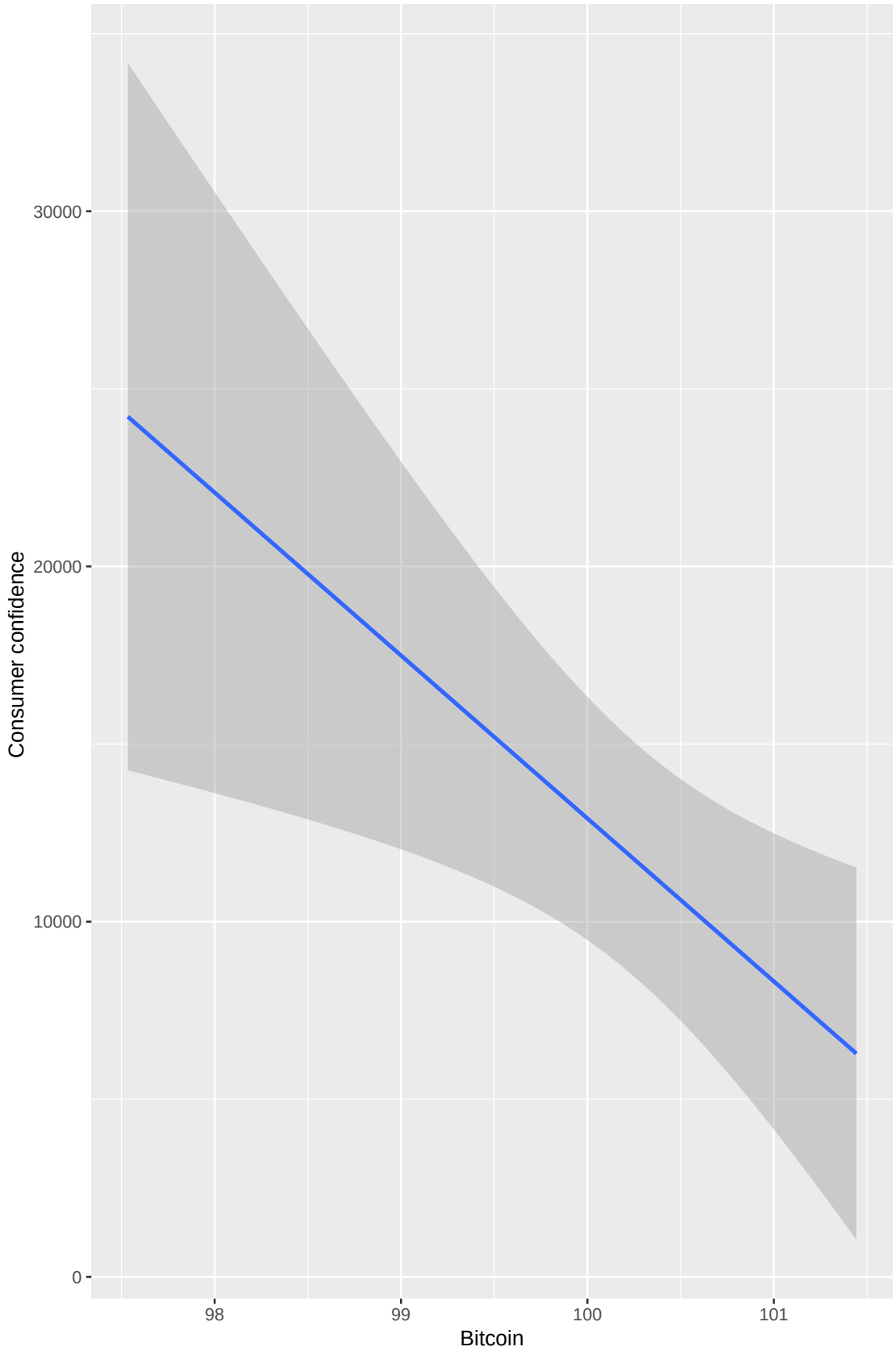
Prices of Bitcoin in USD, gold and the level of consumer confidence in the OECD

