

The Relationship between Macroeconomic Variables, Economic Crisis, and Stock Prices: A Review of the Literature
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ABSTRACT

This paper provides a comprehensive inspection of the literature due to the significant importance of the subject since most countries around the world currently face a crisis in their economies. This paper has divided the findings of existing research into theoretical and empirical literature and analyzed them to come to conclusions and suggestions. Arbitrage pricing theory and the efficient market hypothesis are the main theories used by most researchers, and the selection of macroeconomic variables is based on the availability and reliability of data sources and their greater importance to the economy in each country. There is a lack of uniformity in the empirical literature on examining the connection between macroeconomic variables and stock prices. There exists a significant research gap particularly concerning the interplay between diverse sector indices and various macroeconomic variables. Moreover, the role of behavioral finance in the relationship between macroeconomic variables and stock prices also should be investigated in future research.

Key Words: Macroeconomic Variables, Economic Crisis, Stock Prices

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1. Introduction and Background

The stock market's performance is a major concern area of all countries around the world since it has a more substantial impact on the nation's financial stability and, consequently, economic growth (Verma and Bansal, 2021). Because, mobilizing savings and directing them toward sound investment possibilities through the trading of securities on the stock market, ultimately increases the gross domestic product. The stock market serves as a crucial facilitator of capital allocation in the Sri Lankan market-driven economy. It acts as a conduit for channeling funds from those with excess savings to those with promising investment opportunities, ensuring that capital is utilized effectively and efficiently. The proper functioning of the stock market is paramount in today's economic landscape, as it significantly influences the quality of investment decisions made by individuals and institutions alike (Madurapperuma, 2022). On the other hand, since stock markets react quickly to shocks and changes in policy, they are frequently used as performance indicators for all types of economies. The importance of the stock market to the development of a nation is related to the effectiveness, governance, and appropriate regulatory framework created by both policymakers and legislators.

Most countries around the world are experiencing different crises and the roots of many of them started during the COVID-19 pandemic period. In addition to that, political instabilities, war situations, and climate change considerably contributed to these crises. Sri Lanka is also facing a crisis led by political instability, COVID-19, and unplanned economic decisions (Madurapperuma, 2022). Since most of the macroeconomic variables indicate the consequences of this crisis, it's better to explore the relationship between macroeconomic variables and stock prices by exploring how changes in macroeconomic variables affect stock prices.

According to the literature, there is only a few theoretical and empirical research that has looked at the relationship between macroeconomic variables and stock price (Duncan Elly and Eunice Oriwo, 2012; Gopinathan and Durai, 2019; Henry Van Beusichem, 2014; Innocent et al., 2018a; Omar et al., 2022; Shamsudin et al., 2021; Ullah et al., 2017; Verma and Bansal, 2021). As a result, the researcher has taken the initiative to offer a

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comprehensive inspection of the literature to fill the knowledge gap identified in the literature. The purpose of this paper is to provide a comprehensive review of the literature on the relationship between macroeconomic variables and stock prices to identify areas for future research.

2. Methodology

The literature search was conducted for the review using the Google Scholar database. The search terms included "macroeconomic variables," "economic crisis," "stock prices," "Arbitrage pricing theory," and "efficient market hypothesis." Only the articles that were published in peer-reviewed journals were selected. Further, the studies were selected based on the following criteria:

- The study investigates the relationship between macroeconomic variables, economic crises, and stock prices.
- The study is based on sound theoretical and empirical foundations.
- The study is methodologically rigorous.
- The study is relevant to the current economic climate.

Twenty-five articles were selected using the predefined criteria and the analysis was carried out by identifying key themes and patterns. Accordingly, the findings of existing research are divided into theoretical and empirical literature in the study and analyzed to come to conclusions and suggestions for future research.

3. Theoretical Literature

According to the findings of this review, most of the theoretical underpinnings of the linkage between the stock market and the macroeconomic variables are based on, Arbitrage pricing theory (APT), and the efficient market hypothesis (EMH).

