Η διπλωματική εργασία

«Σχέσεις αιτιότητας μεταξύ πραγματικών αποδόσεων των

μετοχών & επιλεγμένων μακροοικονομικών μεταβλητών:

Στοιχεία από χώρες της Ασίας & του Ειρηνικού»

εκπονήθηκε από το φοιτητή

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«Χρηματοοικονομική και Τραπεζική Διοικητική»

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CONTENTS

ABSTRACT

Using a multivariate vector autoregression (VAR) approach, this paper investigated the causal relations and dynamic interactions among real stock returns, industrial production growth, M1 growth and inflation in twelve selected countries of the Asia Pacific Basin area. Our findings show that real stock returns granger cause industrial production growth in every country we examine while the opposite occurs in 9 out of the 12 countries. In general our findings indicate that stock markets are efficient in some of these markets while in other they are not.

Keywords : stock returns, macroeconomic variables, VAR methodology, Granger Causality

INTRODUCTION – PURPOSE OF THE STUDY

In nowadays, the role of the stock markets returns in the modern economic environment is getting more and more important due to their liberation and the growing importance that investors and companies give to the fluctuations of these markets. For that reason the study of the relationship between the stock market returns and real macroeconomic variables has become almost imperative to those exercising economic and financial policies (i.e. governments, central banks, companies etc). Therefore, throughout the last two decades we have seen leading personalities in financial and macroeconomic field presenting several studies showing the relationship between stock market returns and macroeconomic variables. The conclusions that can be derived from such analysis can help from one side the central banks and those responsible in ministries of economy to organize a better and more efficient economy policy and from the other hand to assure a better economic programming for enterprises. In other words, since most of these studies have concluded that stock prices interact with the key macroeconomic variables in the short and long run, decent government economic or financial policies can yield impressive gains in both the sectors.

The purpose of this study is the examination of the role of the stock returns on selected macroeconomic variables i.e. GNP, the consumer price index, the money supply, the interest rate and the exchange rate in selected countries of the Asia Pacific basin. In other words we are going to analyze the role of the stock market in the evolution of economic activity by examining its impact on the mentioned mechanisms – channels. But why these countries, and why the relationship between their stock returns and macroeconomic variables? The answer is simple but quite long.

Recently, and more precisely during the last 15 years international investors and researchers have focused their attention on emerging financial and especially those of Asia. During the nineties the stock markets of countries of southeast Asia such as Hong Kong SAR drew much of the attention but after the economic crisis of the these countries, known as Asia

Tiger, the focus of international investors has been turned to China and India whose GDP growth per year surpasses 8 and 5% correspondingly. Given the fact that during the 90s the market capitalization of the stock market of these countries was practically multiplied, they provided attractive investment opportunities to foreign investors and have become investment icons in the global financial markets, in other words these countries are an attractive investment opportunity for foreign investors and can play a major role in a global financial market. In fact, stock markets of the selected countries have experienced a tremendous growth in the market capitalization along with a high and steady growth rate of GDP in the last decade, as mentioned before. However, these markets remain much smaller regarding trading activities and market capitalization compared to the US and other developed stock markets and because of limitation they could be subject to speculative activities, manipulations and especially government interventions. The recent also financial crisis and associated output declines experienced by a number of these emerging market economies have raised anew the issue of scarcity of systematic analysis of links between financial and real variables in these countries although we can find a lot of reasons why analyzing this link is very important in emerging countries (only recently in - 2001 - there has been a study by Bilson M. Christofer, Brailsford J. Timothy, Hooper J. Vincent for a number of number small emerging economies, who examines selected macroeconomic variables as explanatory factors of emerging stock market returns). Before that, we can add that a possible reason why previous research has not focused on the link between stock returns and output growth in these emerging markets might be the presumption that these stock markets are smaller and less liquid in emerging markets that in advanced and more mature economies.

First, leading indicators are relatively scarce in emerging markets. More particularly, relatively low financial market liquidity and frequent changes in financial structure imply that other financial market variables such as yield spreads are unlikely to be successful predictors of output and in any case it is usually difficult to identify a relevant yield spread for a sufficiently long sample period. Given the speed with which stock market become available, it seems that the stock market could be a helpful leading indicator in forecasting economic growth.

Another reason is the high volatility of stock returns and output of these countries which is higher than those of mature markets (Richards 1996). This finding can be a source of extra information about these markets even though data for these countries are usually available for shorter periods than data on mature markets. On the other hand this finding can even raise policy issues if stock prices changes that are not justified by fundamentals, really affect output.

A third reason why we should examine the relationship between the stock returns and macroeconomic fundamentals of these emerging countries of the Pacific basin is that by expanding our analysis to emerging markets we can examine whether this relationship is stronger in some types of countries than others, depending not only on their level of economic development , but also on several indicators such as the size, the liquidity and legislation governing of their stock markets.

Finally, according to Paulo Mauro (2002), the empirical relationship between stock returns and output growth is as important in emerging economies as in mature ones.

The methodology that is going to be used for our study is going to be focused on the process of proving the causality of stock returns to certain macroeconomic variables.

The countries that we have chosen are the following:

ASEAN 5 : Indonesia, Malaysia, Philippines, Thailand & Singapore plus Hong Kong, South Korea, Taiwan, Australia, New Zealand, Japan and China.

The choice of these countries isn't at all irrelevant. Actually these twelve countries are part of APT or ASEAN plus Three group which is considered as a basis for consideration of an Asian one currency area, by than other than R. Mundell!

More particularly Mundell thinks that in the future, which of course isn't so near, these countries can form a third currency area, similar to those of the United States and of course that of the European Monetary Union. The latter has become one of the most important currency area in the world expanding to dozens of countries outside Europe i.e. Africa, and becoming almost as dynamic and imperative as the dollar area. On the other hand the dollar – euro exchange has become the most important exchange rate in the world. We mentioned that the creation of a currency area in Asia is a long term one. This is due to the fact that currency areas are formed after years of growth and changes of the economies and of course reforms of the political relationships among the countries which are going to be part of this union. On the other hand the large instability of the exchange rates in large currency areas has been and continues to be a great disadvantage for their development. An example of this enormous instability between exchange rates in large currency areas is the exchange rate of euro and dollar. This problem is, according to Mundell, not due to bad capital movements which have become massive and dominate exchange rates, but due to bad monetary and exchange rate systems.

But does really Asia need a common currency? According to Mundell it does. But as we mentioned before it cannot be in the near future, because it will involve more political integration than is now possible between China and Japan. For example it took decades for the European Union to decide if a single currency could stand, even in 1989 the proposition was found to be a big gamble. According to all that we come to the conclusion that the construction of a single currency in Asia out of the blue would be extremely difficult since the new currency must start off on the back an existing currency, which has established confidence and it can link the past with the future.

Now does this future Asian currency need an anchor? Well according to Mundell it will be difficult to come about without one. Even though in theory Asian countries could make a basket of their currencies and designate that as a unit of account and reference point to measure the Asian currency, just like the European countries it would be a very difficult and long process, such the European one. The european monetary union would have been easier if they had chosen an external or an internal anchor for their currencies. If they had chosen for example the dollar for an external anchor, the convergence in these countries would have been much easier, since in the 1960's where the project of a single European currency was introduced the concerned countries were fixed to the US dollar resulting in same inflation and interest rates. On the other hand if the concerned countries had chosen, DM as an internal anchor they would have had joint flows. But neither Great Britain nor France were willing to do that. For these reasons the EMU was delayed for about three decades.

On the basis of these observations we conclude that the Asian currency would be best link to a currency anchor. But which? The analysis of this question brings us to an dead end since China's currency is not suitable, since , although China is destined to become a superpower, its currency is not convertible on a capital account and its financial system is not well developed. On the other hand choosing the Japanese yen as a currency anchor would also create problems. Although Japan has a GDP 4 times bigger than that of China, it has high savings rate and huge current account surpluses, it also has severe economic problems. The first is the banking system which is in grave due to the appreciation of yen. The second is the problematic mixed policy of fiscal expansion and monetary tightness which has led to a high degree of capital mobility and a flexible exchange rate which kept the yen overvalued and reduced the current account surplus by building up the largest public debt level in the history of any country. Finally, choosing the US dollar as an external anchor for this Asian currency would also create problems because of the enormous instability of the yen dollar rate. Although stabilizing the yen dollar exchange rate would help tremendously the transformation in Asia and on the other hand could be at least short term helpful since lot of countries of this area are tied to the dollar (China, Hong Kong, Australia).

All the above analysis leads to the conclusion below. Since the internal or external anchor for the Asian currency would create problems and delay the convergence of these selected countries, they must also at the time provide an institutional and political structure for monetary integration (agreement on a common inflation rate and on a common index of measuring inflation, a common monetary policy etc).

This is where our study comes. If the findings are similar to these countries, meaning that if they have common relationships between their stock market returns and macroeconomic variables it could really help these countries so as to find common elements and characteristics among their economies so that their central banks and of course governments start up building a common monetary, economic and fiscal policy.