Predictive Analytics

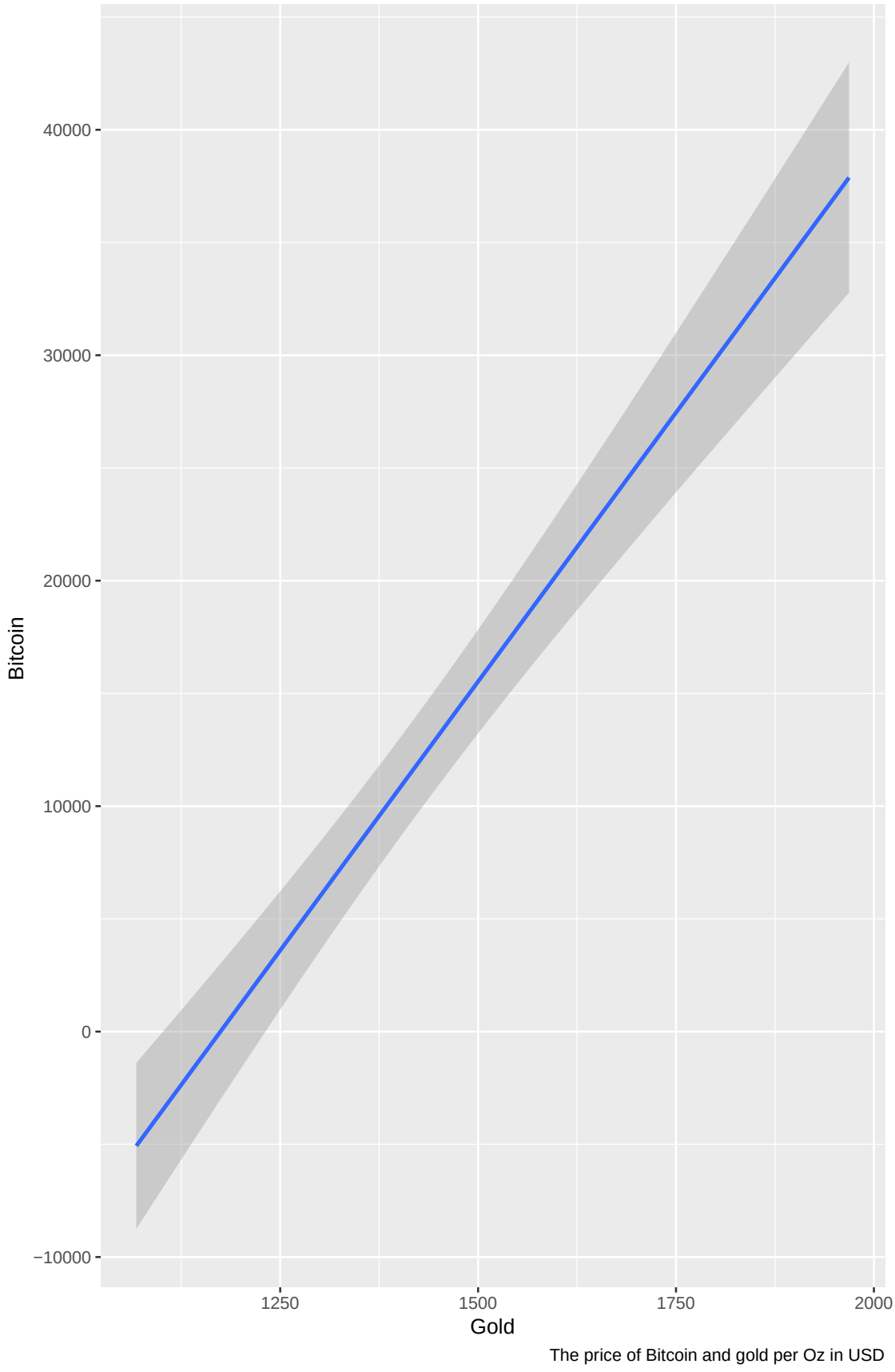
Attempting linear models between the three variables individually



The price of gold in USD per Oz and level of consume confidence for OECD member states

