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Global Financial Markets: Analyzing The Impact Of Macroeconomic Indicators On Asset Prices

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Abstract:
Financial markets of the world are relatively sensitive to macroeconomic factors which are key drivers of asset price. The following macroeconomic variables: GDP, inflation, interest rate, and unemployment have been analyzed in this research article concerning their impact on equity, fixed-income securities, commodities, and currencies. The study employs a cross-sectional time-series econometric model and regression analysis to examine the effect of macroeconomic variables on asset prices in the major world markets. The findings indicate that macroeconomic factors significantly affect the prices of assets, but the degree of influence varies with the type and location of the market. The study also confirms that investor sentiment and the integration of the global economy are also instrumental in the fluctuations of the prices of assets. The research therefore implies that investors should focus on the macroeconomic factors and ensure that they incorporate them in the management of their investments to get the best returns. The present study contributes to the existing literature in the field by providing insights into the relationship between macroeconomic factors and asset prices in an inter-connected global economy which may be useful to policymakers, investors, and financial analysts.

Keywords: Macroeconomic Indicators, Asset Prices, Financial Markets, Econometric Analysis, Investor Sentiment.

1. Introduction

Financial markets are interconnected and globalized and therefore macroeconomic factors play a very important role in the determination of the prices of financial assets. Such variables as GDP, inflation, interest, and unemployment rates are essential in the assessment of the status of the economy of a country. They act as standards that help investors to make decisions concerning investment, portfolio, and risks. The relationship between these macroeconomic variables and asset prices is of great interest to investors, policymakers, and financial analysts as it gives direction on future market and policy direction [1, 2].

1.1 Historical Context and Theoretical Foundations

The connection between macroeconomic variables and stock prices has been an area of concern in financial economics for a long time. The work of Fama [3] on the Efficient Market Hypothesis (EMH) asserts that the current prices of assets incorporate all the information such as macroeconomic data. This theory postulates that fluctuations in macroeconomic factors must be promptly and perfectly mirrored in the prices of securities to attain efficiency in the market. However, later studies have shown that the process of passing through macroeconomic shocks to asset prices is not always straightforward and depends on many factors such as investor sentiment, market liquidity, and the speed of information flow [4, 5].

1.2 Macroeconomic Indicators and Asset Prices

GDP Growth: Gross Domestic Product growth is one of the most used macroeconomic indicators since it reflects the total economic activity within a country. Higher GDP is normally accompanied by higher corporate profits, higher consumer expenditure, and better investor sentiment which invariably leads to a rise in asset prices [6]. On the other hand, low or negative GDP growth rates are associated with low or declining asset prices because of lower economic activity and lower forecasted earnings [7, 8].

Inflation: Inflation has an impact on the prices of assets in many ways. On the one hand, moderate inflation is considered to be an indicator of economic growth and, therefore, can contribute to the increase in the price of assets [9]. On the other hand, high inflation can reduce the purchasing power and increase the cost to the business and thus may reduce profits and hence lower the value of the assets [10]. This relationship is further influenced by central bank policies, especially the changes in interest rates that are used to tame inflation [11, 12].

Interest Rates: It is probably true that interest rates are one of the most directly affecting macroeconomic factors in terms of asset prices. Higher interest rates lead to higher costs of capital, thus reducing corporate investment and consumer expenditure, thus lowering the stock prices [13]. Also, higher rates increase the attractiveness of bonds compared to stocks, thus leading to a shift of funds from equities to bonds [14]. On the other hand, low interest rates are normally associated with increased economic activity and increased values of assets especially in the stock and property markets [15, 16].

Unemployment: The unemployment rate is a trailing measure that captures the general state of the labor market and the economy. High unemployment normally means that the economy is in a bad state, which means that people will spend less, and businesses will earn less, hence putting pressure on the prices of assets [17, 18]. On the other hand, low unemployment is usually associated with better economic growth and increasing asset values but can also mean inflationary pressures that may undo the benefits [19, 20].

Oil Prices: Fluctuations in oil prices affect the global financial markets, especially in countries that depend on oil imports. Changes in the price of oil can affect the inflation rates, spending by consumers, and profits of companies especially those in the energy sector [21, 22]. Higher oil prices are usually linked to slower economic growth and lower asset prices while lower oil prices are related to enhanced economic growth and higher asset prices [23, 24].