REVIEW OF THE BIBLIOGRAPHY

Several studies have modeled relationships between U.S. share prices and real economic activities. First in 1975, Bosworth examined the relationship between stock market returns and aggregate demand. By using simple linear models he found that stock returns influence consume and non durable products and business investments with a certain time lag. In 1984 Fisher and Merton tried, also, to analyze the role of stock returns in investment. By using a simple VAR model they concluded that stock returns can help us predict future investments when of course we know past investment growths. Finally in 1990 Barro by using simple linear models found showed that stock returns can better explain investment policies than Tobin's q theory of investment theory. Fama (1981) documents a strong positive correlation between common stocks returns and real variables, such as capital expenditure, industrial production, GNP, the money supply, lagged inflation and the interest rate. Actually, Fama has underlined the importance of the stock market in the real activity by quoting that those responsible for the economic policy must intervene in the stock market so as to strengthen real investment. He also hypothesizes that the negative correlation between stock returns and inflation is not a causal relation but that it is proxying for a positive relation between stock returns and real activity and is induced by a negative relation between real activity and inflation. Also in 1990 Fama shows that monthly quarterly and annual stock returns are highly correlated with future production growth rates for 1953 – 1987. Moreover the degree of correlation increases with the length of the holding period. He argues that the relation between current stock returns and future production growth reflects information about future cash flows that is impounded in stock prices. Fama uses multiple regression tests to control for variation in expected stock returns that is reflected in dividend yields on stocks D(t) / V(t), default spreads on corporate bonds DEF (t) and term spreads on bonds TERM (t). William Schwert (1991) by using the same method as Fama did, but for a much longer period of data (100 years 1889 – 1988 for the New York Stock Exchange), strengthens Fama's conclusions that there is a strong positive relationship between real stock returns and future production growth rates, even when variables that proxy for time varying expected returns and shocks to expected returns are included in the regressions.

Geske and Roll (1983) and Huang and Kracaw (1984) also document a significant linkage between variations in the U.S. stock market and real economic activities. Geske and Roll (1983) argue that stock returns cause or signal changes in inflationary expectations because of a chain of macroeconomic events. When stock prices decline in response to anticipated changes in economic conditions, the government, given largely fixed expenditures, will tend to run a deficit. To the extent that the deficit is monetized, expected inflation will rise. (although Ram & Spencer (1983) find evidence of undirectional causality from inflation to stock returns). In 1985, James, Koreisha and Partch also investigated the causal linkages among stock returns, real activity, money growth and expected inflation. Using VARMA estimation techniques they examined the validity of models that attempt to explain the the observed negative relation between stock returns and inflation. They found a strong link between stock returns, a proxy for expected real activity and the growth rate in monetary base. Moreover, they found that expected changes in real activity and money supply growth are important predictors of changes in expected inflation. These evidence, which are consistent with the reserved causality model proposed by Geske and Roll, strongly support the hypothesis that stock returns signal changes in expected inflation and nominal interest rates.

Furthermore, Chen, Roll and Ross (1986) investigate the effect of macroeconomic factors (industrial production, the money supply, inflation the exchange rate and long and short term interest rates) on the stock market returns in the United States using a multivariate arbitrage – pricing model (APM). These variables fundamentally influence either the future cash flow or the risk adjusted discount rate in a standard stock price valuation model, in which the stock price is broadly interpreted as the present value of the expected future cash flow. Chen (1991) documents that domestic variables, such as the lagged production growth rate, default premium, term premium, short run interest rate and market dividend – price ratio, are indicators for the current and future economic growth. These results confirm the finding of Chen et al. (1986) on the ability of domestic variables to forecast excess market returns via their forecast of the macroeconomy. In addition, Abdullah and Hayworth (1993) observed that the U.S. stock returns are related positively to inflation and growth in money supply, yet negatively to budget and trade deficits and also to short and long term interest rates.

Moreover, Poon and Taylor (1991) investigate the effect of macroeconomic variables similar to those of Chen et al. (1986) on the UK stock market and conclude that the interrelationship between the macroeconomic variables and stock prices in the UK are different those of the U.S. as described by Chen et al. (1986). Cheng (1995) also analyzes UK stock price returns and macroeconomic factors by using canonical correlation analysis. The results indicate that the UK security returns are significantly influenced by a number of systematic economic factors. This finding is in-line with Chen et al. (1986) but contradicts that of Poon and Taylor (1991).

For Japanese stock market, Hamao (1988) concludes that changes in expected inflation, unanticipated changes in risk premia and the term structure of interest rates significantly affect the Japanese stock returns. Through the arbitrage pricing theory, Brown and Otsuki (1990) explore the effects of the money supply, a production index, crude oil prices, exchange rates, call money rates and a residual market error on the Japanese stock market. They observe that these factors are associated with significant risk premia in Japanese equities. Recently, Mukherjee and Naka (1995) observe a long run relationship between the Japanese stock market and six macroeconomic variables are generally consistent with their a priori hypotheses.

So far, we come to the conclusion that there are numerous studies (Chen 1991, Chen et al. 1986, Fama 1970, 1990, 1991, Huang & Kracaw 1984, Pearce & Roley 1988, Wei & Wong 1992) that have modeled the relation between asset prices and real economic activities in terms of production rates, productivity, growth rate of gross national product, unemployment, yield spread, interest rates, inflation, dividend yields and so forth. On the other hand, though, only a handful of studies have been devoted to investigating the role of fundamental macroeconomic variables on stock markets in developing countries. Fung and Lie (1990) examine the role of the Taiwanese stock market in response to GNP and the money supply and conclude that the

Taiwanese stock market is inefficient since it fails to capture information regarding changes in these economic variables. Furthermore, Kwon, Shin and Bacon (1997) investigate the relationship between Korean stock market (a stock market that is one of the most rapidly growing markets in the Pacific Basin and has become the eighth largest stock exchange in regard to market capitalization) and basic economic factors using a regression analysis. They observe that the Korean stock returns are influenced by some significant economic factors (i.e. dividend yields, the exchange rate, the interest rate, the oil prices and the money supply), which are quite different from those of the U.S. and Japan. This difference is due to the fact that the Korean stock market differs from that of the United States and Japan and it is much smaller.

In 1992, Bong Soo Lee by using a VAR model conducted an innovative investigation of causal relations and dynamic interactions among stock returns, interest rates, real activity and inflation without imposing a priori restrictions, for the postwar US market. His major findings were that : 1) stock returns appear granger causally prior and help explain a substantial fraction of the variance in real activity, which responds positively to shocks in stock returns, 2) with interest rates in a VAR system stock returns explain little variation in inflation, while interest rates explain a substantial fraction of the variation in inflation, with inflation responding negatively to shocks in real interest rates and 3) inflation explains little variation in real activity, which responds negatively to shocks in inflation for the postwar period. *We must underline that the methodology of this paper will be the base of the methodology of this one*. Also in 1999, Oystein Gjerde and Frode Saettem made an investigation of causal relations among stock returns and macroeconomic variables in a small, open economy (Norway). They used a VAR model which included among other variables, that of interest rates. Their findings were similar to those of Bong Soo Lee (with interest rates in a VAR system stock returns explain little variation in inflation, while interest rates explain a substantial fraction of the variation in inflation) and they tried to explain them as it follows: For example high interest rates are typically associated with the expansion phase of a business i.e. signalling improved cash flows for firms and support an overreaction of investors. This study also demonstrated that significant results from major economies are valid in a small open economy with less mature financial markets, something that will really help us in our study which includes both mature and less mature financial markets.

In 2001, Hassapis and Prodromidis made a study on the relations between among real stock market returns and real economic activity for the countries of Latin America. By using VAR models they concluded that domstic stock markets do not appear to have been a prominent factor of output flunctuations in the Latin American countries under examination.

Finally we would also cite the study of Chatrath, Ramshandler and Song (1996) on the relationship among stock returns, inflation and real activity in India. By using an autoregressive moving average model (ARMA) they concluded there is a positive relationship between stock returns and real activity in India although the relationship is negative between stock returns and inflation. This result doesn't support the proxy hypothesis of Fama (1990) that shows strong positive relationship between stock returns and inflation, stock returns and real activity.

After this presentation of the bibliography we come to the conclusion that the opinions concerning the causal relations among stock returns and macroeconomic variables such as real activity, money supply and interest rates are diverse and vary not only from country to country (i.e. developed economies, emerging economies) but even in the same country (i.e. USA) due to the different models and theorems that economists use in their studies.

THEORETICAL RELATIONSHIP BETWEEN STOCK MARKET RETURNS AND MACROECONOMIC VARIABLES (OUTPUT GROWTH etc)

- Theories about the relationship between stock market returns an output growth

In 1990, Morck et al., review the five existing theories on the link between stock market returns and macroeconomic variables. These theories can be put in two different groups. The first can contain the theories according to which stock price movements not reflecting changes in future fundamentals cannot predict changes in output (the passive informant hypothesis and the accurate active informant hypothesis) and those according to which they can (the faulty active informant the financing hypothesis and the stock market pressure on managers hypothesis).

According to the passive informant hypothesis there is only one mechanism that can underlie the correlation between stock returns and output growth. Under the assumptions that stock prices reflect the present discounted value of all future dividends and that dividend growth is related to GDP growth, a correlation between this year's stock returns and next year's economic growth arises naturally: if next year's economic growth is buoyant , news revealed this year will typically be positive, resulting in large stock price increases this year. All theories reviewed below accept that the above mechanism plays a role, but leave room for additional mechanisms.

