Since the first shock in 1972, researchers have focused on evaluating the impact of exogenous shocks to the price of oil on macroeconomic variables. To do it requires the ability to change the price of oil while holding all the other variables constant, which is difficult to do as prices reflect the changes in demand and supply. In addition, the demand shocks do not have the same effect the price of oil, or vice versa, as a supply shock. To allow the changing of a single variable, while holding the others constant, and different effects of the shocks of macroeconomic variables on the price of oil, Killian (2009) proposed a structural Vector Auto-Regressive (VAR) model for the global oil market. He found that a shock to the precautionary demand for oil has an immediate large and persistent impact on the price of oil; a shock to the aggregate demand has a lagged, but sustained, increase in the price; and a supply shock causes a small transitory increase in the price of oil. Killian (2009) used the VAR specifically to study the impact of exogenous shocks to the price of oil on the supply and demand for it, but it can be used to study other commodities or monetary policies.

Even though gold is a commodity that is similar to oil, most of the economic literature has focused on gold’s trying to explain the causes of its price fluctuation. One the hand, Baur and Lucey (2010) found that the price of gold responds to increased uncertainty in the financial markets as gold acts as a “safe haven” for financial investors. On the other hand, Dooley, Isard and Taylor (1995) found that exchange rate movements influence the price of gold. In fact, current literature has studied gold believing that it’s price is only affected by financial shocks, ignoring the fact that gold is used in the industrial manufacturing process. In order to determine whether the industrial demand for gold might have a significant effect on the real price of gold, this paper proposes a similar structural VAR used by Killian (2009). The main findings of this paper provide some surprising results. A disruption in the supply of gold leads to a statistically significant immediate increase in gold production, followed by a sharp decrease in production one quarter after the shock. A sudden increase in the global industrial demand for gold slightly increases the production of goods when the shock occurs and causes a growth in the S\&P500 index a quarter after the shock. However, this sudden increase in demand for gold has no statistically significant effect on the real price of gold, evidence that the literature is correct in explaining changes in the price of gold due to supply and financial shocks. An increase in the volatility in the stock market leads to an immediate increase of the S&P500 index, seemingly a counter-intuitive response, and in the price of gold that disappears one quarter after. Lastly, a shock to the real price of gold has no significant effect on supply or demand but has transitory a one lag positive effect on the S&P500 index.

The paper is organized as follows. Part I provides a description of the data, how supply for gold was determined from the World Gold Council and how the global industrial demand for gold is created from the data acquired by the United Nations Industrial Development Organization (UNIDO). Part II focuses on the construction of the VAR model and the ordering of the shocks. Part III delivers and explains the empirical results. The concluding remarks are in part IV.

\section{I. Building the Data}

The quarterly time series have been taken from three different organizations - the World Gold Council, UNIDO and the Federal Reserve System – and span over a period from 2011Q3 to 2020Q4. The World Gold Council provides data that will be used to estimate the quantity of gold that is produced, and the data given by UNIDO will be manipulated to build a proxy for the global industrial demand for gold, henceforth gold demand. The Federal Reserve System, through the Federal Reserve Economic Data database, gives the quarterly percent change in the S\&P500 index and the Gold Fixing Price in the London bullion market. The following subsections explain how the data from the World Gold Council and UNIDO are used to estimate the gold supply and gold demand respectively.