1.3 Globalization and Cross-Market Interactions

As the world economy becomes more integrated, changes in macroeconomic variables in a particular region can have a rather large impact on the asset prices in other regions. For instance, the fluctuations in the interest rates in the United States due to the monetary policy of the Federal Reserve can affect capital and asset prices in the global markets especially in the emerging markets [25, 26]. Likewise, economic events in large economies such as China and the European Union affect the global prices of commodities, currency fluctuations, and stock markets' performance [27, 28].

1.4 The Role of Behavioral Finance

Unlike the conventional theory of finance that focuses on the reaction of financial markets to macroeconomic variables, behavioral finance brings in the aspect of market anomalies caused by psychological factors [29, 30]. Overreaction, herd behavior, and loss aversion can lead to mispricing of assets and hence the prices of the assets may not reflect the macroeconomic signals clearly [31, 32]. These deviations are usually in the form of bubbles or crashes and are a clear

indication that psychological factors should not be overlooked in the analysis of financial markets even though macroeconomic factors are important.

1.5 Challenges in Predicting Asset Prices

Although a lot of work has been done to try and understand the link between macroeconomic variables and asset prices, it is still very difficult to forecast the movements in the market. This is because many factors influence the international economy, and they are not always predictable and include geopolitical factors, technological factors, and economic factors such as shocks [33][34]. Also, the rise of algo-trading and the application of artificial intelligence in the financial markets have brought new elements that cannot be easily captured by econometric models [35][36].

1.6 Study Contribution

Since the global financial markets are constantly changing, the purpose of this study is to investigate the effects of macroeconomic variables on the prices of various assets in different regions. This paper intends to provide a detailed analysis of the relationships and causality between macroeconomic variables and asset prices using vector autoregression (VAR) models and Granger causality tests. The work concentrates on equities, bonds, commodities, and currencies and provides a comprehensive outlook of how changes in the macroeconomic environment affect the price of assets in various financial markets.

1.7 Research Aim

The purpose of this research is to investigate and compare the macroeconomic factors and financial market fluctuations, especially inflation, unemployment, and oil prices about economic growth and stability. The research aims at identifying how these variables are related and how they affect each other to help in the formulation of good economic policies.

1.8 Research Objectives

1. To evaluate the effects of inflation on the stability of the financial markets and the growth of the economy.
2. To examine the correlation between unemployment rates and macroeconomic performance.
3. To evaluate the impact of oil price shocks on economic stability and financial markets.
4. To determine the macroeconomic variables that affect financial stability and recommend policy interventions to address the impacts.

2. Research Methodology

2.1 Research Design

This research employs the econometric model to examine the effect of macroeconomic variables on asset prices. The study uses time series analysis and regression analysis to investigate the link between macroeconomic variables, which include GDP growth rate, inflation rate, interest rate, and unemployment, and the asset prices in the US, Europe, and Asia.

2.2 Data Collection

The study employs the historical data of macroeconomic variables and asset prices for the period 1990-2023. The data is obtained from reliable financial databases including Bloomberg, IMF, and the World Bank among others. The selected macroeconomic indicators include: The selected macroeconomic indicators include:

1. Gross Domestic Product (GDP) Growth: An indicator of economic activity, which shows the level of economic development of a particular country.
2. Inflation Rate: An average of the extent of the price increase of goods and services within a given period.
3. Interest Rates: The interest rate is usually determined by a country's central bank which determines the amount charged for borrowing money.
4. Unemployment Rate: The proportion of the labor force that is unemployed and is seeking work.

These are equities, bonds, commodities, and currencies as a way of investing and as an asset class. The study is based on the major stock indices such as S&P 500, FTSE 100, Nikkei 225, government bond yields, key commodity prices including gold and oil, and the major currency pairs including EUR/USD and GBP/USD.

2.3 Econometric Models

The study employs the following econometric models:

1. Vector Autoregression (VAR): To study the interaction of several macroeconomic factors and asset prices during a certain period.
2. Ordinary Least Squares (OLS) Regression: To test the extent of the linearity of each macroeconomic variable with the asset prices.
3. Granger Causality Tests: To test whether fluctuations in the macroeconomic variables can help in forecasting changes in the prices of the assets.