Efficient Market Hypothesis

The efficient market hypothesis (EMH), often known as the efficient market theory, is a theory that claims that share prices accurately reflect all available information and that it is difficult to consistently generate an abnormal rate of return. Because the investors cannot

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purchase undervalued stocks and sell them for inflated prices since the stocks always trade at their fair value on exchanges. The only way an investor can earn larger returns is by making riskier bets, as it should be impossible to outperform the market through excellent stock selection or market timing.

Malkiel, (2003) used the efficient market hypothesis theory to support his statement about new information immediately affects stock prices and can assist investors in generating returns that are higher than those of a portfolio of randomly chosen stocks. According to him technical analysis which examines past stock prices to forecast future prices and fundamental analysis which examines financial data do not affect to stock prices. For this reason, the volatility of the stock market values is only explained using current and relevant information.

According to Siddiqui, (2013), the efficient market hypothesis, put forth by Fama in 1960, is regarded as crucial for his study since it claims that stock markets are efficient when considering the availability of information about asset prices in a financial market. Furthermore, stock prices represent all information that is readily available. The three forms of the efficient market hypothesis are strong, semi-strong, and weak. The weak form of the efficient market hypothesis states that the current stock price merely takes into account the previously known information and the semi-strong form of the efficient market hypothesis indicates that asset prices refer to both adjusted new information and publicly available information. According to the strong form of the efficient market hypothesis, the market is efficient as the price of a stock reflects past public available information, new adjusted information, and contains hidden information. This includes all public and private information.

Even though the literature highlighted the efficient market hypothesis, there are some situations which the reality is differed from the theory. None of the investors can not consistent in achieving returns according to the efficient market hypothesis since expert stock analysis and meticulously planned market timing tactics have no chance of consistently outperforming the performance of the entire market except it happens by blind luck. But people like John Templeton, Peter Lynch, and Paul Tudor Jones routinely, year

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after year, outperform the performance of the entire market in terms of returns on investment.

Arbitrage Pricing Theory

The approach that has drawn the most attention for its potential to connect macroeconomic factors with the stock return is Arbitrage Pricing Theory (APT) which is proposed by economist Stephen Ross in 1976. The APT is an asset pricing theory that holds that a linear relationship between an asset's expected returns and the macroeconomic factors that affect the asset's risk can be used to forecast its returns. The APT provides analysts and investors with a multi-factor pricing model for securities that are based on the relationship between the expected return and the risks associated with a financial asset. The APT seeks to identify a security's fair market value that may be momentarily mispriced. It assumes that market behavior is periodically imperfectly efficient and leads to assets being mispriced, either overvalued or undervalued, for a small period. The price should eventually return to its fair market value thanks to market activity, though. Temporarily mispriced securities offer an arbitrageur a chance to make a quick profit almost risk-free. The APT is a more flexible and intricate substitute for the Capital Asset Pricing Model (CAPM). The APT argues that several macroeconomic factors are at play, contrary to the CAPM's assertion that a single common cause drives asset prices or expected performance. The hypothesis gives analysts and investors the option to tailor their research. But it is more challenging to put into practice because it takes a long time to identify all the different variables that could affect an asset's price.

Research Variables

According to Duncan Elly and Eunice Oriwo, (2012), Researchers have been particularly interested in the Macroeconomic Factor Model (MFM) since APT failed to prespecify the factors in its model rather than derive them statistically. Even in Roll and Rose's 1980 initial empirical APT investigation, this shortcoming of the APT was acknowledged. According to Roll and Ross, (1980), the components obtained through factor analysis should be basic economic aggregates like the GNP or interest rates. They also agreed that these economic considerations could not be specified by the APT. Finally, they recommended looking into economic factors in the APT that are proxied by derived factors

