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100379318 – Formative (Essay Plan)
Essay Question Chosen: Do alternative investments provide portfolio insurance during periods of stock market turmoil? [3]

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Introduction
- Brief overview of essay question.
- Explain how a commodity is defined (its attributes and how its relationship differs from a traditional asset
- Outline objective: analyse whether commodities
- Mention approach – historical simulations using 4 portfolios: 1) 100% commodity with precious metals, 2) 100% commodity with pure agriculture, 3) 100% traditional equities, 4) 50% commodity & 50% stocks
- Mention the crisis time frames I will be focussing on: I will focus on dotcom, GFC and COVID time frames

Expected Hypotheses
- H1 – Expect hybrid portfolio to perform best as an insurance portfolio
- H2 – Relationship presented between commodity assets and S&P 500 should be weak during financial turmoil
- H3 – Metals portfolio should outperform agricultural assets during financial crises as they are more resilient

Literature Review
- Summarise existing research and their findings on how commodities performed during crises.
- Highlight the mixed findings and the variation of the relationship between commodities and traditional stocks (some are highly reactive to systematic risk, whereas some are less).
- Use the literature to justify why we create four portfolio variations.
- Discuss about how alternative investments generally outperform traditional assets during macroeconomic shocks (use Figure 1 as an example to include in the appendix)
- Find literature with expected outcomes of what we could find from our analysis

Methodology & Analysis
- Gather monthly prices from Jan-1990 to Jan-2025 for S&P 500, VIX, S&P GSCI, Gold, Silver, Platinum, Wheat, Soybean and Corn, P&G, Johnson Johnson, Exxon
- Show their time series plots and create 4 portfolios
- Find the descriptive statistics: cumulative returns, volatility, Sharpe ratio, Sortino ratio, Jensen's alpha and maximum drawdown (including a heatmap of all the assets against the 3 indexes: spx, gsci, vix)
- Run the simple regression models and present their outputs:
    - Simple Beta Test Regression: $r_{p,t} = \alpha + \beta \times r_{mkt,t} + inflation + i.r + \epsilon_t$
    [high beta = falls with mkt, low beta = less exposure to systematic risk]
    - Crisis Dummy Regression: $r_{p,t} = \alpha + \beta_1 \times r_{mkt,t} + \beta_2 \times X_{crisis} + inflation + i.r + \epsilon_t$
    [X_{crisis} is a dummy variable; β_2 low = portfolio resisted well during crisis, β_2 high = portfolio didn't react well during crisis]
    - There will be 4 crisis dummies (separate regressions): 1) VIX > 30 or S&P drop > 5%, 2/3/4) date region of dotcom/gfc/covid to test the sensitivity of the portfolio betas to a financial shock.
- Include rolling betas to assess whether alternative investments dynamically hedge equity risk during turmoil
- Run (and briefly explain) the Vector Auto-Regressive (VAR) model to confirm previous findings:
    - $Y_t = \alpha + \Phi_1 Y_{t-1} + \Phi_2 Y_{t-2} + \Gamma X_t + \epsilon_t$

Conclusion
Analyse which portfolios performed best. Discuss how alternatives helped and which portfolio is the safest during times of stock market turmoil. Relate findings to the theory. Acknowledge limitations: naïve diversification, narrow focus on commodities. Summarise that alternatives, especially when blended with traditional assets, can provide partial insurance. Suggest future research directions (e.g. analysing private equity/hedge fund performance or creating a back testing strategy to see how well our portfolios perform during financial turmoil).

Some Literature:
- Commodities vs Traditional Asset: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1394783
- Optimising insurers' investment portfolios: incorporating alt inv: https://hrcak.srce.hr/file/451338
- Impact of Financial Crisis on Risk and Exposure in agriculture: https://www.jstor.org/stable/20616318?seq=1
- Understanding the VIX: https://www.researchgate.net publication/277429711_Understanding_the_VIX/
- Diversifying Portfolios in Modern Markets: advancesinresearch.id/index.php/AEFS/article/view/217/254
- Portfolios with Traditional and Alternative Assets: https://www.researchgate.net/publication/228828261
- Traditional and AI – investment strategies: https://books.google.co.uk/books

Dataset Sources: [Asset and Indexes] – http://investing.com/, [Risk-free Rate] - fred.stlouisfed.org/series/DGS3MO, [Inflation/CPI] - fred.stlouisfed.org/series/CPIAUCSL