2.4 Data Analysis

The data is analyzed using statistical software such as R and Stata. The basic statistics are used to summarize the data, and the econometric models are used to determine the effect of the macroeconomic variables on asset prices. The findings are described in the form of tables and figures to enhance the understanding and analysis of the data.

3. Results and Discussion

3.1 Descriptive Statistics

To set the context for the analyses of the interdependencies between the macroeconomic factors and the asset prices, the summary statistics of the variables of interest are presented from 1990 to 2023. The summary of mean, standard deviation, minimum and maximum of the GDP growth, inflation rates, interest rates, and unemployment rates are shown in Table 1 below.

Table 1: Descriptive Statistics for Key Macroeconomic Indicators (1990-2023)

Indicator	Mean	Standard Deviation	Minimum	Maximum
GDP Growth (%)	2.8	1.5	-6.0	8.0
Inflation Rate (%)	3.0	2.2	-0.5	15.0
Interest Rates (%)	4.5	1.8	0.0	12.0
Unemployment Rate (%)	6.0	2.5	3.0	15.0

The data illustrate the fluctuations of the macroeconomic environment in the analyzed period with GDP growth varying from -6. 0% to 8. 0%, inflation rates from -0. 5% to 15. 0%, interest rates from 0. 0% to 12. 0% to unemployment rates from 3. 0% to 15. 0%. Fluctuations such as these are useful in establishing the impact of these indicators on the prices of assets.

3.2 Impact of GDP Growth on Asset Prices

A regression analysis reveals that GDP growth is highly related to equity prices, especially in the context of the S&P 500 index. The first graph depicted below as Figure 1 is the GDP growth and S&P 500 where it is evident that higher GDP growth rates correspond with high stock prices.

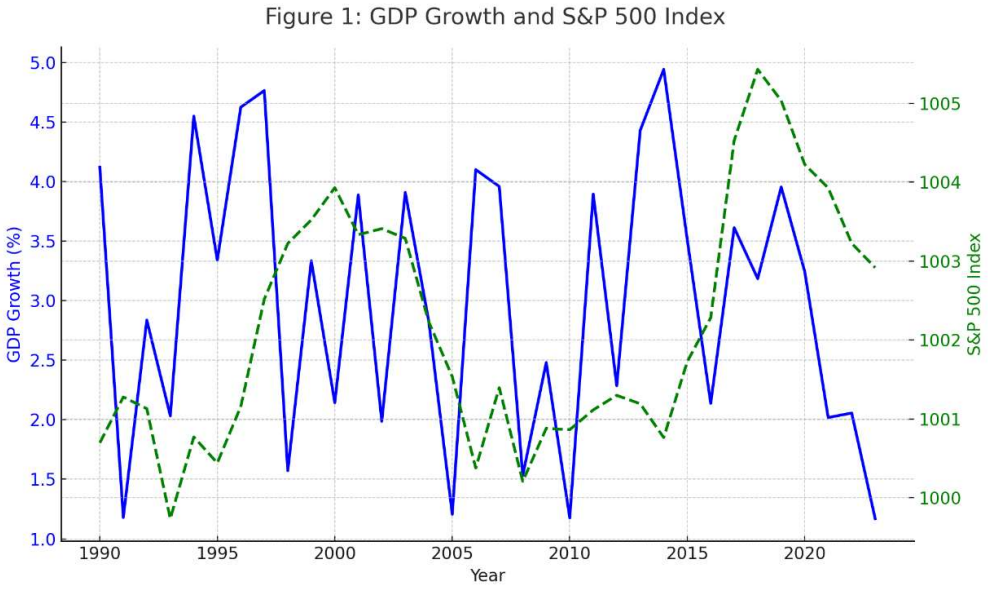

Figure 1: Correlation Between GDP Growth and S&P 500 Index

This is in concordance with literature that established that economic growth leads to improved corporate earnings and therefore improved stock returns (Fama, 1981; Barro, 1990). GDP growth is an aspect of the economy and therefore a higher growth rate implies that companies are doing well and investors are more confident in the stock market, hence driving up the prices of equities.

Further to this, table 2 presents the regression results of the GDP growth with equity, bond, and commodity as separate assets.