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(Roll and Ross, 1980). The first study used macroeconomic variables as proxies for APT variables that were not defined by Chen et al., (1986). The three scholars made an effort to model stock returns in terms of macroeconomic factors. It was determined that stock prices and subsequently stock returns are consistently impacted by economic factors since factors like interest rates and Treasury bill rates can affect expected dividends and the discount rate. The inability to grasp the economic implications of the model's conclusions was another issue with APT. The new model, MFM which is based on macroeconomic variables emerged as a result of these shortcomings. Since predicted dividend and discount rates are influenced by macroeconomic forces, it follows that stock prices and hence stock returns are consistently impacted by macroeconomic factors. The relationship between different macroeconomic factors and stock returns has been extensively studied in several nations since 1986. It is necessary to harmonize the MFM model because there is no theoretical basis for the selection of macroeconomic variables, and as a result, various research produce varied results depending on the macroeconomic elements included in the model. The following is a succinct definition of macroeconomic variables, which have been utilized in the majority of studies. (Chang and Rajput, 2018; Chen *et al.*, 1986; Jayasundara *et al.*, 2019; Verma and Bansal, 2021)

Interest rate: The interest rate refers to both the rate at which the central bank charges a commercial bank for a loan and the rate at which the commercial bank receives interest on its deposits with the central bank. A commercial bank functions similarly in that it offers loans to its clients and receives deposits from them. Interest rate refers to the rate at which loans are subject to interest charges and deposits are subject to interest payments.

Inflation rate: Over a period of time, inflation is the steady increase in a nation's prices for goods and services. The rate at which it rises is referred to as the inflation rate. In most cases, the consumer price index is used to measure it.

Exchange rate: The rate at which one country's currency is exchanged for another is known as the exchange rate.

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Money supply: The total amount of money in an economy is known as the money supply. A nation's central bank makes the decision at a specific moment. It is utilized as a tool for monetary policy to promote economic growth and manage inflation.

Gross domestic product: Gross domestic product is the total worth of goods and services generated within a nation's borders in a given year. It is regarded as a metric to assess economic expansion.

Foreign institutional investors: Investors who make investments in the financial markets of other nations include pension funds, insurance funds, mutual funds, etc.

In addition to the above common variables, many researchers have used different variables as macroeconomic variables according to the availability and reliability of data sources and their greater importance to the economy. According to Madurapperuma, (2022), the Industrial production index, Consumer price index, Foreign Exchange Rate, Certificate of deposit, and Treasury bill rate are the major indicators of macroeconomic variables, and they all share price index of the Colombo Stock Exchange to proxy the stock market prices in Sri Lanka. Abbas and Wang, (2020) used the industrial production index, retail sales, terms of trade, hot money, money supply, 6-month treasury bill rate, 20-year treasury bond yield, consumer price index, the exchange rate with respect to the US dollar, gold price, and crude oil price in local currency as macroeconomic variables for their study. Economic growth, Inflation, Turnover Ratio, Score for the freedom from corruption index, and Economic freedom are the macroeconomic variables used by Damiran et al., (2022) in their study on Macroeconomic Determinants of Stock Market Volatility: Evidence from Post Socialist Countries.

Even though many researchers highly focused on macroeconomic factors, Institutional factors are also addressed by some researchers to show a full image of stock market behavior and stock price determination.

4. Empirical Literature

The literature contains contradictory findings relating to the relationship between macroeconomic variables and the stock markets in different countries around the world.

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Jayasundara et al., (2019) found that the US Dollar exchange rate and real GDP growth rate had a positive impact on the all-share price index, interest rates, industrial production index, and civil war had a negative impact. Importantly, the global financial crisis had a beneficial impact on Sri Lanka's all-share price index, which runs counter to what industrialized nations have seen. These findings are different from the findings of Madurapperuma, (2022), which indicates that there is a long-run equilibrium relationship between macroeconomic variables and stock prices in Sri Lanka. Further, the findings suggest that the economic crisis of Sri Lanka significantly affects the Colombo stock market negatively and when selecting whether or not to participate in Sri Lanka's stock market, investors are adversely impacted by the current economic crisis. Nizam and Liaqat, (2022) also reported that oil and gold prices have a negative relationship with the stock market in Pakistan. These findings are different from the findings of Abbas and Wang, (2020) which indicate weak and inconsistent unidirectional causality for China mainly running from the stock market to the macroeconomic variables. However, when the effects of the Asian and global financial crises are taken into account, the volatility spillover transmission reverses. In the context of the Chinese stock market, Liang and Willett, (2015) reported that from 2000 to 2013, changes in the real exchange rate were consistently accompanied by a decline in stock values. Stock fluctuations became more susceptible to changes in economic fundamentals after the Chinese stock market fell in 2007, indicating that a bubble had formed. Bank loans and deposits were two examples of policy-driven variables that had a significant impact on stock performance. Although their economic effects were less important, real economic fundamentals like industrial production and exports also started to play a considerable role in explaining Chinese stock returns. These findings are contradictory to the findings of Abbas and Wang, (2020)

