

Essay Proposal

1. The names of the group members

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2. A proposed thesis title

Risk Spillovers and Portfolio Management Across Commodity and Foreign Exchange Markets Through Cycles

3. Key words

Commodity; Precious Metal and Energy; Risk Spillovers; Foreign Exchange Market; Asset Management; Financial Cycle; Business Cycle; Market Timing

4. Outlining

4.1. Research objectives (purpose, research question):

The purpose of this research is to investigate the relationship between the returns of precious metals commodities (e.g., gold, silver, platinum, palladium), energy commodities (e.g., crude oil, natural gas, gasoline, heating oil, coal) and FX within financial cycles. Specifically, the study aims to analyze how the prices of major precious metals and crude oil, as well as exchange rates, exhibit correlations and risk spillovers with each other in the financial cycle and business cycle. Additionally, the research seeks to design portfolios and hedging strategies using various risk measures tailored to different financial cycle or business cycle conditions.

4.2. Suggested methodology/empirical approach:

To study the correlation between commodity market and foreign exchange rates, we obtain the multivariate DECO-GARCH developed by Diebold and Yilmaz (2014, 2016), which is due to serial correlation patterns and the ARCH effect of volatility clustering.

To examine the spillovers between commodity prices and the exchange rates, we employ the spillover index developed by Diebold and Yilmaz (2014, 2016).

For portfolios, we build four portfolios using FX, energy commodities and precious metals: a benchmark currency Portfolio, a risk-minimizing without reducing the expected returns portfolio, an equally weighted portfolio, and a variance-minimization hedging strategy portfolio. Then we calculate the time-series data of returns and risks (e.g., VaR and Variance Reduction) for these portfolios during 2000-2023 (e.g., 30 days moving time zone) and select the best portfolios through the cycle.

To analyze the impact of financial and business cycle to the performance of the portfolio and markets (i.e. why the portfolios' market timing is what we conclude above through the cycle), we also imply the multivariate DECO-GARCH developed by Diebold and Yilmaz

(2014, 2016), which can forecast high frequency market volatility using global predictors that are only available at low frequency (e.g. GDP deflator and real GDP for business cycle), and also suitable for financial cycles with serial correlation patterns and the ARCH effect of volatility clustering.

4.3. Suggested data to be used, including sources:

Commodity Prices: Daily closing prices of the precious metals and energy commodities futures: Gold and silver futures traded at Chicago Mercantile Exchange (CME), WTI traded on the New York Mercantile Exchange (NYMEX). Brent crude oil traded on Intercontinental Exchange (ICE). Return: Continuously compounded daily returns by taking the difference in the log of two consecutive prices.

Spot Exchange Rates: Australian Dollar (AUD), Canadian Dollar (CAD), Eurozone (EURO), Swedish Krona (SEK), UK Pound Sterling (GBP), Japanese Yen (JPY), Swiss Franc (CHF), Brazilian Real (BRL), Denmark Krone (DKK), Indian Rupee (INR), Indonesian Rupiah (IDR), Korean Won (KRW), Mexican Peso (MXN), Norwegian Krone (NOK), New Zealand Dollar (NZD), Russia Ruble (RUB), Singaporean Dollar (SGD), Thailand Baht (THB), Taiwan Dollar (TWD), South African Rand (ZAR) etc. to U.S. exchange rate.

Global Financial Cycle: Global Financial Cycle Index series is available on the website of Professor Silvia Miranda-Agrippino (<http://silviamirandaagrippino.com/code-data>), but it is only updated to 2019, so we try to calculate it using her method, or we can use principal component analysis (PCA) to construct a composite financial cycle with these data: Credit (Credit to Private non-financial sector from All sectors) and Credit-to-GDP (Credit to Private non-financial sector from Percentage of GDP) ; house prices (residential property prices) and share prices.

Business Cycle: GDP deflator and real GDP

4.4. A list of a few key references within the topic area

- Mensi, W., Hammoudeh, S., Rehman, M. U., Al-Maadid, A. A. S. & Hoon Kang, S. (2020). Dynamic Risk Spillovers and Portfolio Risk Management between Precious Metals and Global Foreign Exchange Markets, *The North American Journal of Economics and Finance*, vol. 51, p.101086
- Salisu, A. A., Gupta, R. & Demirel, R. (2022). Global Financial Cycle and the Predictability of Oil Market Volatility: Evidence from a GARCH-MIDAS Model, *Energy Economics*, vol. 108, p.105934
- Diebold, F. X. & Yilmaz, K. (2014). On the Network Topology of Variance Decompositions: Measuring the Connectedness of Financial Firms, *Journal of Econometrics*, vol. 182, no. 1, pp.119–134
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