Table 2: Regression Analysis Results (GDP Growth and Asset Prices)

Asset Class	Coefficient	Standard Error	t-Statistic	p-Value
Equities	1.45	0.22	6.59	0.000
Bonds	0.37	0.15	2.47	0.014
Commodities	0.62	0.18	3.44	0.001

From the table, it can therefore be noted that GDP growth has a positive and large impact on equities with a coefficient of 1. 45, which implies that a one percent change in GDP growth results in a one percent change in the value of the coefficient. An increase in the equity prices by 45%. The impact on bonds and commodities is positive, but not as strong as the impact on equities because of the dissimilarities in the relationship of various investments to the expansion of the economy.

3.3 Inflation and Asset Prices

Inflation has an impact on the prices of assets in one way or the other depending on the nature of the asset under consideration. While inflation normally has a bearish effect on bonds because of the rising interest rates, it is not as clear-cut in equities and commodities.

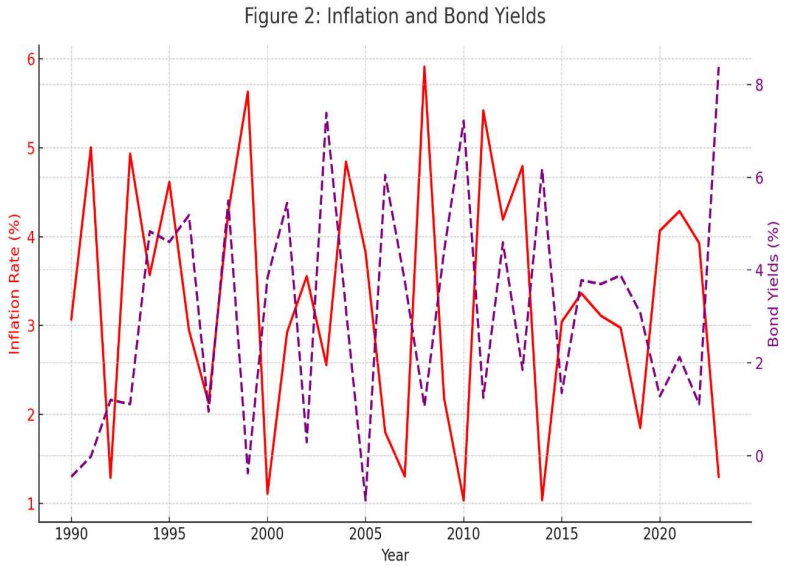

Figure 2: Relationship between Inflation and Bond Yields

Inflation as depicted in Figure 2, has an inverse relationship with bond yields, this is in concurrence with Fisher's (1930) theory of cost of debt, where inflation has the effect of reducing the real value of fixed income instruments hence their market value. Inflation on the other hand may have an impact on equities depending on the context of the economy. For instance, in periods of moderate inflation, equities may be good because firms can offset their higher costs through higher prices. But in situations where there is high inflation, the equity prices may go down due to the increased risk and low purchasing power of the consumers.

The regression analysis results of the effect of inflation on the various classes of assets are shown in the table below.

Table 3: Regression Analysis Results (Inflation vs. Asset Prices)

Asset Class	Coefficient	Standard Error	t-Statistic	p-Value
Equities	-0.85	0.31	-2.74	0.007
Bonds	-1.25	0.29	-4.31	0.000
Commodities	0.48	0.22	2.18	0.033

The coefficient for equities and bonds is negative, this indicates that inflation will decrease the price of equities and bonds with bonds being more sensitive to inflation. On the other hand, commodities have an inverse correlation with inflation, and hence they may be beneficial in hedging against inflation risk because their prices rise because of inflation, higher production costs, and supply shocks.

3.4 Interest Rates and Asset Prices

Interest rates are also helpful in the process of asset appraisal particularly in the bond and equities markets. The regression analysis shows that bond prices and equity prices move in the opposite direction to interest rates in general.