According to the accurate active informant hypothesis stock price changes provide managers with information about thew market's expectations of future economic developments. Managers base their investment decisions upon that information, thereby justifying the market's expectations. In this case, stock price changes turn to be perfectly correlated with fundamentals.

In the faulty active informant hypothesis, decisions about investment are influenced by stock price movements, but managers cannot distinguish between movements reflecting fundamental and those reflecting market sentiment. Stock market movements that are not motivated by fundamentals can therefore mislead managers into over-investing or under-investing compared with what later turns out to be warranted by fundamentals.

The financing hypothesis based upon Tobin's q theory (a formalization of Keynes' reasoning in the quote reported above), argues that when stock prices are high compared to the replacement cost of capital, entrepreneurs will be more likely to expand their activities by investing in new physical capital (possibly financed by issuing new shares of their company) rather than purchasing existing firms on the stock market.

Finally. the stock market pressure on managers hypothesis suggests that stock price changes can affect investment even if they neither convey information nor financing costs. If investors hold negative views on a firm's prospects and drive down its stock price, managers may have to cut their investment projects to protect themselves from the possibility of being fired or taken over.

The table below gives us a total view of these theories.

Implications of various theories for strength of growth – returns links						
Theory	Country Characteristics					
	Emerging /Advanced or per capita DP	Market Capitalization	Turnover	Initial Public Offerings	Listed Companies	Legal Origin
Passive informant	No	Possibly	Possibly	No	Possibly	No
Accurate active informant	No	Possibly	Possibly	No	Possibly	No
Faulty active informant	No	Possibly	Possibly	No	Possibly	No
Financing	No	Yes	Yes	Yes	Yes	No
Stock market pressure	No	Yes	Possibly	No	Yes	Yes
According to each theory, do the above country characteristics – holding other characteristics constant – make it more likely that a country will display a strong association between output growth and lagged stock returns?						

ü Theoretical relationship between stock market returns and macroeconomic fundamentals.

Relationship between stock returns and consume

$\uparrow$ stock market returns $\Rightarrow \uparrow$ wealth $\Rightarrow$ b $\uparrow \Rightarrow \uparrow$ Consume $\Rightarrow \uparrow$ Aggregate Demand = C $\uparrow$ + I + G + X – IM $\Rightarrow \uparrow$ AS $\Rightarrow \uparrow$ Y $\Rightarrow \uparrow$ Yd

Relationship between stock returns and investment

$\uparrow$ stock market returns $\Rightarrow \uparrow$ WACC (Weighted Average Cost of Capital) $\Rightarrow \uparrow$ Investments $\Rightarrow \uparrow$ Aggregate Demand = C + I $\uparrow$+ G + X – IM $\Rightarrow \uparrow$ AS $\Rightarrow \uparrow$ Y $\Rightarrow \uparrow$ Yd

Relationship between stock returns and real activity, consequences on monetary and fiscal policy

$\downarrow$ stock market returns and $\uparrow$interest rates $\Rightarrow \downarrow$ Aggregate Demand = C $\downarrow$+ I + G + X – IM $\Rightarrow \downarrow$ AS $\Rightarrow \downarrow$ Y $\Rightarrow \downarrow$ Yd

We come to the conclusion from the above presentation that there are several theoretical channels through which the stock market leads changes to real activity. For example, optimistic expectations of future profits may cause a rise in stock prices, which is an increase in wealth, which has the likely effect of an increase in demand for consumption and or investment goods. Similarly, in the case of an expansionary policy shock, asset prices change as a result of anticipated changes in real interest rates and profitability. This in turn affects wealth and spending and fuels a rise in supply and equilibrium output, which justifies the original rise in stock prices. Therefore, asset prices will tend to predict future output.

METHODOLOGY & THE HYPOTHESIZED MODEL

SUMMARY

As we mentioned above, the purpose of this study , is the examination of the relationship between the stock returns and real macroeconomic variables of the following countries : Indonesia, Malaysia, Philippines, Thailand & Singapore plus Hong Kong, South Korea, Taiwan, Australia, New Zealand, Japan and China. More specifically we are going to examine whether the stock returns influence the macroeconomic variables or the opposite. The examination of this causality relationship among these variables is going to take place with the help of Granger causality in a VAR or a VEC model (if the series of the macroeconomic variables are characterized by stationarity we are going to use a VAR (Vector Autoregressive Model) otherwise we are going to use a VEC Model.

First of all I will examine the stationarity of the stock returns and the macroeconomic variables that I have chosen. More specifically I will examine the stationarity of first differences (the growth rates) of the variables that I have chosen. The stationarity of the variables is made the unit root tests and to be more specific by the Augmented Dickey – Fuller (ADF) test and afterwards by the Phillips Perron test (PP test). In case that the variables chosen are not stationary we are going to use the Johansen cointegration test so as to test the number of significant cointegrating vectors. Prior to the testing of the cointegrating vectors we are going to perform likelihood ratio tests in order to determine the lag length of the vector autoregressive system. We are also going to examine our variables with the Akaike and Schwartz criteria which help me to choose the proper model (VAR or VEC). Finally we are going to test for granger causality by using a VAR or a VEC (Vector Error Correction) model.

VAR (p) model

$$Z_t = A_o + A_1 Z_{t-1} + A_2 Z_{t-2} + \dots + A_p Z_{t-p} + \varepsilon t \sim NIID\ (0, \Sigma)$$

VEC model

$$\Delta Z_t = A_0 + \Pi Z_{t-1} + \sum_{I=1}^{p} \gamma_i \Delta z_{t-I} + \varepsilon_t$$

where

$$\Pi = \sum_{I=1}^{p} A_t - I \quad \text{, and} \quad \Gamma_i = - \sum_{j=I+1}^{p} A_j$$

The hypothesis of the existence of cointegration will take place by using a test on matrix Π who is equal to the number of cointegrating vectors.

Note : *We avoid to use a bivariate VAR model, and we are going to use a VAR model which will contain all the variables that we have taken under account (after of course they have been tested for stationarity) because the first one can lead us to the wrong conclusions. More particularly, the causal relations observed based on a bivariate causal test may not be robust when other relevant variables are introduced into the vector autoregressive system (VAR). More generally these findings may not be robust in a larger system of variables.*

ANALYTICAL PRESENTATION OF METHODOLOGY & THE HYPOTHESIZED MODEL

GRANGER CAUSALITY

Although Weiner was the first one who formed the idea of “causality relationships” in 1948, Granger was the one who linked the meaning of “causality” with the probability of estimating. According to Granger, if we have a specific total of variables which includes variables X and Y, then variable X “causes” variable Y, if the present value of variable Y can be well predicted by past values of variable X. This relationship can be of course vice versa.

Granger causality has more to do with the usefulness of a variable in the prediction of another one rather than creation.

More specifically variable A may “granger cause” variable B, although in reality its variable B that “granger causes” variable a. For example, according to historic data , increases of wages proceed inflation which they granger cause. Although, in reality, increases in wages are depended from the predictions of inflation so that the real relationship is that an increase in future inflation (if it is correctly predicted) cause an increase at current wages.

The causality relationship is estimated by applying double regression :

$$Y_t = a + \sum_{I=1}^{n} b_I Y_{t-I} + \sum_{I=1}^{n} c_I X_{t-I} + \varepsilon_t$$

$$X_t = a + \sum_{I=1}^{n} \beta_I Y_{t-I} + \sum_{I=1}^{n} \gamma_I X_{t-I} + u_t$$

If in the first equation $c_i = 0$ for I = 1,2,….. n then we come to the conclusion that variable X fails according to Granger to cause variable Y. also, if the second equation $\gamma_i = 0$ for I = 1,2,….n then variable Y fails to cause variable X. tha final conclusion is that the two variables do not correlate.

If $c_i \neq 0$ for I = 1,2, ….n in the first equation and $\gamma_i = 0$ for I = 1,2,… n in the second equation then variable X causes variable Y. If $c_i = 0$ for I= 1,2,….n in the first equation and $\gamma_i \neq 0$ for I= 1, 2, ….n in the second equation then variable Y causes variable X. Finally, if c_i and γ_i are different that zero then we conclude that variables X and Y granger cause each other.

TIME SERIES STATIONARITY

Usually, granger cause relationships are applied on variables that are stationary. A time series Y_t is characterized stationary if the following three statistical characteristics are fulfilled :a) the mean of the time series doesn’t change through time (stable mean : $E(Y_t) = E(Y_{t+s}) = E(Y_{t-s}) = \mu_y$). b) the variance of the time series doesn’t change through time (stable variance :

Var (Y_t) = Var (Y_{t+s}) = Var(Y_{t-s}) = σ^2_y c) the covariance of the values of the time series in two different time moments depends on the distance between these points and not on the time points themselves (Cov (Y_t, Y_{t+s}) = Cov(Y_{t+m}, Y_{t+s+m}) = γ_s). On the other hand a time series is not stationary if one of these statistical characteristics changes through time.

TEST FOR STATIONARITY OR NON – STATIONARITY

In order to check whether a time series is stationary or not we use the Dickey – Fuller criteria which we are to analyze.

