**Literature review**

1. **identify gaps in the literature**
2. **find what economic indicators to include**
3. **find the best way to transform data**
4. **find the best techniques to use**

**Structure:**

1. gaps in the literature:
   1. part 1 – relationship between gold and economic variables
   2. part 2 – constructing a trading strategy
2. use papers to introduce subheadings
3. intro and conclusion

* why: anecdotal belief of gold as a store for value
* why: history of gold as currency
* why: intrinsic value of gold
* exploit: price inefficiencies

Countries

* Pakistan, India, China, Turkey, Malaysia, Iran, Indonesia
* USA, UK, Germany

Economic indicators

* inflation, macroeconomic news, USD exchange rate, stock prices, interest rate
* oil, bonds

Data

* Price daily returns
* Exchange rate returns

Techniques

* Gold price analysis
  + Bayesian analysis
  + linear regression
  + impulse response analysis

Other data:

* central bank gold holdings
* investment bank gold holdings
* CEO gold holdings
* gold as a diversification instrument over time
  + safe haven (uncorrelated with another asset in times of stress), hedge (uncorrelated or negatively correlated with another asset on average), diversification instrument (uncorrelated with another asset on average)

Contents

[**Akbar, 2019 6**](#_Toc97546465)

[**Baur, 2010 7**](#_Toc97546466)

[**Wang, 2013 8**](#_Toc97546467)

[Reboredo, 2013 8](#_Toc97546468)

[Batten, 2014 8](#_Toc97546469)

[Capie, 2005 8](#_Toc97546470)

[Joy, 2011 8](#_Toc97546471)

[Shahzad, 2020 8](#_Toc97546472)

[Fortune, 1987 8](#_Toc97546473)

[Iqbal, 2017 8](#_Toc97546474)

[Christie-David, 2000 8](#_Toc97546475)

[Laughlin, 1887 8](#_Toc97546476)

[Hartmann 2004 8](#_Toc97546477)

do changes in gold and oil prices affect stock indices the same?

(Jain and Biswal, 2016)

“Flight-to quality”: whether investors flee from stocks into bonds when stock markets exhibit severe losses

(Gulko 2002, Hartmann 2004, Baur 2009)

**INTRO**

* + inverse relationship between gold price and stock prices (Akbar, 2019 p.1)
  + gold as a safe haven in emerging economics during stock market crashes or when the dollar weakens (Akbar, 2019 p.1)
  + several studies have analyzed the relationship between gold price, exchange rates and other macroeconomic variables for different economies (Akbar, 2019 p.2)
  + the results of interrelationship analysis are varied and mixed (Akbar, 2019 p.2)
  + cross-examination of theoretical and empirical relationships between gold price and economic variables [in US financial market] (Akbar, 2019 p.2)

**METHODS**

* + Classical VAR modelling for forecasting and analyzing linkages between these variables (Akbar, 2019 p.2)
  + Bayesian VAR modelling overcomes the problem of overfitting, giving more accurate estimates compared to the classical model (Akbar, 2019 p.2)
  + Bayesian econometric inference is computation-heavy (Akbar, 2019 p.2)
  + ARDL approach (Akbar, 2019 p.2: Srinivasan and Prakasam, 2015)

**ANALYSIS**

* + long-run relationship between gold prices and exchange rates in different countries (Akbar, 2019 p.2: Dooley, 1995)
  + changes in economic and financial variables affect gold prices, but changes in gold prices have no effect on other economic variables (Akbar, 2019 p.2: Laughlin, 1997 and Pravit, 2009) [**unilateral relationship]**
  + long-run relationship between nominal gold price and US retail price index (Akbar, 2019 p.2: Ghosh, 2004)
  + negative relationship between gold price and yen-USD exchange rate (Akbar, 2019 p.2: Capie, 2005)
  + positive relationship between gold prices, US inflation and credit risk (Akbar, 2019 p.2: Levin and Wright, 2006)
  + gold is used as a long-term hedge against inflation and uncertainty in major gold-consuming countries (China, India, Turkey, Indonesia) (Akbar, 2019 p.2: Levin and Wright, 2006)
  + floating exchange market has been a major source of price instability in the world gold market (Akbar, 2019 p.2: Sjaastad, 2008)
  + gold has a short-run relationship with precious metal prices, exchange rates, and oil price (Akbar, 2019 p.2: Sari et al. 2010)
  + gold price significantly affects exchange rates but exchange rates do not affect gold price (Akbar, 2019 p.2: Sujit and Kumar, 2011)
  + gold only has short-run relationships with the interest rate and stock market returns in Iran (Akbar, 2019 p.2: Yahyazadehfar and Babaie, 2012)
  + no long-run relationship between gold price, stock price and exchange rate in Indonesia (Akbar, 2019 p.2: Sinton, 2014)
  + bi-directional relationship between gold price and exchange rate in India (Akbar, 2019 p.2: Bhunia and Pakira, 2014)
  + Long-run relationship between stocks and gold price with exchange rate but no relationship between stocks and gold price (Akbar, 2019 p.2: Srinivasan and Prakasam, 2015)
  + No long-run relationship between gold and Bombay stock exchange (Akbar, 2019 p.2: Gupta, 2015)
  + Gold price volatility has a negative impact on the stock markets of all emerging economies (Akbar, 2019 p.2: Raza et al., 2016)
  + A fall in the price of gold and oil cause a fall in the Indian rupee and stock market (Akbar, 2019 p.2: Jain and Biswal, 2016)