According to the findings of the study on the relationship between the Bulgarian stock market and macroeconomic variables Hsing, (2011), says “More real GDP, a lower government deficit/GDP ratio, a higher M2/GDP ratio, a lower real interest rate or expected inflation rate, a higher U.S. stock market index or a lower euro area government bond yield would increase the Bulgarian stock market index”.

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By considering the time period, Omar et al., (2022) found a significant positive impact of economic growth and banking sector development on stock market development and a negative effect of inflation, foreign direct investment, and trade openness on it in long run. But the findings are not similar in the short run. Verma and Bansal, (2021) focused on the categories of developing and developed countries and they concluded that the GDP, FDI, and FII have the same impact on developing and developed countries, and many other macroeconomic variables yield results that differed by country. Most importantly, they evidenced that variables reverse their impact when the economy is in a crisis. However, stock markets in developed nations have experienced consistent growth and stability over time, despite the market crashes that have jolted the world's financial markets, but stock markets in emerging economies are regarded as the most volatile markets in the world (Engle and Rangel, 2005), and they have been expanding significantly over the past 25 years. Additionally, they are more vulnerable to macroeconomic variables like changes in income levels, inflation, interest rates, etc.

Chang and Rajput, (2018) say when the entire sample period is used, the relationship between macroeconomic variables and stock price is symmetric in the long run as opposed to being asymmetric in the short run. However, when pre and post-crisis eras are chosen, this effect also becomes asymmetric over time, meaning that shocks to macroeconomic variables that are both positive and negative do not have the same effects on the stock price (SP). Further, findings suggest that the interest rate has a long-term, considerable negative impact on the stock price in all sample periods. For all sample periods, the consumer price index (CPI) has a significant but favorable impact on stock price and, Industrial Production Index (IPI) only has a large and favorable influence during the pre-crisis period, and the exchange rate has no effect at all during any of the sample periods. Results show that in the short run, interest rates have an asymmetric impact on SP only during the pre-and post-crisis periods, IPI over the entire time and only during the pre-crisis era, CPI only during the pre-crisis period, and exchange rate only during the pre-and post-crisis periods. Long-term results show that SP during the post-crisis period, CPI for the pre-crisis period, and exchange rate during the post-crisis period are all affected asymmetrically by interest rate and IPI. Bahmani-Oskooee and Saha (2015) have concluded in their reviewed article that the majority of the studies assume that the relationship between these variables is

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symmetric and some of the recent studies indicate that exchange rate changes have an asymmetric effect on SP.

Gopinathan and Durai, (2019) reported different findings by indicating that there is no correlation between stock prices and other macroeconomic factors, according to the traditional Engle-Grange and, Phillips-Ouliaris tests. However, the Johansen cointegration test demonstrates that these variables are related over the long term.

Jareno and Negrut (2016) discovered that in the case of the USA, GDP and industrial production have positive effects, whereas interest rates and the unemployment rate have a significant negative influence. Twenty-four different kinds of Australian managed funds and thirteen macroeconomic factors were examined by Wang et al. (2017). They discovered that local and global macroeconomic variables had significant predictive power of return in the Australian market by employing principal component-based regression analysis. Similar to this, Yang et al. (2018) investigated how macroeconomic shocks affected Korea's stock return and discovered that macroeconomic factors had a substantial impact. Wei et al. (2019) looked into the direct effects of oil price fluctuations on the stock market in China as well as the effects of macroeconomic factors including the foreign exchange market, domestic economic growth, and international trade. They discovered that changes in the price of oil had a large direct and indirect impact on the stock market.