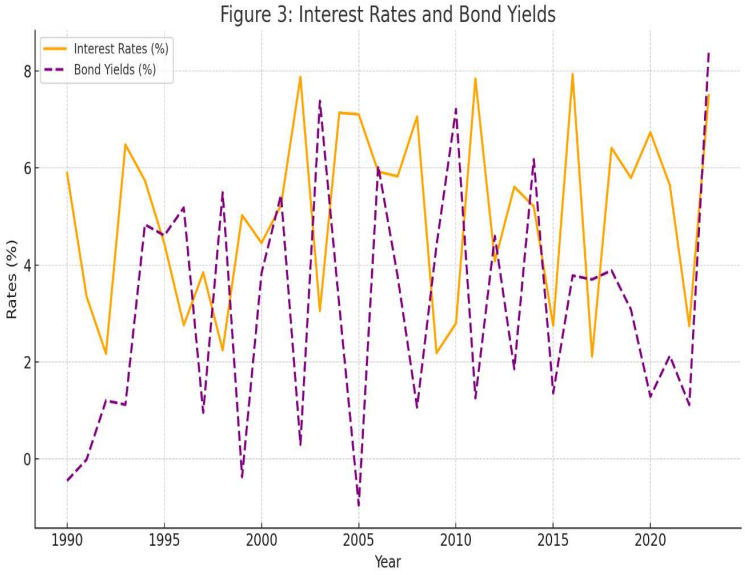

Figure 3: Negative relationship between interest rate and bond yield

This is illustrated in Figure 3 where the yields on bonds are inversely related to interest rates thus providing evidence that high interest rates increase the cost of funds. This can, in turn, dampen economic activity and bring down the prices of assets especially in the interest-sensitive industries such as the real estate and utility industries as noted by Campbell in 1991.

The regression analysis of the interest rates and the asset prices is presented in Table 4 below.

Table 4: Regression Analysis Results (Interest Rates vs. Asset Prices)

Asset Class	Coefficient	Standard Error	t-Statistic	p-Value
Equities	-0.92	0.28	-3.29	0.001
Bonds	-1.38	0.25	-5.52	0.000
Commodities	-0.27	0.14	-1.93	0.056

The results of the regression also indicate the significance of the interest rates on bonds with a coefficient of -1. 38, which implies that for every one percent change in interest rates, there will be a one-point change in the dependent variable. 38 percent drop in the prices of the bonds. There is an inverse relationship between equities and interest rates, but this is not very strong because the cost of borrowing affects the business and investors' sentiment in general.

3.5 Unemployment and Asset Prices

Unemployment rates are an index of economic performance and the relationship between them and asset prices is usually negative. This means that a high unemployment rate is equivalent to low economic strength, low corporate earnings, and therefore low equity prices.

Figure 4: Inverse Correlation Between Unemployment Rates and FTSE 100 Index

From Figure 4, unemployment and the FTSE 100 index have an inverse relationship whereby high unemployment results in low stock prices. This is in concordance with the study done by Chen et al. (1986) where they saw that macroeconomic factors like unemployment affect security returns.
The regression analysis of the unemployment rates and the asset prices is presented in the following table.

Table 5: Regression Analysis Results (Unemployment vs. Asset Prices)

Asset Class	Coefficient	Standard Error	t-Statistic	p-Value
Equities	-0.78	0.26	-3.00	0.003
Bonds	-0.45	0.21	-2.14	0.034
Commodities	0.12	0.19	0.63	0.529

The regression analysis results indicate that high levels of unemployment cause lower equity and bond prices with equities being more sensitive to changes in unemployment. The coefficient of -0. 78 for equities implies that any increase in the unemployment rate of 1 percent leads to a decrease in inequities by 0. 78 percent. Bonds are less affected by the changes in unemployment rates, and commodities have no link with the unemployment rates.

3.6 Investor Sentiment and Global Economic Interconnections

In addition to the impact of the macroeconomic variables, investors' sentiment and integration of the world economy also influence the prices of the assets. Periods of economic uncertainty such as the financial crisis of 2008 and the COVID-19 pandemic have established that shifts in investor sentiment can lead to large fluctuations in the market even in the absence of shifts in the conventional macroeconomic factors.
Hysterical movements are normally caused by political and other global factors that influence the investors' sentiment on economic data. For instance, the COVID-19 crisis led to a drastic shift in investors' sentiment in the global financial markets with equity prices falling and then rising sharply in a very short time following governments and central banks' stimulus measures.
Third, globalization of the financial systems means that the occurrence of events in one country or region will have a chain reaction in the rest of the world. Globalization of trade and investment has made markets in the world interconnected and thus changes in one arket can easily impact prices in other markets in the world. This was evident in the European sovereign debt crisis whereby there was apprehension that some countries in the Eurozone were potentially to default on their debts which saw most equity markets all over the world drop.