**CONCLUSION**

* + domestic gold price and *x* economic variables [results: variables significantly correlated with gold {*x* = stock prices, exchange rate and interest rates}] have much significance for investors, portfolio managers, and policy makers (Akbar, 2019 p.161)
* tbc:
  + differences in relationship between gold in different types of economies?
    - developed: USA
    - emerging: India, China
    - developing: Iran, Pakistan
  + do changes in gold and oil prices affect stock indices the same?
    - (Jain and Biswal, 2016)

# **Akbar, 2019**

* Location: Pakistan
* “Understanding the complex relationships among economic variables has much significance for investors, researchers and policy makers alike”
* Methods:
  + Bayesian and classical VAR modelling
  + impulse response analysis
* Data:
  + monthly average data, 2011-2016 (5 years):
    - gold price – nominal gold price in rupees per troy ounce
    - stock price – KSE 100 index of stock prices
    - exchange rate – nominal exchange rate in rupees per USD
    - interest rate – nominal discount rate
* Main findings:
  + domestic gold price, stock prices, exchange rate, and interest rates (nexus) are non-stationary at level and stationary at first difference
  + one structural break found between gold price and exchange rate
  + no long-run relationship between nexus
  + impulse response analysis revealed that variations in stock market, gold market and foreign exchange market are interconnected:
    - adverse fluctuations in exchange rate cause a decline in stock and gold price, and vice versa.
    - decline in stock market causes boom in gold price, and vice versa.
    - decline in gold price exerts a positive impact on stock market and rupee value in USD (exchange rate).
    - explanation: some investments in the gold market are shifted to the stock market, while others are converted into local currency, resulting in an appreciation of the exchange rate.

# **Baur, 2010**

Is gold a hedge or safe haven? An analysis of stocks, bonds and gold

* Location: USA, UK, Germany
* “While gold has often been associated with the existence of a safe haven, we are not aware of any study actually testing this hypothesis”
* “Flight-to quality”: whether investors flee from stocks into bonds when stock markets exhibit severe losses (Gulko 2002, Hartmann 2004, Baur 2009)
* Methods:
  + Regression model
  + Gold returns regressed on stock and bond returns
  + Flight-to-quality: Return used to analyze whether investors react to extreme negative shocks relatively fast and use gold as a safe haven asset
  + Profitability: Determine how profitable it is for investors to buy and sell gold in periods of stock market turmoil.
  + regression
  + portfolio analysis (robustness check on regression): cumulated returns
* Data:
  + daily returns, 1995-2005 (10 years):
    - gold price – nominal gold price in rupees per troy ounce
    - stock price – KSE 100 index of stock prices
    - exchange rate – nominal exchange rate in rupees per USD
    - interest rate – nominal discount rate
* Main findings:
  + gold is a safe haven for stocks in the short-run (<15 days)
  + investors who hold gold for more than 15 trading days after an extreme negative shock lose money with their gold investment
  + regression:
  + portfolio analysis:

# **Wang, 2013**

Dynamic transmission effects between the interest rate, the US dollar, and gold and crude oil prices

