

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

There are many studies related to the causal relations among stock returns and some monetary or macroeconomic variables such as interest rate, inflation, money and output. Some examined the validity of EMH in various stock markets. Other researchers investigated the bivariate causality between macroeconomic variables, for instance, money and output, investment and economic growth, interest rate and inflation, price level and monetary aggregates. In the next section, works on other countries are reviewed. In the third section, Malaysia related studies are reviewed. Local researchers mostly focused on the analysis of market efficiency by examining if any lead-lag relationship exists between stock prices and macroeconomic variables.

2.2 Studies on Other Countries

Sims (1972) conducted an empirical study in the causality between money and income for United States (US) postwar period. Quarterly data were used for the period 1947 to 1969. Income was measured by gross national product (GNP) and

money (M) was measured by both monetary base and M1. Sims regressed GNP on future and lagged M and the reversed regressions of M on future and lagged GNP. All variables used in the regressions were measured in natural log. The main empirical finding was that causality was unidirectional from money to income. However, the hypothesis that the causality was unidirectional from income to money was rejected. In other words, there was no feedback causality.

Fama (1990) investigated the relationships among stock returns, expected stock returns and the economic activity in US. The time period covered is from 1953 to 1987, and monthly, quarterly and annual data were used. New York Stock Exchange (NYSE) value-weighted return measured stock return while seasonally adjusted industrial production index measured the real activity. The total return variations could be explained by expected returns, shocks to expected returns and shocks to expected cash flows. Fama employed regressions of monthly, quarterly and annual production growth rates on contemporaneous and one-year lag of quarterly real returns on the value-weighted NYSE portfolio. He also regressed monthly, quarterly and annual continuously compounded real returns on the value-weighted NYSE portfolio on contemporaneous and one-year lead of quarterly production growth. The results revealed that leads of quarterly production up to three or four quarters ahead helped to explain monthly, quarterly and annual returns. It also showed that three or four lags of quarterly returns also helped to forecast monthly, quarterly and annual production growth. The value of R^2 increased as the return and industrial production horizon increased which

suggested that annual data produced better results than quarterly and monthly data.

Schwert (1990) analyzed a century relationship between real stock returns and real activity in US from 1889 to 1988. He replicated Fama's (1990) results for the 1953-1987 period. He compared the new Miron-Romer index of industrial production for the period of 1884-1940 with the Babson index of physical volume of business activity from 1889-1918. He tried to explain the variation in real returns to a value-weighted portfolio of common stocks. He used capital gain returns from the end-of-month values of Dow-Jones Composite portfolio and dividend yields added from the Cowles portfolio to measure total stock returns. He followed Fama's methods by using compounded real returns for the horizon of one month, one quarter and one year. The results showed that Babson-Fed production growth rates were more highly correlated with past real stock returns than the Miron-Romer data for both the periods 1889-1925 and 1926-1952. Similarly, the real stock returns were more highly correlated with future production growth rates measured by Babson-Fed production growth rates than the Miron-Romer data.

Lee (1992) investigated the causal relations and dynamic interactions among the asset returns, real activity, inflation and real interest rate in the postwar US. The sample period for the study is from January 1947 to December 1987. The common stock returns were computed using the NYSE value-weighted stock

index. The nominal interest rate was the return on one-month US Treasury bills and the industrial production index was used as a proxy for the real activity. He employed the multivariate vector autoregression (VAR) approach for explaining their relationship. By using the VAR analysis, he examined the Granger causality, impulse responses and variance decomposition of the variables. The results showed that US stock market rationally acted as signals to changes in real activity. The response of industrial production to shocks in real stock returns was significant up to 12 months. Real stock returns did not Granger-cause inflation. Real interest rate explained a substantial fraction of the forecast error variance in inflation while inflation did not have significant explanatory power for growth in industrial production in the presence of stock returns and interest rate.

