Bull and Bear Market: Asymmetric Volatility Spillover Effects

Project

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ABSTRACT

Purpose

To investigate the Asymmetric Volatility Spillover Effects within and across International stock markets.

Study design/methodology/approach

GARCH (Generalized Autoregressive Conditional Heteroscedasticity) Model, Markov-switching model, and Vector Autoregressive Model.

Findings

Volatility spillovers are asymmetric, with the largest impact being auto-influence. Canada has the least impact on other countries, while Japan and the US experience the least cross-influence volatility from abroad. Italy is most impacted by external volatility changes.

In order to realistically and accurately predict volatility, investors' expectations are a significant factor. In contrast to Bensaida (2019), the United States maintains dominance with respect to global market influence.

Originality/value

Existing Literature continues to use either realized volatility or conditional volatility without controlling for expected return of the market. This leads to overestimated volatility as well as biased spillover effects. This research combines GARCH and Markov-switching models to capture conditional volatility and expected return simultaneously. It also contributes to the good and bad volatility literature by showing that using time-varying expected return as threshold to distinguish good and bad is better than using 0.

Practical Implications

Stakeholders in the financial sector (Hedge Funds, Money and Asset managers etc) can leverage findings and insights from this research to inform investment strategies, risk management and the exploitation of spillover opportunities. A reliable and robust data ecosystem, highly qualified analysts and organizational management are required for the implementation and deployment of this model.

Keywords

Expected-Return, Asymmetry, Volatility, Spillover, GARCH, Markov-Switching, Vector Autoregression

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CHAPTER 1: INTRODUCTION

Business Framework

The interdependence of financial markets has been widely investigated both in terms of return and return volatilities (King et al., 1994; Forbes and Rigobon, 2002). During crises, for example, the financial market volatility generally increases sharply and spills over across markets. Diebold and Yilmaz (2012) introduce a simple measure of volatility spillovers across markets by using a generalized vector autoregressive framework. Their methods have been widely applied to many different markets, including stock, energy, foreign exchange, and commodities.

On the other hand, one of the most enduring stylized facts in finance is the negative correlation between stock return and volatility of the return. This negative correlation leads to an asymmetric distribution of stock returns. Bekaert and Wu (2000) and Wu (2001), among others, explain this phenomenon using leverage effects or feedback effects. Other studies (e.g. Chen and Ghysels, 2011; Bekaert et al. 2015) argue that good news and bad news have different impact on stock return volatility, and knowing a volatility reaction to the sign of a shock is relevant to the analysis of market dynamics and the implementation of more effective hedging and trading strategies.

Motivated by this asymmetric relationship between good and bad news and volatility, BenSaida (2019) applies Diebold and Yilmaz's (2012) method to analyze whether the volatility from good news transmitted across financial markets in the same way as volatility from bad news. BenSaida(2019) infers the conditional volatilities from a conditional heteroskedastic model, and he uses the sign of return to determine whether the news is good or bad. In other words, if the return at a period is positive, then the news is good and the inferred conditional volatility at that period will be counted as volatility from good news, and vice versa. Using the directional asymmetric spillovers measure from Diebold and Yilmaz (2012), he finds significant differences in volatility transmission among international stock markets.

Bensaida's (2019) model can be extended in several ways.

1. It assumes a constant zero mean for stock return, this may overlook the time-varying expected return and thus overestimate the volatility.

2. The criterion for good and bad volatility is using 0 as an absolute threshold. However, good and bad news should be evaluated relative to investors' expectations rather than an absolute threshold.

3. It would be interesting to see if the volatility spillover effects are also asymmetric between bull and bear markets.

4. A by-product of this project is the probabilities of each period belonging to the bear market. This can be seen as a bear market index. It would also be interesting to see how bear market index spillovers to other markets.

In this project, we propose a new model to identify bull and bear market along with the good and bad conditional volatility in the stock returns. We consider the following model,

$$r_t = \mu s_t + \epsilon_t \sqrt{h_t}, \varepsilon_t \sim i.i.d(0,1),$$

$$h_t = \alpha s_t + \alpha h_{t-1} + \beta r_{t-1}^2 + \delta 1_{[rt-1<0]} r_{t-1}^2,$$

Where $S_t = 1, 2$ is a two-state Markov-switching regime variable with the transition probabilities $Pr(S_t = j | S_{t-1} = i) = p_{ij}$, where $S_t = 1$ denotes bull market, and $S_t = 2$ for the bear market. We also allow the mean in the conditional heteroskedasticity equation to switch to capture the different nature in volatility in bull and bear markets.