Dickey – Fuller criteria (1979)

Lets assume a 1st degree autoregressive model AR(1) :

$$y_t = \mu + \rho y_{t-1} + \varepsilon_t \quad (1)$$

Where μ and ρ are the parameters and ε_t is a "white noise" process. Time series y is stationary if $-1 < \rho < 1$. If = 1 then the time series y is not stationary (random walk with drift). If the absolute value of ρ is greater then one, the series is explosive. Therefore the hypothesis of a stationary series can be evaluated by testing whether the absolute value of ρ is strictly less than one. Both the Dickey Fuller and Phillips Perron tests take the unit root as the null hypothesis H_0 = 1. Since explosive series do not make much economic sense, this null hypothesis is tested against the one sided alternative $H_1 = \rho < 1$.

The test is carried out by estimating an equation with yt-1 substracted from both sides of the equation :

$$\Delta y_t = \mu + \gamma y_{t-1} + \varepsilon_t$$

Where $\gamma = \rho - 1$, and the null and alternative hypotheses are

$$H_0 : \gamma = 0$$
$$H_1 : \gamma < 0$$

While it may appear that the test can be carried out by performing a t- test on the estimated γ, the t statistic under the null hypothesis of a unit root does not have the conventional t-distribution. Dickey and Fuller (1979)showed that the distribution under the null hypothesis is non-standard and simulated the critical values for selected sample sizes. More recently MacKinnon (1991) has implemented the response surface using the simulation results , permitting the calculation of Dickey Fuller critical values for any sample siza and for any number of right hand variables.

The Augmented Dickey Fuller test

The simple unit root test described above is valid only if the series is an AR (1) process. If the seriues is correlated at higher order lags, the assumption of white noise disturbances is violated. The ADF and PP tests use different mathods for high – order serial correlation in the series. Tha ADF tests makes a parametric correction for higher – order correlation by assuming that the y series follows an AR(ρ) process and adjusting the test methodology.

The ADF approach controls for higher order correlation by adding lagged difference terms on the dependent variable y to the right hand side of the regression:

$$\Delta y_t = \mu + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \ldots + \delta_\rho \Delta y_{t-\rho} + \varepsilon t$$

This augmented specification is then used to test

$$H_0 : \gamma = 0$$
$$H_1 : \gamma < 0$$

in this regression. An important result obtained by Fuller is that the asymptotic distribution of the t-statistic on γ is independent of the number of lagged first differences included in the ADF regression. Moreover, while the parametric assumption that y follows and autoregressive (AR) process may seem restrictive, Said and Dickey (1984) demonstrate that the ADF test remains valid even when the series has a moving average (MA) component, provided that enough lagged difference terms are augmented to the regression.

Finally except from determining the number of different lagged difference terms we must also decide whether to include a constant, a constant and a linear trend or neither in the test regression. One approach would be to run the test with both a constant and a linear trend since the other two cases are just special cases of this more general specification. However, including irrelevant regressors in the regression reduces the power of the test, possibly concluding that there is a unit root when in fact there is none. The general principle is to choose a specification that is a plausible description of the data under both the null and alternative hypothesis if the series seems to contain a trend (whether deterministic or stochastic), we should include both a constant and trend in the test regression. If the series does not exhibit any trend and has a non zero mean, we should only include a constant in the regression, while if the series seems to be fluctuating around a zero mean, we should include neither a constant nor a trend in the test regression.

THE PHILLIPS PERRON TEST

Phillips and Perron (1988) propose a non parametric method of controlling for higher – order serial correlation in a series. The test regression for the Phillips – Perron (PP) test is the AR (1) process:

$$\Delta y_t = \alpha + \beta y_{t-1} + \varepsilon_t$$

While the ADF test corrects for higher order serial correlation by adding lagged differenced terms on the right hand side, the PP test makes a correction to the t-statistic of the γ coefficient from the AR(1) regression to account for the serial correlation in ε. The correction is non-parametric since we use an estimate of the spectrum of ε at frequency zero that is robust to heteroskedasticity and autocorrelation of unknown form. Finally we must underline that the asymptotic distribution of the PP t – statistic is the same as the ADF t – statistic.

Determining the number of lags

Akaike criterion, known to the time series bibliography as Akaike Information Criterion : AIC) help us to choose the best model among others with different number of factors but with the same number of observations. The chosen model is the one which minimizes AIC which is defined as:

$AIC = N \ln(\sigma\varepsilon^*) + 2k$

Where
N = the number of observations
k = the number of factors
$\sigma\varepsilon^*$ = variance estimator of the disturbing term

We will use the Akaike criterion so as to determine the exact number of lags in the equation of the ADF regression. The chosen model will be the one with the smallest Akaike value

VECTOR AUTOREGRESSIVE MODELS (VARs)

The vector autoregression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variabes. The VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of the lagged values of all of the enfogenous variables in the system.

The mathematical representation of a VAR is

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + Bx_t + \varepsilon_t$$

Where y_t is a k vector of endogenous variables, x_t is a d vector of exogenous variables, A_1,A_p, and B are matrices of coefficients to be estimaterd, and ε_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and with of the right hand side variables.

Since only lagged values of the endogenous variables appear on the right hand side of the equations, simultaneity is not an issue and OLS yields consistent estimates. Moreover, even though the innovations ε_t may be contemporaneously correlated, OLS is efficient and equivalent to GLS since all equations have identical regressors.

Furthermore the multivariate vector autoregression modelling technique is a useful alternative to the conventional structural modelling procedure. VAR analysis works with unrestricted reduced forms, treating all variables as potentially endogenous. The results of causality tests within a multivariate VAR system are considerably more general and reliable as compared to bivariate test results. The VAR technique provides an unbiased test for Granger causality and can detect feedback relations among the series.

Why do we use a VAR model?

We use a VAR model firstly, in order to examine the causal relations among the stock returns and the selected macroeconomic variables (money supply M1 growth, inflation and industrial production growth). Second we use a VAR model to establish the dynamic interactions among our variables. The VAR model will also help us to analyze the structural regularities among the factors by a variance decomposition, and to utilize the impulse – response functions to address the question of how rapidly events in one variable are transmitted to the others.

SOURCE OF DATA

The data that we are going to use for our study, so as to proof the relationship between stock returns and several macroeconomic variables will be derived from several sources in the internet, among them Datastream International Financial Statistics of International Monetary Fund. We are going to use monthly and quarterly data of the stock price index, industrial production index or the manufacturing production index (for Philippines and Thailand), the consumer price index which are going to use so as to calculate the inflation and finally the money supply M1 (currency plus demand deposits).

VARIABLES IN THE SYSTEM

As we mentioned, we are going to employ a four – variable VAR system – real stock returns, inflation rate, growth in the industrial production and monetary supply M1 growth. The sample period of this study is from January 1993 to December 2003. The nominal stock returns are the monthly returns of the main stock exchange index of each country which are the following:

COUNTRY	STOCK MARKET
Australia	All Ordinaries
China	Shanghai Composite
Hong Kong	Hang Seng
Indonesia	Jakarta Composite
Japan	Nikkei 225
Malaysia	Kuala Lumpur Composite
New Zealand	Top 40
Philippines	PHS Composite
Singapore	Strait Times Index
South Korea	KOSPI

Taiwan	Weighted
Thailand	SET

Nominal stock returns are computed by the following type:

$(SIP_{t+1} – SIP_t) / SIP_t$ where SIP : Stock Index Price. The real stock returns are computed with the help of inflation rate. They are computed as nominal stock returns less the expected inflation rate which is obtained by taking a one step ahead forecast : RSR = NSR – EIFR (where RSR : real stock returns NSR : nominal stock returns and EIFR : expected inflation rate)

The monthly rate of inflation is computed by using the CPI index (Concumer Price Index) on year basis (i.e. INF = $(CPI_{t+12} – CPI_t) / CPI_t$. (where INF is inflation rate). The monthy growth of industrial production is also computed on year basis and it is as it follows : IPG = $(IP_{t+12} – IP_t) / IP_{t.}$ (where IPG is Industrial Production growth). Finally the money supply growth M1 is computed by the following type : MSG = $(M1_{t+1} – M_t) / M_t$. (where MSG money supply growth). We must underline that we chose the series of M1 which were seasonally adjusted for each country.

The majority of these variables was taken from the Datastream database and from the internet sites of the countries' stock markets.

ü *Why did we choose these variables?*

The majority of the chosen countries (China, Indonesia, Korea, Malaysia, Philippines, Taiwan, Thailand) are emerging markets. According to a number of studies stock returns in emerging markets are influenced and influence local macroeconomic factors rather than international ones. Although stock returns in Japan, which we are going to examine, have shown to influence and be influenced by international macroeconomic factors, we must take into account that we examine these 12 countries of the Pacific basin area, as a whole, in order to find common links, resemblance among them in order to conduct conclusions about their possible future monetary union.