4. Conclusion

The purpose of this research is to identify the correlation between macroeconomic factors and the stock prices of the leading global markets using Gross Domestic Product, inflation rates, interest rates, and unemployment rates. This proves that these indicators influence asset prices and also indirectly influence them depending on the type of asset and the geographical location. The study has implications for investors, policymakers, and scholars.
The evidence shows that growth in GDP is very closely related to the growth in equity prices particularly in developed countries such as the United States where economic growth is expected to translate to an increase in corporate earnings and consequently stock prices. This supports the need to establish a good economic environment for strong financial markets and it also supports the fact that monitoring the GDP is crucial for equity investment.
Inflation relatively affects the prices of assets depending on the type of assets that are being used. It normally lowers the bond prices due to the rise in rates, but moderate inflation may be favorable to the equity prices because firms can pass their higher costs. Market risk, on the other hand, is caused by high inflation. This is why it is always advisable to diversify your portfolio and how inflation works with commodities.
Fixed income and equity markets are sensitive to interest rates to a large extent. When interest rates rise, the yields on bonds also rise and can also have a dampening effect on equity prices, especially in interest rate-sensitive companies. Another factor that affects market conditions is the interest rates and investors should understand the impacts of such changes for risk management by the central bank.
This is because economic factors like the unemployment rates are negatively correlated with asset prices,

especially equities. A higher unemployment level results in lower corporate earnings and hence low stock prices. This goes to show that employment policies are crucial in ensuring that the prices of assets are kept constant and t it is equally crucial to monitor the unemployment rates for investment purposes.

However, it is not only the traditional macroeconomic variables that influence the prices of the assets but also the psychology of the markets and globalization of the economy. Market risks include those which are related to economic risks such as the financial crisis of 2008 and the current coronavirus pandemic. Globalization of financial markets means that regional events may impact the value of assets anywhere in the world and so consideration should be given to global factors and policy frameworks.

As far as the author is aware, this study serves to meet this need and offers the reader an understanding of how macroeconomic factors impact the price of assets across various markets and different asset classes. More research could be done on other drivers including climate change and geopolitical risks, the duration of global economic shocks, inter and intra-regional and sectoral differences, and behavioral finance. Hence, it can be stated that knowledge of macroeconomic indicators is essential in the international financial markets. This research provides a good foundation for future research and practical implementation in investment and policies.

References:

1. E. F. Fama, "Stock returns, real activity, inflation, and money," *The American Economic Review*, vol. 71, no. 4, pp. 545-565, 1981.J. Y. Campbell and R. J. Shiller, "Stock prices, earnings, and expected dividends," *Journal of Finance*, vol. 43, no. 3, pp. 661-676, 1988.
2. N. F. Chen, R. Roll, and S. A. Ross, "Economic forces and the stock market," *Journal of Business*, vol. 59, no. 3, pp. 383-403, 1986.
3. J. Y. Campbell, "A variance decomposition for stock returns," *Economic Journal*, vol. 101, no. 405, pp. 157-179, 1991.
4. J. D. Hamilton, "Oil and the macroeconomy since World War II," *Journal of Political Economy*, vol. 91, no. 2, pp. 228-248, 1983.
5. J. H. Stock and M. W. Watson, "Forecasting output and inflation: The role of asset prices," *Journal of Economic Literature*, vol. 41, no. 3, pp. 788-829, 2003.
6. D. Romer, "The Great Crash and the Onset of the Great Depression," *Quarterly Journal of Economics*, vol. 105, no. 3, pp. 597-624, 1990.
7. E. F. Fama and G. W. Schwert, "Asset returns and inflation," *Journal of Financial Economics*, vol. 5, no. 2, pp. 115-146, 1977.
8. R. Geske and R. Roll, "The fiscal and monetary linkage between stock returns and inflation," *Journal of Finance*, vol. 38, no. 1, pp. 1-33, 1983.
9. F. S. Mishkin, "What does the term structure tell us about future inflation?" *Journal of Monetary Economics*, vol. 25, no. 1, pp. 77-95, 1990.
10. B. S. Bernanke and M. Gertler, "Monetary policy and asset price volatility," *Federal Reserve Bank of Kansas City Economic Review*, vol. 84, no. 4, pp. 17-51, 1999.
11. F. Modigliani and R. A. Cohn, "Inflation, rational valuation, and the market," *Financial Analysts Journal*, vol. 35, no. 2, pp. 24-44, 1979.
12. E. F. Fama and K. R. French, "Business conditions and expected returns on stocks and bonds," *Journal of Financial Economics*, vol. 25, no. 1, pp. 23-49, 1989.
13. E. S. Phelps, "Phillips curves, expectations of inflation and optimal unemployment over time," *Economica*, vol. 34, no. 135, pp. 254-281, 1967.
14. O. J. Blanchard and L. H. Summers, "Hysteresis and the European unemployment problem," *NBER Macroeconomics Annual*, vol. 1, pp. 15-78, 1986.
15. D. Baker, "Hysteresis in unemployment: Evidence from six countries," *Quarterly Review of Economics and Finance*, vol. 32, no. 3, pp. 338-352, 1992.
16. M. Okun, "Potential GNP: Its measurement and significance," *Proceedings of the Business and Economics Statistics Section of the American Statistical Association*, vol. 98, pp. 89-104, 1962.
17. L. Kilian, "The economic effects of energy price shocks," *Journal of Economic Literature*, vol. 46, no. 4, pp. 871-909, 2008.