Serletis (1993) examined the long-run relationship between stock prices and money in US. He employed two cointegration techniques, which were the Engle and Granger two-step approach and Johansens's maximum likelihood approach. Monthly data covering the period from January 1970 to May 1988 were used. The data series were the Standard & Poor's Composite Index of stock prices, and eight money supply measures (based on simple sum and Divisia measures of the money stock). The augmented Dickey-Fuller test was utilized to check the existence of unit root in the data series and followed by cointegration test. It was found that all series were characterized as $I(1)$, with a stochastic trend which is consistent with the EMH. Moreover, both money and stock prices did not cointegrate, suggesting

the absence of an error correction representation, which is also consistent with the EMH.

Thornton (1993) employed the methodology of VAR analysis and Granger causality test to investigate the lead-lag relationships among stock prices, money supply and real output in United Kingdom (UK). Stock prices were measured by Financial Times Price Index of Ordinary Industrial Shares (FTSE), real economic activity was measured by real gross domestic product (GDP), and the money supply was represented by monetary base, M0 and M5. All series were seasonally adjusted and the sample period was from the first quarter of 1963 to the fourth quarter of 1990. The results suggested that stock prices tended to lead M5 money supply and real GDP. Real GDP was also Granger-caused by monetary base. There were feedback effects between money supply volatility and stock price volatility. Real GDP volatility led both stock price volatility and money supply.

Serletis and King (1994) examined the effects of deterministic trend in money growth towards money-income causality by using US and Canadian data. They evaluated the central role of money in the monetary policy formulation process. Monthly data of money supply and output were used and the study period covered January 1970 to May 1988 for US and from January 1972 to December 1988 for Canada. Data series for output were industrial production index and real GDP at factor cost for US and Canada respectively and eight money supply measures for each country. The case of US rejected the hypothesis that money growth did not

Granger-cause real output with Divisia M2, M3 and Divisia L aggregates. The outcomes were not significantly affected after dropping the deterministic trend. For Canada, output growth was only Granger-caused by Sum M1 and Divisia M1. The removal of deterministic trends for money growth also showed no impact on the statistical inference.

Bittlingmayer (1998) examined the stock volatility and output decline due to political uncertainty in Germany. Monthly data for the period January 1880 to December 1940 were used. Political uncertainty was treated as an exogenous factor. The period of political uncertainty in the analysis included the beginning of World War in August 1914, armistice and revolution in October and November 1918, insurrection in 1920, conflict with allies in 1922 and the onset of the Great Depression from 1931 to 1932. He regressed the changes in industrial production on current and lagged changes in stock volatility and other variables that could explain changes in output. The results implied that the current and past increased in stock volatility were associated with output declined, consistent with the US experience. The political issues emerged clearly as the source of volatility.

Binswanger's (2000) study revealed that the stock variations, which could be explained in the past by future values of measures of real activity in US no longer hold since the occurrence of stock market boom in early 1980s. In other words, stock returns ceased to lead real activity. He performed the regressions for the whole sample period of 1953 to 1995 and also compared the results to regressions

over sub-samples of 1953 to 1965 and 1984 to 1995. The first sub-sample denoted the first stock market growth period while the second sub-sample measured the recent stock market growth period. The augmented Dickey-Fuller unit root test and Granger causality test were employed in the study. The results showed that the null hypothesis that stock returns did not Granger-cause production growth was strongly rejected for the whole sample and the first sub-sample period. Nevertheless, there was no evidence to prove the causal relationship between stock returns and production growth for the second sub-period, irrespective of whether monthly or quarterly data were used. The study indicated that the relation between stock returns and future production growth broke down since after 1984. This was in contrast with Fama's (1990) finding. Binswanger evaluated his findings that the high growth period was due to the existence of (positive) speculative bubbles or fads because of the impossibility to distinguish bubbles from unobserved fundamental factors. Other reasons for the breakdown that occurred during 1980s may be due the effects of globalization and monetary policy.