With this model we can assign probabilities of bull and bear markets for each period of data and then calculate the time-varying average return.

Analytics Objectives

- Visualize expected return and conditional volatility in six stock markets.
- Analyze how the volatility of the stock market in one country spills over to other markets.
- Predict and quantify the volatility spillover effects after controlling for expected returns.
- Measure the dynamics of volatility spillover effects during unusual events such as financial crisis, pandemics etc.

CHAPTER 2.1: BACKGROUND AND ANALYTICS OBJECTIVES

Company Background and Macro Environment Analysis

In light of the fact that the potential beneficiaries of our research work in this project includes financial institutions such as hedge funds, mutual investments funds, and related asset managers, we highlight the company background of a particular firm in this sector to implement the assigned task. We provide the company background and macro environmental and industry analysis.

Company: JP Morgan Asset Management Organization

The firm was established as J.P. Morgan & Co., a commercial banking and investment banking firm, by J. Pierpont Morgan in 1871. The firm created its first institutional management division in 1959.

In the 1980s, the firm expanded its investment management business and acquired several asset management firms, including Mitchell Hutchins Asset Management and The First National Bank of Boston's investment management division and till date, acquisitions continue to be one of the firm's growth strategies. Today, J.P. Morgan Asset Management is one of the largest asset management firms in the world, with more than $3 trillion in assets under management. The firm offers a wide range of investment products and services, including traditional and alternative investment strategies, to individual and institutional investors.

Mission and Objectives

J.P. Morgan Asset Management's mission is to provide its clients with investment solutions that help them achieve their financial goals. The firm's objectives are focused on delivering consistent investment performance, innovative products and services, and exceptional client service.

Some of its key objectives includes:

- Investment Performance: J.P. Morgan Asset Management strives to deliver investment performance that meets or exceeds its clients' expectations. The firm invests in a broad range of asset classes and uses a rigorous investment process to identify attractive investment opportunities and manage risk.
- Innovation: J.P. Morgan Asset Management is committed to developing innovative investment solutions that meet the evolving needs of its clients. The firm invests in

cutting-edge technology and research to stay ahead of industry trends and offer its clients access to new investment strategies and products.

- Client Service: J.P. Morgan Asset Management places a high priority on delivering exceptional client service. The firm has a dedicated team of professionals who are available to answer clients' questions and help them make informed investment decisions.
- Responsible Investing: J.P. Morgan Asset Management recognizes the important role that investment management can play in promoting sustainability and addressing social and environmental challenges. The firm incorporates responsible investing principles into its investment processes and offers a range of responsible investing solutions to its clients.

Core Competencies and Value Proposition

JP Morgan Asset Management's core competencies includes:

- Investment Performance: J.P. Morgan Asset Management strives to deliver investment performance that meets or exceeds its clients' expectations. The firm invests in a broad range of asset classes and uses a rigorous investment process to identify attractive investment opportunities and manage risk.
- Investment Expertise: J.P. Morgan Asset Management has a team of experienced investment professionals with deep expertise in a range of asset classes and investment strategies. The firm uses a rigorous investment process to identify attractive investment opportunities and manage risk.
- Global Reach: J.P. Morgan Asset Management has a global presence, with investment professionals and offices located around the world. This allows the firm to offer its clients access to a wide range of investment opportunities and to provide local market insights.
- Innovation: J.P. Morgan Asset Management is committed to developing innovative investment solutions that meet the evolving needs of its clients. The firm invests in cutting-edge technology and research to stay ahead of industry trends and offer its clients access to new investment strategies and products.
- Risk Management: J.P. Morgan Asset Management places a high priority on risk management, and has developed a robust risk management framework to help ensure that its clients' investments are managed in a responsible and sustainable manner.
- Client Service: J.P. Morgan Asset Management is dedicated to delivering exceptional client service. The firm has a team of professionals who are available to answer clients' questions and help them make informed investment decisions.

- Responsible Investing: J.P. Morgan Asset Management recognizes the important role that investment management can play in promoting sustainability and addressing social and environmental challenges. The firm incorporates responsible investing principles into its investment processes and offers a range of responsible investing solutions to its clients.

Description of current marketing programs

J.P. Morgan Asset Management uses a range of marketing practices to promote its products and services and reach its target market. Some of the key marketing practices used by the firm include

- Digital Marketing Programs: J.P. Morgan Asset Management has a strong online presence and uses digital channels, such as its website, social media, and email campaigns, to reach its target audience. The firm also uses online advertising programs to promote its products and services to potential clients.

