



# PROBLEM STATEMENT

MScFE Capstone Project

Dynamic Connectedness between commodities,  
forex exchanges, equity markets, and uncertainty:  
Evidence from the US and Australia

Group 7105

September 2024

## Abstract

The financial markets are facing a situation of growing unprecedented uncertainty, supported by various shocks to the system, such as pandemics or energy and inflation pressures. This paper studies the interdependence across extreme quantiles of volatility of related financial markets, such as stocks, foreign exchange, oil, and gold, under the impacts of market sentiment. Quantile Time-Varying Parameter Vector Autoregression (TVP-VAR) is employed by the project as a new approach that is superior to the traditional mean-based measures. This model performs well in extreme market conditions to check for dynamic spillovers related to return and energy shocks. The empirical results could show evidence of the density of network connections in not only the mean (median) cases but also the lower and upper extremes of market volatility. In addition, time-varying effects analysis will enable the identification of significant shock events, which include the Shale Oil Crisis, the COVID-19 pandemic, and recent energy shocks related to the Russia-Ukraine conflict. These findings will be critical for investors, financial markets, fund managers, and policymakers regarding the management of risks, especially at times when there are significant disruptions in the market.

## Project Track

This paper is a research track and will focus on investigating the connectedness between commodities, forex and financial markets under the controls of market uncertainty sentiments.

## Problem statement

In the last decades, the growing interconnectedness of financial and economic variables, including those of commodity prices, stock markets, and macroeconomic indicators, makes knowledge about systemic risk necessary. Global crises like the 2008 financial crisis, COVID-19, and geopolitical tensions like the Ukraine-Russia conflict, increase market volatility and risk levels, which lead to the need to investigate these relations via the proxies of market uncertainty sentiment indices. While several pieces of literature have researched conventional financial assets, such as the equity market and forex (Barunik et al., 2017; Chow, 2021; Wang et al, 2023), those papers might not include the effects of commodities on the whole system. For instance, the two most important commodities that strictly influence the financial and macroeconomic systems are crude oil and gold. Their nature of characteristics, for instance, oil is used in production and energy markets, and gold is acting as a safe-haven asset (Baur and McDermott, 2010). These are very critical to understanding how the shocks spread across the economy, especially in the US and Australia as comparison case studies.

However, conventional methodologies of risk assessment, such as correlation analysis or traditional VaR, usually focus on average market conditions while missing conducting necessary studies on the varying dynamics that occur under different quantile levels, such as extreme market conditions. Thus, there is a need for a more appropriate and accurate approach to examine how these economic variables interact under normal and extreme conditions.

## Goals and Objectives

**Goals:** The study focuses on the analysis of the dynamics connectedness between financial markets (stocks, foreign exchange, and commodities) under the controls of market uncertainty sentiments in periods of extreme market conditions.

**Objectives:** the study will aim to acquire the following objectives.

- To apply the framework of Quantile TVP-VAR to examine the interdependency between financial markets and market uncertainty sentiments and compare results with traditional mean-based measures or VAR models.
- Localizing supply or demand shocks and elaborating on their effects over the whole financial market or over specific investment instruments.
- suggest prediction approaches based on found insights of the effects of commodities, forex, and market sentiments on stock indices.
- Finally, provide actionable insights for market participants (investors and policymakers) based on the result during periods of extreme market conditions

## References

- Baruník, J., Kočenda, E., & Vácha, L. (2017). Asymmetric volatility connectedness on the forex market. *Journal of International Money and Finance*, 77, 39-56.
- Baur, D. G., & McDermott, T. K. (2010). Is gold a safe haven? International evidence. *Journal of Banking & Finance*, 34(8), 1886-1898.
- Chow, H. K. (2021). Connectedness of Asia Pacific forex markets: China's growing influence. *International Journal of Finance & Economics*, 26(3), 3807-3818.
- Wang, G. J., Wan, L., Feng, Y., Xie, C., Uddin, G. S., & Zhu, Y. (2023). Interconnected multilayer networks: Quantifying connectedness among global stock and foreign exchange markets. *International Review of Financial Analysis*, 86, 102518.
- Wen, T., & Wang, G. J. (2020). Volatility connectedness in global foreign exchange markets. *Journal of Multinational Financial Management*, 54, 100617.