More analytically, the number of factors that influence or are influenced by equity returns has been a source of much contention. The selection of these initial factors is ultimately subject to criticism on the grounds of subjectivity and the arbitrary nature of the selection process. This is an unavoidable problem associated with this area of research. However we can look to prior research and form judgements as to the relevance of various factors. The extant literature suggests that a wide range of factors may be relevant. Such variables include good prices, money supply, real activity, exchange rates, interest rates, political risk, oil prices, the trade sector and regional stock market indices. In order to narrow the list of possible factors, their relevance to emerging stock markets is considered and there is argument that several of the above variables are neither relevant nor appropriate. For instance, studies incorporating interest rates have found that it is not the interest rate itself that is relevant but the yield and default spread that are more likely to influence equity returns. Yet, in many emerging markets, there is not an active secondary market for bond issues and government paper. Furthermore political risk indices and oil prices have been shown to be only weakly correlated with emerging stock market returns. Although previous studies have shown that in Japan international factors have been increasingly more important and that Japanese stock markets have overreacted to new information about oil prices (Japan's industry is almost totally depended on first sources that are imported into the country like the case of Germany), we must again underline that we must examine these countries as a whole, and we must take into account variables that are common influential factors in all of the economies. Since, the majority of these countries are emerging (only Japan can be described as a well developed market) we must examine factors that are common to all of them in order to deduct conclusions for any future monetary union.

Furthermore, regional influences are expected to be incorporated into returns only if countries are integrated regionally, but the theoretical justification for the empirical link is limited. Moreover, any such link is likely to driven by fundamental macroeconomic factors and a regional index is only useful to the extent that it captures the underlying fundamentals. In light of the above considerations and balancing the theoretical propositions and prior evidence, the selected macroeconomic factors / variables are the following : money supply, good prices and real activity. (exchange rates are out of our list since they are not stationary series).

THEORETICAL LINKAGES AMONG THE VARIABLES (STOCK RETURNS, INDUSTRIAL PRODUCTION, M1 & INFLATION) OF THE CHOSEN MODEL

Exploring each variable in turn, Monetary Portfolio Theory suggests that changes in money supply alter the equilibrium position of money, thereby altering the composition and price of assets in an investor's portfolio. In addition, changes in money supply may impact on real economic variables, thereby having a lagged influence on stock returns. Both of these mechanisms suggest a positive relationship between changes in money supply and stock returns.

Common stock is traditionally viewed as a hedge against inflation, due to the fact that equity represents a contingent claim on the real assets of the firm (i.e. cash, securities, receivables and debt) will be independent of the fluctuations in the price level. Hence, it is only the real component of the firm that will be hedged against changes in inflation. Empirical tests have documented a negative relationship between inflation and nominal stock returns. In light, also, of the lack of agreement between the theory and evidence, it is difficult to predict the direction of the relationship between stock returns and inflation in emerging stock markets. This is particularly so for some of the Latin American and Asian countries which have experienced periods of extremely high inflation.

Finally, it is widely accepted that current stock price levels are positively related to future levels of real activity, as measured by GDP or industrial production. This finding seems intuitive since returns are a fu8nction of the future cash flow stream, which is highly dependent upon future economic conditions. However, a number of studies have documented a relationship between past or current production and stock returns. Fama (1981) as we have mentioned before, documents a relationship between concurrent measures of US stock returns and industrial production that is positive and significant. James et al. Have investigated the relationship between the lagged change in US industrial production and the return on the S&P 500 index using monthly data from 1962 to 1981. They report that current stock returns are related to industrial production lagged by 2 months. Therefore, a priori, real activity is expected to be positively related to equity returns.

UNIT ROOT TESTING OF THE VARIABLES OF THE SYSTEM

We examined the stationarity of our series by using the Augmented Dickey Fuller unit roots test of E Views program. More specifically we first created graphs of all the series in order to see whether they seem to contain a trend or not or if they fluctuate around a zero mean. We are obliged to do that in order to decide whether to include a constant, a linear trend and a constant or neither in the test regression. One approach would be to to run the test with both a constant and a linear trend since the other two cases are just special cases of this more general specification. However, including irrelevant regressors in the regression reduces the power of the test, possibly concluding that there is a unit a unit root when in fact, there is none. The general principle is to choose a specification that is plausible description of the data under both the null and alternative hypotheses. If the series seems to contain a trend (whether deterministic or stochastic) we should include both a constant and trend in the test regression. If the series does not exhibit any trend and has a non zero mean, we should only include a constant in the regression, while if the series seems to be fluctuating around a zero mean, we should include neither a constant nor a trend in the test regression.

This choice, of including other exogenous variables in the test regression is very important since the asymptotic distribution of the t-statistic under the null hypothesis depends on our assumptions regarding these deterministic terms. If we include a constant in the test regression, the t – statistic has a non standard distribution if the underlying process contains a unit root with a zero constant. On the other hand if we include a constant and linear trend in the test regression, the t-statistic has a non standard distribution if the underlying process contains a unit root with a zero linear trend. The asymptotic distribution changes when these assumptions are not satisfied. For example, if we include a constant in the test regression and if the underlying process contains a unit root with a nonzero constant, then the t-statistic, has an asymptotic standard normal distribution under the null hypothesis of a unit root.

Last but not least we have to specify the number of lags to add to the test regression. The usual is to include lags sufficient to remove any serial correlation in the residuals.

All the series of the system (real stock returns, inflation rate, M1 growth and industrial production growth) are stationary. The following tables show how many lags we concluded for each series and if we included a constant (intercept) , a linear trend and a constant or neither in each test regression.

AUSTRALIA			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	8	Intercept
Industrial Production Growth	Stationary	4	None
M1 Growth	Stationary	3	Intercept
Real Stock Returns	Stationary	3	None

CHINA			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	13	None
Industrial Production Growth	Stationary	1	Intercept
M1 Growth	Stationary	3	None
Real Stock Returns	Stationary	1	None

HONG KONG			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	11	None
Industrial Production Growth	Stationary	4	None
M1 Growth	Stationary	11	Intercept
Real Stock Returns	Stationary	4	None

INDONESIA			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	4	Intercept
Industrial Production Growth	Stationary	4	None
M1 Growth	Stationary	3	Intercept
Real Stock Returns	Stationary	7	None

JAPAN			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	11	None
Industrial Production Growth	Stationary	4	Intercept
M1 Growth	Stationary	7	Intercept
Real Stock Returns	Stationary	3	None

KOREA			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	9	Intercept
Industrial Production Growth	Stationary	5	Intercept
M1 Growth	Stationary	11	Intercept
Real Stock Returns	Stationary	2	None

MALAYSIA			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	8	Trend & Intercept
Industrial Production Growth	Stationary	6	Intercept
M1 Growth	Stationary	8	Intercept
Real Stock Returns	Stationary	2	None

NEW ZEALAND			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	5	Intercept
Industrial Production Growth	Stationary	8	None
M1 Growth	Stationary	6	Intercept
Real Stock Returns	Stationary	3	None

PHILLIPPINES			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	7	Trend & Intercept
Industrial Production Growth	Stationary	2	Intercept
M1 Growth	Stationary	11	Intercept
Real Stock Returns	Stationary	2	None

SINGAPORE			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	2	None
Industrial Production Growth	Stationary	4	Intercept
M1 Growth	Stationary	5	Intercept
Real Stock Returns	Stationary	4	None

TAIWAN			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	2	None
Industrial Production Growth	Stationary	2	None
M1 Growth	Stationary	8	Intercept
Real Stock Returns	Stationary	2	None

THAILAND			
Variable	Augmented Dickey Fuller	Number of lags	Include in test equation
Inflation Rate	Stationary	3	Intercept
Industrial Production Growth	Stationary	8	Intercept
M1 Growth	Stationary	6	Intercept
Real Stock Returns	Stationary	1	None

All the variables (real stock returns, industrial production growth, M1 growth and inflation rate) for all the twelve countries are stationary at the 5% level of MacKinnon's critical value for rejection of hypothesis of a unit root (although we must underline the fact that the majority of our variables are also stationary at the 1% level of MacKinnon's critical value).

More analytically the following tables show the ADF t statistic for every variable (real stock returns, industrial production growth, M1 growth, inflation rate) for every country we have chosen and the 5% level of MacKinnon's critical value for rejection of the null hypothesis of a unit root.

AUSTRALIA		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-3.153627*	-2.885051
Industrial Production Growth	-3.450567*	-1.943364
M1 Growth	-3.499780*	-2.884109
Real Stock Returns	-2.842484	-1.943344

CHINA		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-2.201380	-1.943563
Industrial Production Growth	-3.600426*	-2.883753
M1 Growth	-4.648389*	-1.943344
Real Stock Returns	-5.468143*	-1.615087

HONK KONG		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-1.984181	-1.943516
Industrial Production Growth	-2.080263	-1.943364
M1 Growth	-3.764659*	-2.885654
Real Stock Returns	-3.108333*	-1.943364

INDONESIA		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-4.391736*	-2.884291
Industrial Production Growth	-2.654340*	-1.943364
M1 Growth	-3.560610*	-2.884109
Real Stock Returns	-2.591978*	-1.943427

JAPAN		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-2.719570*	-1.943516
Industrial Production Growth	-3.792430*	-2.884291
M1 Growth	-3.689333*	-2.884856
Real Stock Returns	-5.605599*	-1.943344

KOREA		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-3.091588	-2.885249
Industrial Production Growth	-3.579660*	-2.884477
M1 Growth	-3.946820*	-2.885654
Real Stock Returns	-4.702607*	-1.943324

MALAYSIA		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-3.948543	-3.446765
Industrial Production Growth	-3.603204*	-2.884665
M1 Growth	-3.517091*	-2.885051
Real Stock Returns	-6.126710*	-1.943324

NEW ZEALAND		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-3.057823	-2.884477
Industrial Production Growth	-2.631874*	-1.943449
M1 Growth	-3.798737*	-2.884665
Real Stock Returns	-3.891796*	-1.943344

PHILIPPINES		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-4.584070*	-3.446464
Industrial Production Growth	-2.883931	-2.883930
M1 Growth	-3.664054*	-2.885654
Real Stock Returns	-4.444520*	-1.943324

SINGAPORE		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-2.844157*	-1.943324
Industrial Production Growth	-3.734865*	-2.884291
M1 Growth	-4.358961*	-2.884477
Real Stock Returns	-2.902623*	-1.943364

TAIWAN		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-2.120660	-1.943324
Industrial Production Growth	-2.086297	-1.943324
M1 Growth	-3.276545	-2.885051
Real Stock Returns	-6.518680*	-1.943324

THAILAND		
Variable	Augmented Dickey Fuller test statistic	5% Mac Kinnon's critical value
Inflation Rate	-2.895854	-2.884291
Industrial Production Growth	-3.535664*	-2.885051
M1 Growth	-3.014236	-2.884665
Real Stock Returns	-6.004014*	-1.943304

* The asterisk indicates that our variables are also stationary at 1% level of MacKinnons critical value.