* Location: XXX
* Methods:
  + XXX
* Data:
  + daily returns, 1995-2005 (10 years):
    - gold price – nominal gold price in rupees per troy ounce
    - stock price – KSE 100 index of stock prices
    - exchange rate – nominal exchange rate in rupees per USD
    - interest rate – nominal discount rate
* Main findings:
  + Bilateral effects between interest rates, oil prices and gold prices
  + Demand for oil is high during economic expansion. Price of oil goes up. When prices increase to a certain level, inflation occurs. The Fed then raises interest rates to cool down the economy. The dollar depreciates, economic expansion slows down, and investors move their money to gold, raising the price of gold.
  + Short-term
    - gold prices lead interest rate
    - oil prices lead interest rate
  + Long-term
    - interest rate leads gold prices
    - interest rate leads USD , and USD leads oil prices
  + XXX
  + XXX

2-3 flight-to-quality

2-3 gold behaviour

2-3 gold vs stocks

1-2 random walk

1 gold vs stocks in US

10-12 references

# **Capie, 2005**

# **Gold as a hedge against the dollar**

* Data: weekly prices, 1971-2004 (23 years)
* autoregressive distributed lag model, ARCH

# **Joy, 2011**

# **Gold and the US dollar: hedge or haven?**

* Data: weekly returns, 1986-2008 (18 years)
* Method: DCC-GARCH

**Baur and Lucey, 2010  
Is gold a hedge or safe haven? An analysis of stock, bonds and gold**

* Data: daily returns, 1995-2005 (10 years)
* Method: Regression

# **Shahzad, 2020**

# **Safe haven, hedge and diversification for G7 stocks markets: gold versus bitcoin**

* Data: daily returns, 1986-2008 (18 years)
* Method: Regression

# **Iqbal, 2017**

# **Does gold hedge stock market, inflation and exchange rate risks? An econometric investigation**

* Data: log daily and monthly returns, 1995-2005 (10 years):
* Method: Regression

# **Reboredo, 2013**

# **Is gold a hedge or safe haven against oil price movements**

* Data: weekly prices, 1995-2005 (10 years):
* Method: conditional copula function

# **Batten, 2014**

# **On the economic determinants of the gold-inflation relation**

* Data: daily returns, 1995-2005 (10 years):

# **Fortune, 1987**

# **The inflation rate of the price of gold, expected prices and interest rates**

* Data: daily returns, 1995-2005 (10 years):

# **Christie-David, 2000**

# **Do macroeconomics news releases affect gold and silver prices**

* Data: daily returns, 1995-2005 (10 years):

# **Laughlin, 1887**

# **Gold and prices since 1883**

* Data: daily returns, 1995-2005 (10 years):

# **Hartmann 2004**

# **Asset market linkages in crisis periods**

* Data: daily returns, 1995-2005 (10 years):

# **Dooley, 1995**

# **Exchange rates, country-specific shocks and gold**

* Data: daily returns, 1995-2005 (10 years):

# **Ghosh, 2004**

# **Gold as an inflation hedge?**

* Data: daily returns, 1995-2005 (10 years):

# **Lastrapes, 1995**

# **Gold price targeting by the FED**

* Data: daily returns, 1995-2005 (10 years):

# **Pravit, 2009**

# **Forecasting Thai gold prices**

* Data: daily returns, 1995-2005 (10 years):

# **Raza, 2016**

# **Asymmetric impact of gold, oil prices and their volatitlies on stock prices of emerging markets**

* Data: daily returns, 1995-2005 (10 years):

# **Sjaastad, 2008**

# **The price of gold and the exchange rates: once again**

* Data: daily returns, 1995-2005 (10 years):

# Reboredo, 2013

Is gold a hedge or safe haven against oil price movements

# Batten, 2014

On the economic determinants of the gold-inflation relation

# Capie, 2005

Gold as a hedge against the dollar

# Joy, 2011

Gold and the US dollar: hedge or haven?

# Shahzad, 2020

Safe haven, hedge and diversification for G7 stocks markets: gold versus bitcoin

# Fortune, 1987

The inflation rate of the price of gold, expected prices and interest rates

# Iqbal, 2017

Does gold hedge stock market, inflation and exchange rate risks? An econometric investigation

# Christie-David, 2000

Do macroeconomics news releases affect gold and silver prices

# Laughlin, 1887

Gold and prices since 1883

# Hartmann 2004

Asset market linkages in crisis periods

Dooley, 1995

Exchange rates, country-specific shocks and gold

Ghosh, 2004

Gold as an inflation hedge?

Lastrapes, 1995

Gold price targeting by the FED

Pravit, 2009

Forecasting Thai gold prices

Raza, 2016

Asymmetric impact of gold, oil prices and their volatitlies on stock prices of emerging markets

Sjaastad, 2008

The price of gold and the exchange rates: once again