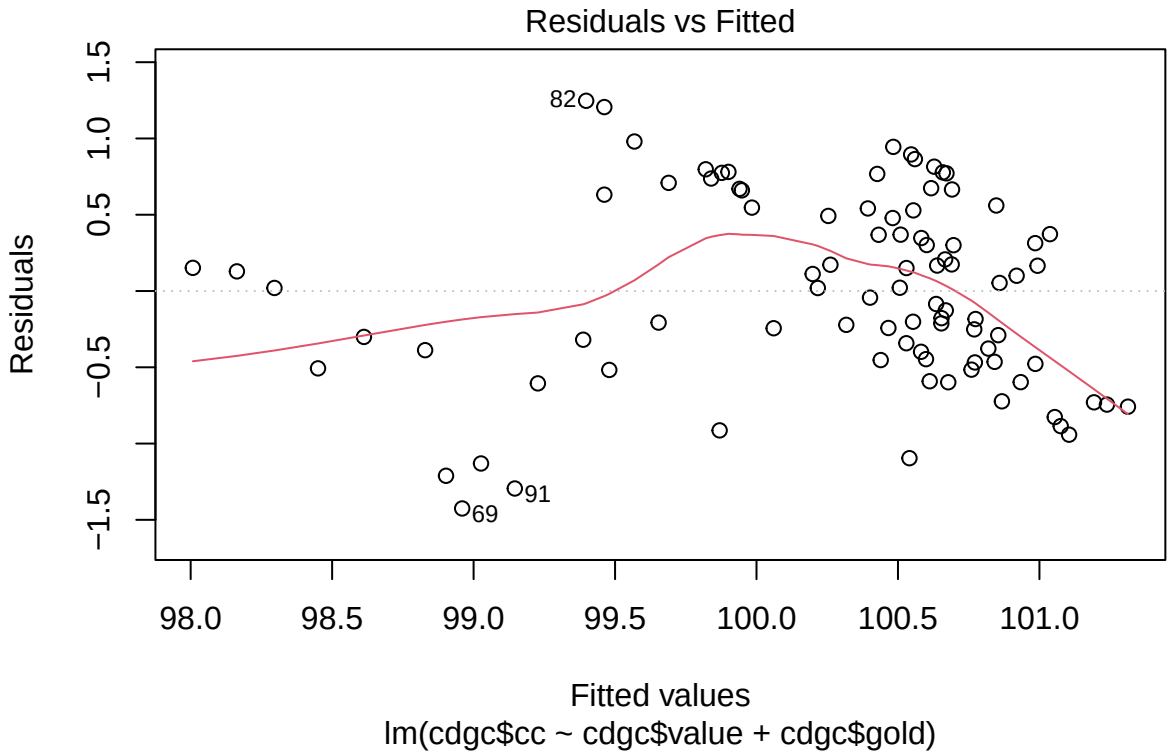


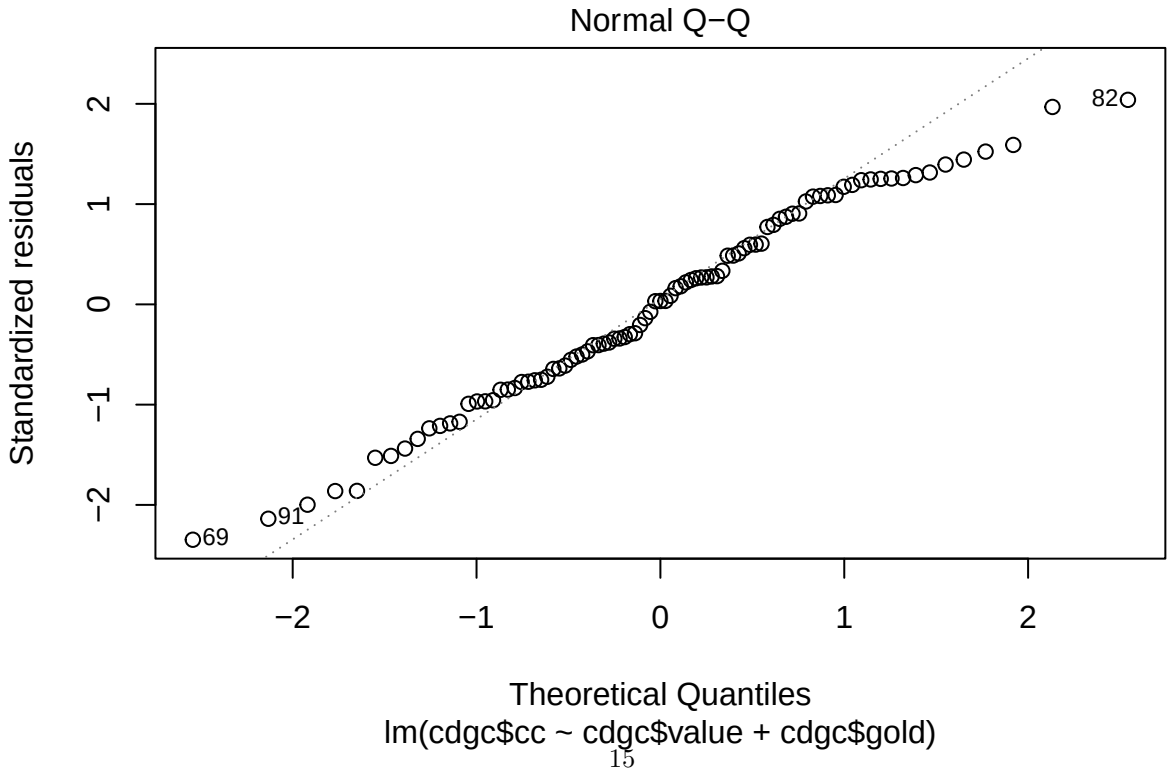
The price of Bitcoin in USD and level of consume confidence for OECD member states