- Client Outreach Programs: J.P. Morgan Asset Management has a dedicated team of relationship managers who are responsible for building and maintaining relationships with clients. The firm may have specific client outreach programs in place, such as regular client webinars or face-to-face meetings, to promote its products and services and engage with its clients.

- Referral Marketing Programs: J.P. Morgan Asset Management leverages its network of existing clients to generate new business through referral marketing. The firm may have specific referral marketing programs in place to incentivize clients to refer their friends, family, and colleagues to the firm, and to support clients in making the referral.

- Content Marketing Programs: J.P. Morgan Asset Management produces a range of content, such as research reports, investment insights, and thought leadership articles, to educate its target audience about its products and services and build its reputation as a trusted investment advisor. The firm may have specific content marketing programs in place to support the production and distribution of this content.

- Events and Conferences Programs: J.P. Morgan Asset Management participates in a number of industry events and conferences, such as investment conferences, trade shows, and seminars, to promote its products and services and engage with its target audience. The firm may have specific programs in place to support its participation in these events, such as speaker programs or sponsorship programs

Description of current management and human resources practice

J.P. Morgan Asset Management places a high priority on attracting, retaining, and developing talent, and has a range of programs and initiatives in place to support employee

development and engagement. The firm has a reputation for providing its employees with a supportive work environment, competitive compensation and benefits, and opportunities for career advancement.

In terms of management practices, J.P. Morgan Asset Management is known for its strong leadership, clear strategic vision, and commitment to delivering results for its clients. The firm has a well-established investment process that is supported by a culture of risk management and accountability. J.P. Morgan Asset Management also places a strong emphasis on ethical behavior and compliance with regulatory requirements.

The firm has a diverse and inclusive culture, and has been recognized for its efforts to promote diversity and equality in the workplace. J.P. Morgan Asset Management provides its employees with training and development opportunities, and encourages a work-life balance.

Overall, J.P. Morgan Asset Management's management and human resources practices are designed to support its employees and contribute to the success of the firm and its clients.

Industry Analysis:

Professionally managed assets under management grew for a third consecutive year reaching an all time high of $123 trillion. By the end of 2021, the largest concentration is in the North American market with $62.9 trillion followed by Europe at $40.5 trillion, Asia Pacific at $17.4 trillion and the rest of the world contributing $2.7 trillion to the total as shown by Deloitte Insights (2022). The recorded compound annual growth rate has shown double digits over the 7 years with Asia Pacific recording the largest growth rate at 14.7%

In 2021, private capital outperformed hedge funds returning 39.7% compared to 10.2% on an absolute return basis for a one-year period. Open-ended funds take the largest share of investments as of end of year 2021 accounting for 57.5% of all investments followed by 30.5% (all others), private capital at 8% and hedge funds at 3.8%.

The year 2021 was a difficult one for many active managers, and the outlook for 2022 and beyond is expected to bring even more challenges. According to a survey of global managers, 66% and 59% of respondents are worried that inflation and the geopolitical landscape will have a negative effect on their firms in the next 12 months (Deloitte Insights, 2022). Those with significant concerns about inflation are mainly located in the United States.