NUMBER OF LAGS IN EACH VAR MODEL & VAR MODEL RESULTS (ESTIMATION OUTPUTS, IMPULSE RESPONSES & GRANGER CAUSALITY TESTS)

ü *LAGS OF THE VAR MODELS*

By using the E Views program we specified the VAR models for each of the twelve countries we examine. The endogenous variables for each model are stock returns, industrial production growth, M1 growth and inflation rate. The series of the endogenous variables is kept the same for each model. The exogenous variable for all the VAR models of our study has chosen to be a simple constant.

By using the lag length criteria option from the VAR we estimated the lag order for each model. According to theory and past studies Akaike and Schwarz information criteria best indicate the best lag order for each VAR model. According, to these criteria, the lag orders selected for the VAR models of the countries under examination are shown at the following table.

Country's VAR model	Lag order chosen by Akaike & Schwarz criteria
Australia	8
China	6
Honk Kong	3
Indonesia	3
Japan	8
Korea	3
Malaysia	2
New Zealand	7
Philippines	8

Singapore	6
Taiwan	8
Thailand	4

We come to the conclusion from the above that the number of lags for each country's model vary from 2 (for Malaysia) and 3 (for Honk Kong, Korea and Indonesia) to 6 (for China and Singapore), 7 (for New Zealand) and 8 (for Australia, Japan, Philippines and Taiwan).

ü *VARS' ESTIMATION OUTPUT REPRESANTIONS*

According to the lag orders for each VAR model, and their estimation output, the equations for each variable (stock returns, industrial production growth, M1 growth and inflation rate) for every VAR model have as it follows:

AUSTRALIA'S VAR ESTIMATION OUTPUT
STOCKRETURNS = - 0.1505156834*STOCKRETURNS(-1) - 0.09752274785*STOCKRETURNS(-2) - 0.02782218455*STOCKRETURNS(-3) - 0.1330744377*STOCKRETURNS(-4) - 0.1028396749*STOCKRETURNS(-5) - 0.1027106808*STOCKRETURNS(-6) + 0.1476207283*STOCKRETURNS(-7) - 0.07108194936*STOCKRETURNS(-8) + 0.2081710935*INDPRO(-1) - 0.285510045*INDPRO(-2) + 0.491923388*INDPRO(-3) - 0.4639561693*INDPRO(-4) + 0.2397796297*INDPRO(-5) - 0.08987879492*INDPRO(-6) + 0.1068193061*INDPRO(-7) - 0.1882560476*INDPRO(-8) + 0.06668022557*M1(-1) + 0.07975819472*M1(-2) - 0.05120924936*M1(-3) + 0.04508371441*M1(-4) - 0.2839066296*M1(-5) + 0.1453062115*M1(-6) + 0.168694919*M1(-7) - 0.1544208543*M1(-8) - 1.03369101*CPI(-1) - 0.6473078485*CPI(-2) + 1.376825178*CPI(-3) - 0.8672634311*CPI(-4) - 3.154772209*CPI(-5) + 6.034026469*CPI(-6) - 3.532278475*CPI(-7) + 0.1272786717*CPI(-8) + 0.01067665595
INDPRO = 0.0537380107*STOCKRETURNS(-1) + 0.004909550908*STOCKRETURNS(-2) + 0.08051563713*STOCKRETURNS(-3) + 0.05044794451*STOCKRETURNS(-4) + 0.05155869627*STOCKRETURNS(-5) + 0.08647756427*STOCKRETURNS(-6) - 0.01044414076*STOCKRETURNS(-7) + 0.03705977726*STOCKRETURNS(-8) + 1.013138801*INDPRO(-1) - 0.1337653383*INDPRO(-2) - 0.06314474894*INDPRO(-3) + 0.06667890737*INDPRO(-4) - 0.008517630647*INDPRO(-5) - 0.004640469846*INDPRO(-6) - 0.2593576178*INDPRO(-7) + 0.1743623377*INDPRO(-8) - 0.00139435411*M1(-1) - 0.02265206353*M1(-2) - 0.04449372639*M1(-3) - 0.008597871828*M1(-4) + 0.07453022766*M1(-5) - 0.01083714053*M1(-6) - 0.07385931914*M1(-7) + 0.04992944866*M1(-8) + 0.4043533857*CPI(-1) - 0.1041227412*CPI(-2) - 0.5215130736*CPI(-3) + 0.2052802064*CPI(-4) + 1.0108472*CPI(-5) - 1.475839671*CPI(-6) +

0.3434486683*CPI(-7) + 0.5372838852*CPI(-8) + 0.004158707818

M1 = 0.1089187873*STOCKRETURNS(-1) + 0.08710427374*STOCKRETURNS(-2) + 0.02983478364*STOCKRETURNS(-3) + 0.04576444001*STOCKRETURNS(-4) + 0.06064475515*STOCKRETURNS(-5) - 4.343542048e-05*STOCKRETURNS(-6) + 0.1254953741*STOCKRETURNS(-7) + 0.09097589239*STOCKRETURNS(-8) + 0.0826136636*INDPRO(-1) - 0.1892686848*INDPRO(-2) + 0.07626503481*INDPRO(-3) - 0.06520250576*INDPRO(-4) + 0.04967851944*INDPRO(-5) + 0.02127679478*INDPRO(-6) + 0.0128167907*INDPRO(-7) + 0.01965178651*INDPRO(-8) + 0.938970573*M1(-1) + 0.03394520443*M1(-2) + 0.02724518385*M1(-3) - 0.1862185698*M1(-4) - 0.02906232921*M1(-5) + 0.189350101*M1(-6) - 0.2131894645*M1(-7) + 0.08586664299*M1(-8) + 0.3328188623*CPI(-1) - 0.9201195408*CPI(-2) + 2.03296498*CPI(-3) - 2.913208138*CPI(-4) + 2.699346486*CPI(-5) - 1.5234412*CPI(-6) - 0.1341080398*CPI(-7) + 1.157610603*CPI(-8) + 0.006913327506

CPI = - 0.00800988095*STOCKRETURNS(-1) + 0.0003227753358*STOCKRETURNS(-2) - 0.004866662701*STOCKRETURNS(-3) - 0.004422216326*STOCKRETURNS(-4) - 0.0051302954*STOCKRETURNS(-5) - 0.003736175364*STOCKRETURNS(-6) + 0.007867702905*STOCKRETURNS(-7) + 0.003551848453*STOCKRETURNS(-8) - 0.02021224867*INDPRO(-1) + 0.02019812733*INDPRO(-2) + 0.007656395647*INDPRO(-3) - 0.00831191595*INDPRO(-4) + 0.00809586104*INDPRO(-5) - 0.01072268555*INDPRO(-6) - 0.005069717987*INDPRO(-7) - 0.001009551651*INDPRO(-8) - 0.01415837158*M1(-1) + 0.03745604099*M1(-2) - 0.03056930264*M1(-3) - 0.003290768557*M1(-4) + 0.03205333779*M1(-5) - 0.02199796731*M1(-6) + 0.007772718741*M1(-7) - 0.006972741498*M1(-8) + 1.292040131*CPI(-1) - 0.1221516194*CPI(-2) - 0.3640084704*CPI(-3) + 0.1837862947*CPI(-4) + 0.10637365*CPI(-5) - 0.07525036407*CPI(-6) - 0.06402552573*CPI(-7) - 0.02652294096*CPI(-8) + 0.001707900497

CHINA'S VAR ESTIMATION OUTPUT

STOCKRETURNS = - 0.0569395237*STOCKRETURNS(-1) - 0.1665438831*STOCKRETURNS(-2) - 0.03891390005*STOCKRETURNS(-3) - 0.02853593373*STOCKRETURNS(-4) - 0.02212883207*STOCKRETURNS(-5) -