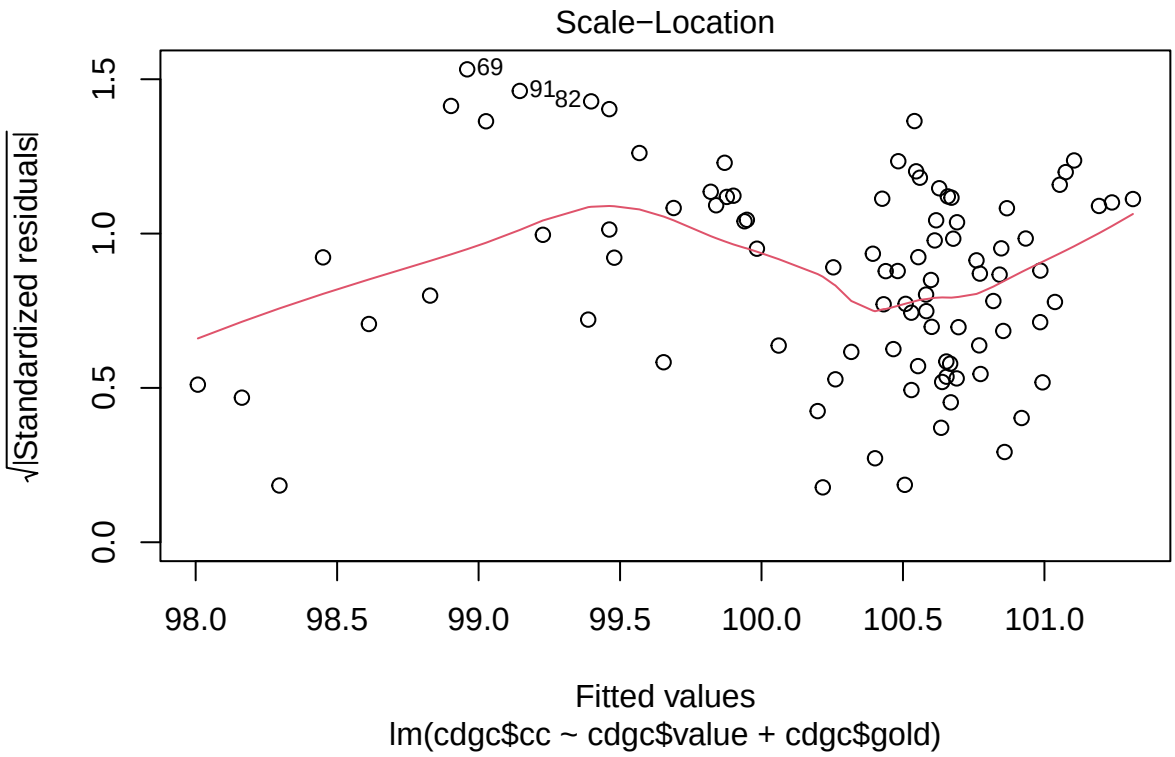


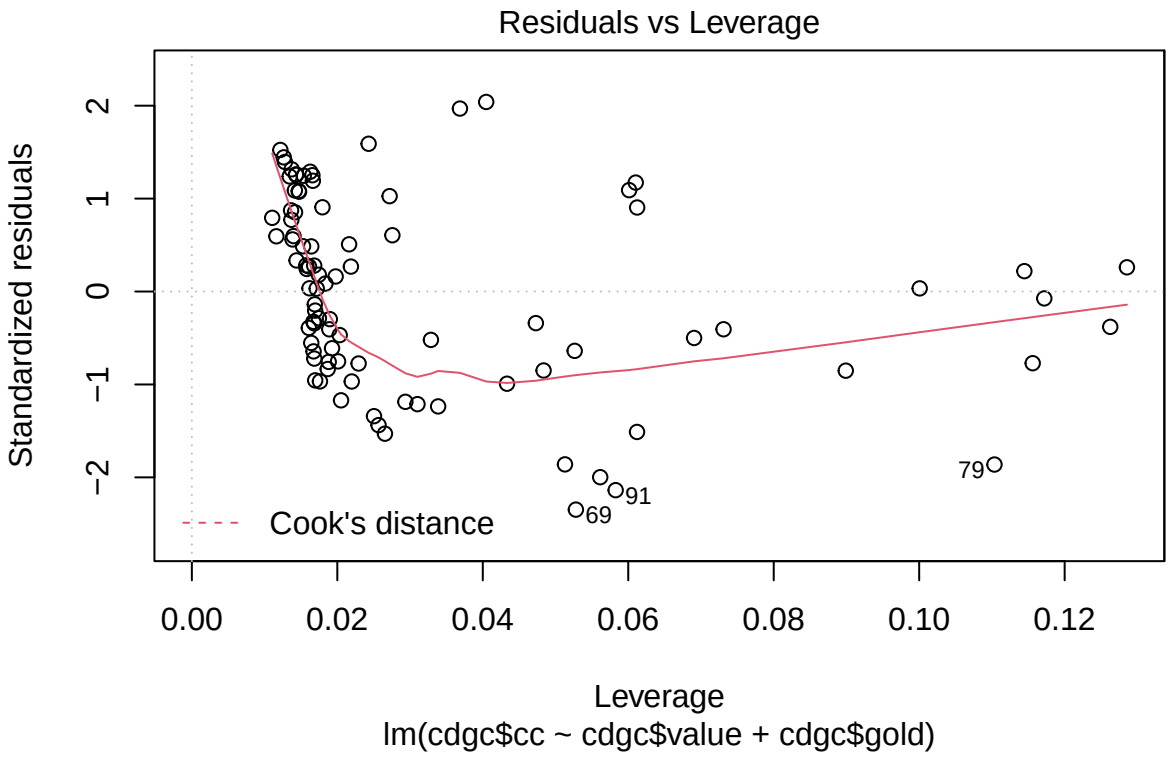
The price of Bitcoin and gold per Oz in USD

Attempting to use multiple linear regression






Scale−Location
√|Standardized residuals|
0.0
0.5
1.0
1.5
69
91
82
98.0
98.5
99.0
99.5
100.0
100.5
101.0
Fitted values
lm(cdgc$cc ~ cdgc$value + cdgc$gold)



Discussion

The findings of this paper

In the absence of supply-related restrictions, gold and Bitcoin behave similarly in the context of demand. However, the variation in the prices of Bitcoin increased significantly at the dawn of the COVID-19 pandemic. One explanation for why the change in the prices of gold did not mirror the change in the prices of Bitcoin is the emergence of supply chain issues which Bitcoin was not subject to, and a general reluctance to avoid the exchange of tangible good to avoid the transmission of COVID-19.

It should be noted that the pre-pandemic correlation between the price of gold and Bitcoin can also be attributed to the latter being a relatively new and unknown phenomenon.

A linear model between the levels of consumer confidence and Bitcoin prices could not be established, nor could it between the price of gold and of Bitcoin. Attempts to use multiple linear regression to show how levels of consumer confidence impacted the prices of gold and Bitcoin could also not establish a linear model. Neither the price or gold nor the price of Bitcoin can be predicted using the prices of each other or consumer confidence levels among OECD member states.