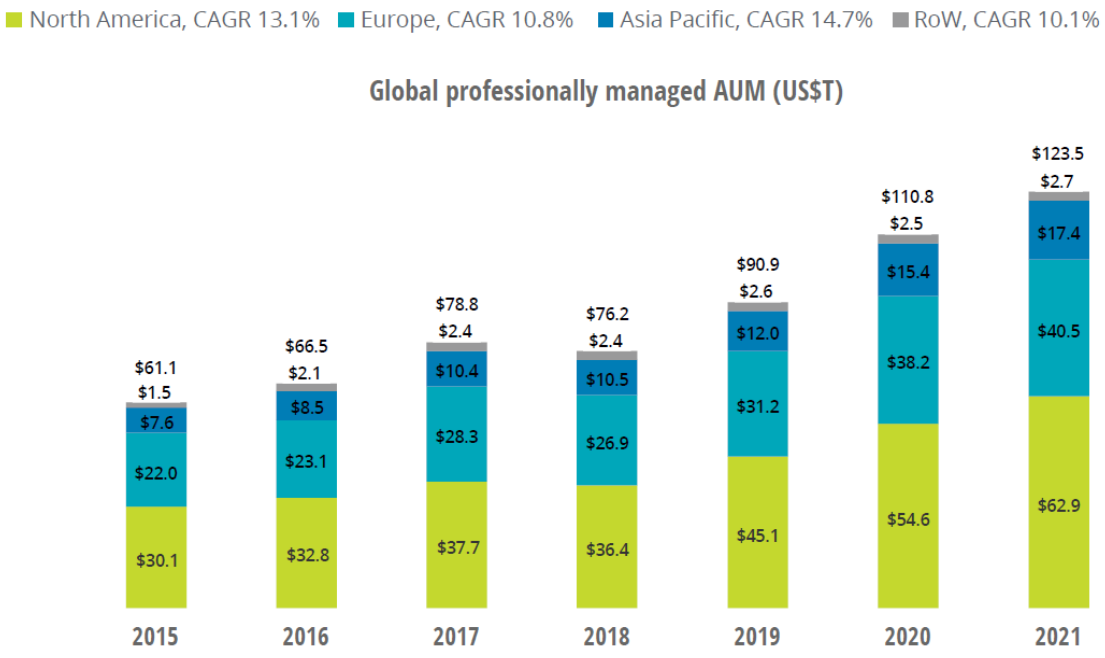
These worries appear to be having an impact on US public markets, which entered a bear market in the second quarter of 2022. This means that stock prices have dropped significantly from their peak levels, making it difficult for investors to make money from their

investments. The bear market has been caused by a combination of factors, including rising inflation expectations, increasing interest rates, and political uncertainty (JPM-AM, 2022).

Inflation is likely to remain an issue in 2023 as well, as it has been steadily increasing since 2020. This could lead to higher prices for goods and services, which could further reduce investor confidence in the stock market. Additionally, geopolitical tensions could also cause volatility in the markets as countries compete for resources or try to gain an advantage over one another.

Given these challenges, active managers will need to be more strategic than ever when it comes to investing in 2023 and beyond. They will need to carefully consider how different economic and political factors may affect their investments before making any decisions. Additionally, they should also look for opportunities where they can take advantage of any potential upside while minimizing risk exposure.

According to Deloitte Insights (2022), portfolio managers are increasingly turning to advanced technologies such as artificial intelligence, data acquisition and data analytics to gain an edge over traditional index investing. By leveraging these capabilities, portfolio managers can identify and capitalize on opportunities that may not be available through index investing. This allows them to generate superior risk-adjusted returns for their clients. Additionally, these technologies can help portfolio managers better understand the markets and make more informed decisions about their investments. Ultimately, this can lead to higher returns for investors while also reducing the risk associated with investing.



Sources: Investments and Pensions Europe; Investment Company Institute; Deloitte Center for Financial Services analysis.

Fig 1. Global professionally managed AUM

A mutual fund is a professionally managed investment fund that pools money from many investors to purchase securities. The term is typically used in the United States, Canada, and India, while similar structures across the globe include the SICAV in Europe ('investment company with variable capital') and open-ended investment company (OEIC) in the UK.

Mutual funds are often classified by their principal investments: money market funds, bond or fixed income funds, stock or equity funds, or hybrid funds. Funds may also be categorized as index funds, which are passively managed funds that track the performance of an index, such as a stock market index or bond market index, or actively managed funds, which seek to outperform stock market indices but generally charge higher fees. Primary structures of mutual funds are open-end funds, closed-end funds, and unit investment trusts.

Open-end funds are purchased from or sold to the issuer at the net asset value of each share as of the close of the trading day in which the order was placed, as long as the order was placed within a specified period before the close of trading. They can be traded directly with the issuer.

Mutual funds have advantages and disadvantages compared to direct investing in individual securities. The advantages of mutual funds include economies of scale, diversification, liquidity, and professional management.However, these come with mutual fund fees and expenses.

Mutual funds are regulated by governmental bodies and are required to publish information including performance, comparison of performance to benchmarks, fees charged, and securities held. A single mutual fund may have several share classes by which larger investors pay lower fees.

Hedge funds and exchange-traded funds are not mutual funds, and each is targeted at different investors, with hedge funds being exclusively available to high net worth individuals.

Industry size and Industry outlook

At the end of 2020, open-end mutual fund assets worldwide were $63.1 trillion.The countries with the largest mutual fund industries are:

1. United States: $23.9 trillion
2. Australia: $5.3 trillion
3. Ireland: $3.4 trillion
4. Germany: $2.5 trillion
5. Luxembourg: $2.2 trillion
6. France: $2.2 trillion