0.1323637265*STOCKRETURNS(-6) - 0.4488526865*INDPRO(-1) - 0.2227305149*INDPRO(-2) - 0.2348587144*INDPRO(-3) - 0.3588071913*INDPRO(-4) + 0.2479812026*INDPRO(-5) + 0.3725437907*INDPRO(-6) - 0.001656240138*M1(-1) + 7.264061452e-05*M1(-2) + 0.005625209419*M1(-3) + 0.01209823121*M1(-4) - 0.005607974018*M1(-5) - 0.01344739992*M1(-6) - 0.156538782*CPI(-1) - 0.6076290598*CPI(-2) - 0.4601816525*CPI(-3) + 0.06253036736*CPI(-4) - 0.01505446221*CPI(-5) + 0.03769199534*CPI(-6) + 0.08665773679
INDPRO = 0.05351588048*STOCKRETURNS(-1) + 0.009391808484*STOCKRETURNS(-2) + 0.02086080427*STOCKRETURNS(-3) - 0.06564334338*STOCKRETURNS(-4) - 0.03350872417*STOCKRETURNS(-5) - 0.04073395478*STOCKRETURNS(-6) + 0.08702770205*INDPRO(-1) + 0.007617756737*INDPRO(-2) + 0.1252785417*INDPRO(-3) + 0.08739684869*INDPRO(-4) + 0.0311209146*INDPRO(-5) + 0.04968526515*INDPRO(-6) - 0.0007283996318*M1(-1) - 0.002415121276*M1(-2) - 0.0005160139135*M1(-3) - 0.0004528300155*M1(-4) - 0.002245889866*M1(-5) - 0.001255880818*M1(-6) + 0.2655857468*CPI(-1) + 0.06531416755*CPI(-2) + 0.13532026*CPI(-3) - 0.1139995123*CPI(-4) - 0.1352699628*CPI(-5) - 0.04639941662*CPI(-6) + 0.07331175349
M1 = 0.794875008*STOCKRETURNS(-1) - 0.1395383967*STOCKRETURNS(-2) + 0.9746793665*STOCKRETURNS(-3) - 0.7436044561*STOCKRETURNS(-4) + 0.2566116608*STOCKRETURNS(-5) - 0.07511066476*STOCKRETURNS(-6) - 7.63981559*INDPRO(-1) - 0.5237915553*INDPRO(-2) + 2.041319154*INDPRO(-3) + 2.418551548*INDPRO(-4) + 1.543932647*INDPRO(-5) + 0.4031584355*INDPRO(-6) + 0.04305259595*M1(-1) - 0.01139187255*M1(-2) + 0.004348435769*M1(-3) - 0.02009488927*M1(-4) - 0.03579166104*M1(-5) - 0.01101965778*M1(-6) + 0.09142226418*CPI(-1) - 0.5931509407*CPI(-2) + 1.500479131*CPI(-3) + 0.3399670308*CPI(-4) + 0.2041893313*CPI(-5) - 0.3471774864*CPI(-6) + 0.4894683558
CPI = 0.009895985401*STOCKRETURNS(-1) + 0.003898964154*STOCKRETURNS(-2) - 0.02410902561*STOCKRETURNS(-3) - 0.02707489316*STOCKRETURNS(-4) - 0.03494233058*STOCKRETURNS(-5) - 0.003701777614*STOCKRETURNS(-6) + 0.1430550412*INDPRO(-1) + 0.1232332501*INDPRO(-2) + 0.1704934932*INDPRO(-3) - 0.07082999429*INDPRO(-4) + 0.05452532358*INDPRO(-5) - 0.06377112812*INDPRO(-6) + 0.001305656662*M1(-1) + 0.001047012402*M1(-2) -

0.0109167427*M1(-3) + 0.004676283858*M1(-4) + 0.0004217436994*M1(-5) + 0.001572977077*M1(-6) + 0.4528824028*CPI(-1) + 0.1929601664*CPI(-2) + 0.06761416217*CPI(-3) + 0.04131386583*CPI(-4) - 0.01327660514*CPI(-5) - 0.008365396328*CPI(-6) - 0.03938181204

HONK KONG'S VAR ESTIMATION OUTPUT
STOCKRETURNS = - 0.06372609742*STOCKRETURNS(-1) + 0.08286138293*STOCKRETURNS(-2) - 0.2124567085*STOCKRETURNS(-3) + 0.2637133609*INDPRO(-1) + 0.4525081476*INDPRO(-2) - 1.094104751*INDPRO(-3) + 0.08302499968*M1(-1) - 0.05602741367*M1(-2) - 0.06392629072*M1(-3) - 1.277543044*CPI(-1) + 1.055975002*CPI(-2) - 0.6608741387*CPI(-3) - 0.00957995901
INDPRO = 0.03511576101*STOCKRETURNS(-1) + 0.102274454*STOCKRETURNS(-2) - 0.001527255225*STOCKRETURNS(-3) + 0.7037844146*INDPRO(-1) + 0.04752966105*INDPRO(-2) + 0.09262142186*INDPRO(-3) - 0.03567513675*M1(-1) - 0.008771776376*M1(-2) + 0.08978008326*M1(-3) - 0.0226970444*CPI(-1) + 1.27343246*CPI(-2) - 1.121126494*CPI(-3) - 0.008848755907
M1 = 0.1178177423*STOCKRETURNS(-1) + 0.2002025289*STOCKRETURNS(-2) + 0.1493527309*STOCKRETURNS(-3) + 0.03036556201*INDPRO(-1) - 0.01392814172*INDPRO(-2) - 0.1638739205*INDPRO(-3) + 0.3266990193*M1(-1) + 0.3166006654*M1(-2) + 0.1951692539*M1(-3) + 0.9352993232*CPI(-1) - 0.5594332371*CPI(-2) - 0.06075704105*CPI(-3) + 0.009844374807
CPI = - 0.002862232253*STOCKRETURNS(-1) + 0.0005195021293*STOCKRETURNS(-2) + 0.003253588269*STOCKRETURNS(-3) + 0.02954767392*INDPRO(-1) + 0.009086384363*INDPRO(-2) + 0.005734187677*INDPRO(-3) - 0.01506814949*M1(-1) + 0.009319752717*M1(-2) + 0.02263733327*M1(-3) + 0.712485063*CPI(-1) + 0.120484029*CPI(-2) + 0.1230399022*CPI(-3) + 0.000362691492

INDONESIA'S VAR ESTIMATION OUTPUT
STOCKRETURNS = 0.06698868285*STOCKRETURNS(-1) - 0.1154499029*STOCKRETURNS(-2) - 0.1138485652*STOCKRETURNS(-3) + 0.005338490069*INDPRO(-1) + 0.0358792764*INDPRO(-2) - 0.1436315187*INDPRO(-3) + 0.07429431594*M1(-1) - 0.2337568725*M1(-2) + 0.004546386914*M1(-3) - 1.733622558*CPI(-1) + 0.4585347588*CPI(-2) + 0.2072946561*CPI(-3) + 0.03226589979
INDPRO = - 0.01664965229*STOCKRETURNS(-1) + 0.0712388402*STOCKRETURNS(-2) - 0.1509291474*STOCKRETURNS(-3) - 0.03432707602*INDPRO(-1) + 0.3813542872*INDPRO(-2) + 0.2862421846*INDPRO(-3) - 0.09594899731*M1(-1) + 0.2652593881*M1(-2) + 0.02742921844*M1(-3) - 1.529160418*CPI(-1) + 1.560084904*CPI(-2) - 0.2529374068*CPI(-3) - 0.01596620329
M1 = - 0.03956876833*STOCKRETURNS(-1) - 0.02382605608*STOCKRETURNS(-2) + 0.1562427789*STOCKRETURNS(-3) - 0.03247285241*INDPRO(-1) - 0.1190701498*INDPRO(-2) + 0.1040475456*INDPRO(-3) + 0.783653742*M1(-1) + 0.1760560005*M1(-2) - 0.1522227313*M1(-3) + 0.6678965301*CPI(-1) - 0.9521269112*CPI(-2) + 0.356513931*CPI(-3) + 0.04262520072
CPI = - 0.02327300039*STOCKRETURNS(-1) - 0.07992417767*STOCKRETURNS(-2) + 0.008236801777*STOCKRETURNS(-3) + 0.02044313447*INDPRO(-1) - 0.04616082802*INDPRO(-2) - 0.03603807401*INDPRO(-3) + 0.1650012609*M1(-1) - 0.04870846552*M1(-2) - 0.05413057086*M1(-3) + 1.493570173*CPI(-1) - 0.6675915198*CPI(-2) + 0.01787937515*CPI(-3) - 0.002124862239

JAPAN'S VAR ESTIMATION OUTPUT
STOCKRETURNS = 0.04861803203*STOCKRETURNS(-1) - 0.1764767402*STOCKRETURNS(-2) + 0.1433843238*STOCKRETURNS(-3) - 0.0661389363*STOCKRETURNS(-4) + 0.1579192336*STOCKRETURNS(-5) - 0.1415969676*STOCKRETURNS(-6) - 0.005806549969*STOCKRETURNS(-7) + 0.0148009618*STOCKRETURNS(-8) - 0.1937882661*INDPRO(-1) - 0.2413569539*INDPRO(-2) + 0.6205523875*INDPRO(-3) - 0.2190909151*INDPRO(-4) + 0.5131563077*INDPRO(-5) - 0.06942448499*INDPRO(-6) - 0.9196694414*INDPRO(-7) +