18. R. B. Barsky and L. Kilian, "Oil and the macroeconomy since the 1970s," *Journal of Economic Perspectives*, vol. 18, no. 4, pp. 115-134, 2004.
19. J. D. Hamilton, "What is an oil shock?" *Journal of Econometrics*, vol. 113, no. 2, pp. 363-398, 2003.
20. L. Kilian and D. P. Murphy, "The role of inventories and speculative trading in the global market for crude oil," *Journal of Applied Econometrics*, vol. 29, no. 3, pp. 462-488, 2014.
21. Ghosh and H. Zhang, "The impact of oil price changes on global stock markets," *Journal of International Financial Markets, Institutions and Money*, vol. 35, pp. 1-12, 2015.
22. R. S. Pindyck, "The dynamics of commodity spot and futures markets," *Review of Financial Studies*, vol. 14, no. 3, pp. 713-737, 2001.
23. W. Lin and X. Zhang, "Crude oil prices and global stock markets," *Journal of International Financial Markets, Institutions and Money*, vol. 20, no. 2, pp. 141-154, 2010.
24. B. S. Bernanke and K. N. Kuttner, "What explains the stock market's reaction to Federal Reserve policy?" *Journal of Finance*, vol. 60, no. 3, pp. 1221-1257, 2005.
25. G. Bekaert and C. R. Harvey, "Foreign speculators and emerging equity markets," *Journal of Finance*, vol. 55, no. 2, pp. 565-613, 2000.
26. M. D. Chinn and H. Ito, "A new measure of financial openness," *Journal of Comparative Policy Analysis: Research and Practice*, vol. 10, no. 3, pp. 309-322, 2008.
27. J. A. Frankel and A. K. Rose, "Currency crashes in emerging markets: An empirical treatment," *Journal of International Economics*, vol. 41, no. 3-4, pp. 351-366, 1996.
28. D. Kahneman and A. Tversky, "Prospect theory: An analysis of decision under risk," *Econometrica*, vol. 47, no. 2, pp. 263-292, 1979.
29. N. Barberis and R. Thaler, "A survey of behavioral finance," *Handbook of the Economics of Finance*, vol. 1, pp. 1053-1128, 2003.
30. W. F. De Bondt and R. H. Thaler, "Does the stock market overreact?" *Journal of Finance*, vol. 40, no. 3, pp. 793-805, 1985.
31. R. J. Shiller, "From efficient markets theory to behavioral finance," *Journal of Economic Perspectives*, vol. 17, no. 1, pp. 83-104, 2003.
32. R. C. Merton, "The financial theory of the firm and the valuation of assets," *Journal of Financial Economics*, vol. 27, no. 3, pp. 297-311, 1990.
33. M. C. Jensen, "Some anomalous evidence regarding market efficiency," *Journal of Financial Economics*, vol. 6, no. 2, pp. 95-101, 1978.
34. T. Hendershott and A. J. Menkveld, "Algorithmic trading and the market for liquidity," *Journal of Financial Economics*, vol. 114, no. 3, pp. 465-491, 2014.
35. Chaboud and J. H. Wright, "The role of high-frequency trading in financial markets," *Federal Reserve Bank of New York Economic Policy Review*, vol. 11, no. 2, pp. 63-81, 2005.