Aylward and Glen (2000) conducted an international empirical study on stock prices as leading indicators of economic activity. The purpose of the study was to examine the ability of stock market prices to predict future economic growth in income, consumption and investment. Twenty three markets were included in the study. They were the G7 countries, Australia and 15 emerging market countries for the period 1950s to 1990s. National income was measured by GDP, stock

prices were annual average stock price indices, consumption was defined as private domestic consumption spending and investment was defined as gross fixed capital expenditure. All series were measured in nominal terms in local currencies and deflated by wholesale price indices. Estimation was performed by using Ordinary Least Square (OLS) and Seeming Unrelated Regression (SUR) system estimation technique. He found the evidence that stock price changes led GDP, consumption and investment in most countries. Stocks were substantially better leading indicators of investment than either GDP or consumption.

Muradoglu, Metin and Argac (2001) examined the long-run relationship between stock returns and monetary variables in Turkey. The stock prices were represented by Istanbul Securities Exchange (ISE) Composite Index while the monetary variables were overnight interest rate, money supply and foreign exchange rates in terms of German Mark, British Sterling, US Dollar and Japanese Yen. The study used daily data for the period from January 1988 to April 1995 and all series were in logarithmic forms. The analysis was divided into three sub-periods corresponding to different development phases. They were first sub-period (1988-1989), second sub-period (1990-1992) and the third sub-period (1993-1995). The Engle-Granger cointegration approach was conducted for examining the long-run equilibrium relationship. Results of the whole sample period (1988-1995) showed no cointegrating relationship between stock prices and any of the monetary variables. Only the first sub-sample indicated that stock prices did not cointegrate

with monetary variables while the second and third sub-samples implied that all variables were cointegrated with stock prices.

2.3 Studies on Malaysia

Most researches on Malaysia focused on the relationship between the stock market and macroeconomic variables in order to examine the EMH.

Ibrahim (1999) investigated the dynamic interactions between stock prices and seven macroeconomic variables in Malaysia. End-of-month values of Kuala Lumpur Stock Exchange Composite Index were used as a proxy for stock prices while the seven macroeconomic variables were industrial production index, money supply (M1 and M2), consumer price index, foreign reserves, credit aggregates and exchange rate. All variables were expressed in natural log. Monthly data series for the period January 1977 to June 1996 were used. Both augmented Dickey-Fuller and Phillips-Perron unit root tests were implemented. He employed both the bivariate and multivariate cointegration and causality tests. The Engle-Granger methodology was employed for bivariate cointegration test while the Johansen methodology was utilized for multivariate cointegration test. The Granger causality test was based on error correction model for cointegrated variables, and VAR model for non-cointegrated series. The results from the bivariate analysis revealed that the stock market was informationally inefficient

with respect to consumer prices, official reserves and credit aggregates since they are cointegrated. In addition, the stock prices were Granger-caused by reserves. The multivariate analysis was in compliance with the bivariate analysis in which the changes in stock prices were Granger-caused by the changes in official reserves. Furthermore, changes in exchange rate also led stock prices. In conclusion, the bivariate and multivariate analyses proved that the Malaysian stock market was informationally inefficient.

Habibullah et al. (2000) examined the lead-lag relationship between stock market and five macroeconomic variables. The macroeconomic variables were interest rate, price level, national income, money supply and real effective exchange rate. Stock prices were measured by Kuala Lumpur Stock Exchange Composite Index, national income measured by GNP, three-month Treasury bill rate and Consumer Price Index were used as the proxy for interest rate and price level, respectively. They utilized the Phillips-Perron unit root test to determine the order of integration for each variable. They also employed the long-run Granger non-causality test proposed by Toda and Yamamoto (1995), who provided a simplistic approach in determining the association between integrated series without worrying about the order of integration or cointegrating rank in the VAR system. This method guaranteed the asymptotic distribution of the MWald statistic. The results suggested that the stock prices led national income, price level and exchange rate, which also meant that stock market acted as a leading indicator for

many macroeconomic variables. At the same time, money supply and interest rate were found to lead stock prices.

This review shows that studies on relationships among stock prices and macroeconomic variables are relatively scarce compared to the developed economies. It is hoped that this research paper can contribute to bridge this gap.