**Scope and purpose:**

Often in the mining industry, exploration budgets and expenditure tend to be reactive rather than pro-active, as commodity prices fluctuate due to changes in global economic conditions. This reactive nature can often result in companies being unprepared for favourable market conditions, or over extended during periods of poor commodity pricing, leading to impulsive or unfavourable financial decisions being made.

This project will analyse historic exploration expenditure data and compare it with previous commodity prices, to see the relationship fluctuations in commodity prices have on mine spending.

**Hypothesis:**

If commodity prices begin to rise, exploration expenditure will then be caused to rise after a delay.

Exploration activities cost more when exploration expenditure is higher, due to demand, therefore value per dollar spent is worse. Discoveries may only come online when commodity prices have fallen.

**Data:**

There is exploration expenditure data combined Australian data being available bi-monthly dating back to 1979, or for WA specific after 1988, quarterly through the ABS. These data can be split by either state or commodity type.

<https://www.ceicdata.com/en/australia/mineral-exploration-expenditure-by-state-and-mineral-sought/mineral-exploration-expenditure-western-australia?fbclid=IwAR02IsSwQ5wEbXcQgwyVm7XZ416lO8QpFQTIC9zNiEy9Y9EwIbe5xuqShHg>

[https://geoview.dmp.wa.gov.au/GeoView/?Viewer=GeoVIEW&layerTheme=Drillholes&Module=Drillholes&\_gl=1\*1dw0n8v\*\_ga\*NzQ0NDI1MjkyLjE2Nzk5OTY2Njg.\*\_ga\_S1QYDDWVV5\*MTY4MDAwMzMxNy4zLjAuMTY4MDAwMzMxNy4wLjAuMA](https://geoview.dmp.wa.gov.au/GeoView/?Viewer=GeoVIEW&layerTheme=Drillholes&Module=Drillholes&_gl=1*1dw0n8v*_ga*NzQ0NDI1MjkyLjE2Nzk5OTY2Njg.*_ga_S1QYDDWVV5*MTY4MDAwMzMxNy4zLjAuMTY4MDAwMzMxNy4wLjAuMA)..

<https://www.dmp.wa.gov.au/Company-mineral-drill-hole-data-1552.aspx>

<https://www.abs.gov.au/statistics/microdata-tablebuilder/available-microdata-tablebuilder?fbclid=IwAR3y3YJmbEqTJtqqIShMZzdV_Kwzg17GHopbZ8jvd9CiAXQ9u_mjJFn7hLo#industry>

<https://www.abs.gov.au/statistics/industry/mining/mineral-and-petroleum-exploration-australia/latest-release?fbclid=IwAR2kG2qjuUhcNxo2vyqWh0OV4QqpyI62Q-TcTH8jg5UHNm3uKgdjP0AIlZo#cite-window1>

**Interpretation:**

Any lag identified in exploration expenditure and commodity pricing will be compared with the time frame that is normally taken from discovery to operation. This can be visualised with the steps required to achieve an operational mine. For example, if a mine is discovered during the peak of commodity prices, then by time it is operating, the prices will likely have returned to normal or lower conditions.

Total drillholes over time vs commodity prices (check different commodities)

Cost of drilling over time if available (adjust for inflation?)

**Plots/Visualisations**

Bar chart or maybe pie chart for visualising the amount spent on each commodity over time.

Charts should be able to be viewed by commodity, to compare expenditure in that industry with their given commodity.

Line chart

* Commodities prices over time (may use moving average if too volatile)
* Exploration spend over time (will likely use moving average to account for lower spending during wet season.

**Outcomes:**

Work towards determining a more sustainable and effective exploration strategy, by maintaining a relatively large amount of exploration work during weak commodity pricing, so as to get cheaper rates on contractors and other services. When a discovery is made, it can either be left, or developed so that when commodity prices rise, it is in a prime position for operation.