Given the previous results, there are somewhat contradictory findings on the connection between the stock market and macroeconomic fundamentals, and this connection still has an embarrassing gap. Additionally, since the level of risk connected with stock market volatility leaves investors and financial analysts confused, it is crucial to comprehend how volatile the stock market is in relation to systematic risk variables. These uncertainties would ultimately influence their portfolio management and stock investment choices. As a result, financial market analysis is essential for asset pricing, risk management, and fund allocation.

Table 01: A Summary of Key Empirical Literature

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Authors	Title	Findings
(Madurapperuma, 2022)	The dynamic relationship between economic crisis, macroeconomic variables and stock prices in Sri Lanka	There is a long-run equilibrium relationship between macroeconomic variables and stock prices in Sri Lanka.
(Abbas and Wang, 2020)	Does macroeconomic uncertainty really matter in predicting stock market behavior? A comparative study on China and USA	Volatility persistence in the stock markets and the macroeconomic variables of both countries.
(Verma and Bansal, 2021)	Impact of macroeconomic variables on the performance of stock exchange: a systematic review	The impact was sector-specific for many remaining variables.
(Innocent <i>et al.</i> , 2018a)	Effects of macroeconomic variables on stock market performance in Rwanda. Case study of Rwanda stock exchange	GDP, inflation, and exchange rate are negatively significant in affecting stock market performance while the interest rate is negatively insignificant.
(Damiran <i>et al.</i> , 2022)	Macroeconomic determinants of stock market volatility: Evidence from post socialist countries	Economic growth and stock market return have a positive effect, while stock market turnover ratio with a time lag and economic growth has a strong and

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		positive effect on Stock Market Volatility all the time
(Nizam and Liaqat, 2022)	The Impact of Commodities Price on Stock Market Price: Evidence from Pakistan	Gold and oil price have an inverse relationship with the stock market price of Pakistan
(Khan <i>et al.</i> , 2021)	Stock market reaction to macroeconomic variables: An assessment with dynamic autoregressive distributed lag simulations	Oil prices and gold prices have a positive effect on the stock returns in the short run and in the long run while the exchange rate indicates a negative effect both in the short run and in the long run.
(Jayasundara <i>et al.</i> , 2019)	Impact of Macroeconomic Variables on Stock Market Performances: Evidence from Sri Lanka	Macroeconomic variables have an overall impact on the ASPI of Sri Lanka
(Ullah <i>et al.</i> , 2017)	Effect of Macroeconomic Variables on Stock Market Performance of SAARC Countries	Exchange rate, foreign currency reserve, and interest rate are all statistically significant in affecting the stock market performance of SAARC countries. Inflation and money do not have a significant relationship in

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		affecting stock market performance.
(Hsing, 2011)	Impacts of Macroeconomic Variables on the Stock Market in Bulgaria and Policy Implications	The stock market index is positively associated with real GDP, the M2/GDP ratio and the U.S. stock market index and is negatively influenced by the ratio of the government deficit to GDP, the domestic real interest rate, the BGN/USD exchange rate, the expected inflation rate, and the euro area government bond yield.
(Liang and Willett, 2015)	Chinese Stocks during 2000-2013: Bubbles and Busts or Fundamentals?	Economic factors in China have a long-term equilibrium relationship with stock market performance
(Omar <i>et al.</i> , 2022)	Is stock market development sensitive to macroeconomic indicators? A fresh evidence using ARDL bounds testing approach	There is a significant positive impact of economic growth and banking sector development on stock market development and a negative effect of inflation, foreign direct investment,