Trends that stood out

Consumer confidence levels had little to no impact on the price of gold, contrasting previous academic literature on the topic (Cai, Cheung, and Wong 2001). Furthermore, Bitcoin prices were a strong inverse amplification of consumer confidence levels, however, academic literature points out that this can ostensibly

be caused by the cryptocurrency market not being mature enough to not greatly rely on speculative bubbles. In the context of Bitcoin prices, speculative bubbles can be triggered by changes in consumer confidence, but other factors such as policies and regulatory bodies play a more significant role (Baek and Elbeck 2014).

Future Research

As (Baek and Elbeck 2014) explores in greater detail, the cryptocurrency market is immature, volatile and highly prone to speculative bubbles. It further demonstrates how policies and the actions of regulatory bodies greatly amplify the market demand for Bitcoin, causing immense variation in the price of Bitcoin (although this paper finds that a change in consumer confidence usually is a precursor to this). More research in how regulating, taxing and legislating the use of Bitcoin and other cryptocurrencies can predict prices, encourage or discourage their use and create new investment opportunities for retailers and investors.

Since April 2017, any perceived correlation between the prices of Bitcoin and Gold was incorrect. The contrast became even more stark during the start of the COVID-19 pandemic, however this can be attributed to supply issues rather than just a lack of demand-driven price volatality, since unlike Bitcoin, gold is a tangible object and disrupted supply lines could have played a part. Exploring this phenomenon is beyond the scope of this paper.

Git Repository

Github: "https://github.com/yfuoft/p4.git"

Baek, C., and M. Elbeck. 2014. "Bitcoins as an Investment or Speculative Vehicle? A First Look." *Applied Economics Letters* 22 (1): 30–34. https://doi.org/10.1080/13504851.2014.916379.

"Bitcoin USD (BTC-USD) Price History &Amp; Historical Data." 2022. *Yahoo! Finance*. Yahoo! https://finance.yahoo.com/quote/BTC-USD/history?period1=1410825600&period2=1651017600&interval=1d&filter=history&frequency=1d&includeAdjustedClose=true.

Cai, Jun, Yan-Leung Cheung, and Michael C. S. Wong. 2001. "What Moves the Gold Market?" *Journal of Futures Markets* 21 (3): 257–78. https://doi.org/https://doi.org/10.1002/1096-9934(200103)21:3%3C257::AID-FUT4%3E3.0.CO;2-W.

"Consumer Confidence Index (CCI)." 2022. *Leading Indicators*. https://doi.org/10.1787/46434d78-en.

Francois, Romain. 2020. *Bibtex: Bibtex Parser*. https://github.com/romainfrancois/bibtex.

Grolemund, Garrett, and Hadley Wickham. 2011. "Dates and Times Made Easy with lubridate." *Journal of Statistical Software*. https://www.jstatsoft.org/v40/i03/.

"Historical Gold Prices." n.d. /home/primus/Downloads/Prices.xlsx.

R Core Team. 2021. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Ushey, Kevin, JJ Allaire, Hadley Wickham, and Gary Ritchie. 2020. *Rstudioapi: Safely Access the RStudio API*. https://github.com/rstudio/rstudioapi.

Wickham, Hadley. 2021. *Tidyverse: Easily Install and Load the Tidyverse*. https://CRAN.R-project.org/package=tidyverse.

Wickham, Hadley, Winston Chang, Lionel Henry, Thomas Lin Pedersen, Kohske Takahashi, Claus Wilke, Kara Woo, Hiroaki Yutani, and Dewey Dunnington. 2021. *Ggplot2: Create Elegant Data Visualisations Using the Grammar of Graphics*. https://CRAN.R-project.org/package=ggplot2.

Wickham, Hadley, Romain François, Lionel Henry, and Kirill Müller. 2021. *Dplyr: A Grammar of Data Manipulation*. https://CRAN.R-project.org/package=dplyr.

Wickham, Hadley, and Evan Miller. 2021. *Haven: Import and Export SPSS, Stata and SAS Files*. https://CRAN.R-project.org/package=haven.