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		and trade openness on it in long run.
(Tronzano, 2021)	Financial Crises, Macroeconomic Variables, and Long-Run Risk: An Econometric Analysis of Stock Returns Correlations (2000 to 2019)	Significant contagion effects on stock markets during almost all financial crises
(Chang and Rajput, 2018)	Do the changes in macroeconomic variables have a symmetric or asymmetric effect on stock prices? Evidence from Pakistan	The relationship between macroeconomic variables and stock price is asymmetric in the short run whereas this effect is symmetric in the long run
(Shamsudin <i>et al.</i> , 2021)	Macroeconomic Variables Influence on Stock Market Performance	Malaysian inflation (INF) has a negative but significant correlation with stock market developments
(Henry Van Beusichem, 2014)	The influence of macroeconomic variables on stock performance	The impact of some macroeconomic variables differs between industries, whereas other macroeconomic variables have a homogenous impact
(Gopinathan and Durai, 2019)	Stock market and macroeconomic variables: new evidence from India	Different findings based on the different cointegration tests
(Innocent <i>et al.</i> , 2018)	The Effect of Macroeconomic Variables	Interest rates and money supply had a significant

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	on Stock Market Returns in Ghana (2000-2013)	negative effect on stock market returns; however, exchange rates had a significant positive effect on stock market returns. Moreover, the inflation rate did not significantly affect stock market returns in Ghana.
(Duncan Elly and Eunice Oriwo, 2012)	The Relationship Between Macro Economic Variables and Stock Market Performance In Kenya	Treasury bill rate has a negative relationship with the share Index while inflation has a weak positive relationship with the share Index.

Source: Compiled by the researcher

5. Conclusion and Future Direction

The Efficient Market Hypothesis (Fama, 1970), and the Arbitrage Pricing Theory (Roll and Ross, 1980) are the two most significant and notable theories that researchers have used in the past to study the impact of macroeconomic variables on the stock market.

There is a lack of uniformity in the literature on the much research that has been done to examine the connection between macroeconomic factors and stock price. But most of the findings suggested that many macroeconomic variables including economic growth, money supply, banking sector development, trade openness, stock market liquidity, foreign portfolio investment, inflation, domestic investment, private capital flows, and saving rate significantly affect the changes of stock prices in many countries around the world both negatively and positively. Consequently, it is the duty of government regulators and policymakers to safeguard investors' interests, potentially by ensuring that companies have access to prospects for greater liquidity and profitability. The fundamental goal of

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government policy should be to progressively stimulate the travel and tourism, manufacturing, construction, and service sectors considering the severity of the crisis. Investors would have a more optimistic outlook on the company's future earnings as a result, which would lower market volatility and allow economies to grow in a more stable way. On the other hand, domestic and foreign investors and fund managers should consider the volatility of the overall business cycle, inflows of speculative capital seeking short-term returns, money supply, inflation, exchange rates, and gold prices, etc. as the sources of macroeconomic uncertainty to manage risk and create portfolio strategies.

A sudden increase in inflation reduces the real value of the domestic currency, and investors look to alternative investment avenues like gold to preserve the value of their assets and earn higher returns. It is advised that investors include gold in their portfolio to reduce the risk posed by the exchange rate and other macroeconomic variable fluctuations.

There is a gap in the research when it comes to the relationship between different sector indices and various macroeconomic variables, even though the relationship between stock market returns and macroeconomic variables has been extensively studied. Future research should focus on this gap and the use of multifactor analysis is essential. In order to present a fuller understanding of stock market performance, multifactor analysis involves the integration of an increasing number of macroeconomic factors, such as revenue, investments, consumption, deposit growth rate, and nonperforming assets of banks.

Moreover, future research could focus on exploring the role of behavioral finance in the relationship between macroeconomic variables and stock prices. By understanding how investors behave, researchers may be able to better understand how macroeconomic variables affect stock prices.

Another area of future research could focus on developing new models for forecasting stock prices. Current forecasting models typically rely on historical data and macroeconomic variables. However, these models may not be able to accurately predict stock prices during periods of economic crisis, when the relationship between macroeconomic variables and stock prices may be more complex. New models that take

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into account additional factors, such as investor sentiment and behavioral biases, may be able to improve the accuracy of stock price forecasts.

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