0.3360189956*INDPRO(-8) + 1.157929623*M1(-1) - 1.137085558*M1(-2) - 0.5228698165*M1(-3) + 0.6553345437*M1(-4) - 1.168461056*M1(-5) + 1.393470159*M1(-6) - 0.892322914*M1(-7) + 0.5762213063*M1(-8) - 0.5541248173*CPI(-1) - 0.9143022205*CPI(-2) + 0.2180404352*CPI(-3) - 0.4727791028*CPI(-4) + 0.173620936*CPI(-5) + 1.799259744*CPI(-6) - 2.21529804*CPI(-7) + 1.127784745*CPI(-8) - 0.00971944009
INDPRO = 0.04084213838*STOCKRETURNS(-1) + 0.06620637924*STOCKRETURNS(-2) + 0.02530517187*STOCKRETURNS(-3) + 0.03605647902*STOCKRETURNS(-4) + 0.006073507323*STOCKRETURNS(-5) + 0.0006227228616*STOCKRETURNS(-6) - 0.004862254608*STOCKRETURNS(-7) + 0.02115886651*STOCKRETURNS(-8) + 0.5856078715*INDPRO(-1) + 0.417993758*INDPRO(-2) + 0.1410475858*INDPRO(-3) + 0.1539870978*INDPRO(-4) - 0.2068235605*INDPRO(-5) - 0.195476224*INDPRO(-6) - 0.2515924737*INDPRO(-7) + 0.2049874897*INDPRO(-8) + 0.1066945206*M1(-1) - 0.03452329605*M1(-2) - 0.2065638766*M1(-3) + 0.1670710075*M1(-4) - 0.1082940678*M1(-5) - 0.005308934413*M1(-6) + 0.1502849478*M1(-7) - 0.04725439216*M1(-8) + 0.2214599584*CPI(-1) - 0.3328578473*CPI(-2) + 0.2606834819*CPI(-3) + 0.9349696706*CPI(-4) - 0.9263080474*CPI(-5) - 0.360381481*CPI(-6) - 0.009974514678*CPI(-7) + 0.3309944843*CPI(-8) - 0.0004577970397
M1 = 0.03411915511*STOCKRETURNS(-1) + 0.008564860688*STOCKRETURNS(-2) + 0.002524019052*STOCKRETURNS(-3) - 0.02583421516*STOCKRETURNS(-4) + 0.01409523458*STOCKRETURNS(-5) - 0.04548265199*STOCKRETURNS(-6) - 0.02127374845*STOCKRETURNS(-7) + 0.0225727711*STOCKRETURNS(-8) + 0.1060299417*INDPRO(-1) - 0.1347170264*INDPRO(-2) - 0.05445248833*INDPRO(-3) - 0.05196881612*INDPRO(-4) + 0.04622359949*INDPRO(-5) + 0.05404950787*INDPRO(-6) - 0.1194905188*INDPRO(-7) + 0.08917502205*INDPRO(-8) + 1.220016166*M1(-1) - 0.305997486*M1(-2) + 0.0480958948*M1(-3) + 0.01737747112*M1(-4) - 0.1164240359*M1(-5) + 0.1449593406*M1(-6) + 0.06392597337*M1(-7) - 0.1929516331*M1(-8) + 0.1434095257*CPI(-1) - 0.4932170751*CPI(-2) + 0.4874902293*CPI(-3) - 0.2250819347*CPI(-4) - 0.288702324*CPI(-5) + 0.6551197694*CPI(-6) - 0.1266518411*CPI(-7) - 0.5289315301*CPI(-8) + 0.01345825564
CPI = - 0.005701742312*STOCKRETURNS(-1) - 0.01741061082*STOCKRETURNS(-2) + 0.004736643082*STOCKRETURNS(-3) +

0.003903637781*STOCKRETURNS(-4) - 0.000583935158*STOCKRETURNS(-5) - 0.000403054266*STOCKRETURNS(-6) + 0.006051724134*STOCKRETURNS(-7) + 0.002592105649*STOCKRETURNS(-8) + 0.01267996226*INDPRO(-1) + 0.001812943168*INDPRO(-2) + 0.001659730033*INDPRO(-3) - 0.009551562636*INDPRO(-4) + 0.01193878979*INDPRO(-5) + 0.002344514959*INDPRO(-6) + 0.008626851492*INDPRO(-7) - 0.01644342713*INDPRO(-8) + 0.05364594778*M1(-1) - 0.02827309672*M1(-2) - 0.009069682575*M1(-3) - 0.0222912889*M1(-4) + 0.006216259923*M1(-5) - 0.02546336872*M1(-6) + 0.02248766794*M1(-7) + 0.01691196017*M1(-8) + 0.8862559537*CPI(-1) + 0.09685080343*CPI(-2) - 0.1853426254*CPI(-3) - 0.05462584655*CPI(-4) + 0.2620212828*CPI(-5) - 0.06863802561*CPI(-6) - 0.128336187*CPI(-7) + 0.1616313458*CPI(-8) - 0.001807930628

KOREA'S VAR ESTIMATION OUTPUT
STOCKRETURNS = 0.1657393567*STOCKRETURNS(-1) - 0.2491168844*STOCKRETURNS(-2) + 0.1130308643*STOCKRETURNS(-3) + 0.8322991661*INDPRO(-1) - 0.0002741393947*INDPRO(-2) - 0.9992605912*INDPRO(-3) + 0.09196303973*M1(-1) - 0.09628045996*M1(-2) - 0.02266480206*M1(-3) - 0.3149313458*CPI(-1) + 1.743007216*CPI(-2) - 2.977661603*CPI(-3) + 0.04658785459
INDPRO = 0.0556144349*STOCKRETURNS(-1) - 0.0005940064503*STOCKRETURNS(-2) + 0.05757234138*STOCKRETURNS(-3) + 0.7179289825*INDPRO(-1) + 0.2363815363*INDPRO(-2) - 0.07082930178*INDPRO(-3) + 0.0328804331*M1(-1) - 0.016690544*M1(-2) - 0.01520236131*M1(-3) - 0.6953439322*CPI(-1) - 0.06841286919*CPI(-2) + 0.5859853911*CPI(-3) + 0.02142043037
M1 = 0.09860833392*STOCKRETURNS(-1) - 0.02682416608*STOCKRETURNS(-2) + 0.0526818635*STOCKRETURNS(-3) - 0.1348843763*INDPRO(-1) + 0.0442834526*INDPRO(-2) + 0.05588147671*INDPRO(-3) + 0.3786548348*M1(-1) + 0.2322056351*M1(-2) + 0.2029186066*M1(-3) - 1.945702643*CPI(-1) - 0.08202795133*CPI(-2) + 1.406385348*CPI(-3) + 0.05000110038
CPI = - 0.02189037475*STOCKRETURNS(-1) + 0.003868859903*STOCKRETURNS(-2) - 0.01674009646*STOCKRETURNS(-3) + 0.003212895823*INDPRO(-1) + 0.002544157556*INDPRO(-2) - 0.005423005142*INDPRO(-3) + 0.01249855362*M1(-1) + 0.002962599462*M1(-2) -

0.01199131637*M1(-3) + 1.289236839*CPI(-1) - 0.4053227715*CPI(-2) + 0.008150019154*CPI(-3) + 0.002813590389

MALAYSIA'S VAR ESTIMATION OUTPUT
STOCKRETURNS = - 0.03511188197*STOCKRETURNS(-1) + 0.03673665359*STOCKRETURNS(-2) - 0.06694595163*INDPRO(-1) - 0.05949088173*INDPRO(-2) + 0.3677175184*M1(-1) - 0.253640433*M1(-2) - 0.08705671812*CPI(-1) - 0.01728275896*CPI(-2) - 0.02346885602
INDPRO = 0.05199850904*STOCKRETURNS(-1) + 0.06253617897*STOCKRETURNS(-2) + 0.4733761768*INDPRO(-1) + 0.3625550727*INDPRO(-2) + 0.0548339737*M1(-1) + 0.03296532717*M1(-2) - 0.0276120871*CPI(-1) + 0.1559218095*CPI(-2) + 0.001531760288
M1 = 0.09475529571*STOCKRETURNS(-1) + 0.09601948135*STOCKRETURNS(-2) + 0.003720381553*INDPRO(-1) - 0.04192727334*INDPRO(-2) + 0.781752569*M1(-1) + 0.1586961809*M1(-2) + 0.01324686463*CPI(-1) + 0.08312410997*CPI(-2) + 0.01223913474
CPI = 0.01326940209*STOCKRETURNS(-1) + 0.02627618531*STOCKRETURNS(-2) - 0.03483421396*INDPRO(-1) + 0.0370321418*INDPRO(-2) - 0.009615897582*M1(-1) - 0.01641378526*M1(-2) + 0.1782960919*CPI(-1) + 0.1728532268*CPI(-2) + 0.02184833506

NEW ZEALAND'S VAR ESTIMATION OUTPUT
STOCKRETURNS = - 0.213622239*STOCKRETURNS(-1) - 0.06940852189*STOCKRETURNS(-2) + 0.01813666695*STOCKRETURNS(-3) - 0.1431737521*STOCKRETURNS(-4) - 0.1509103618*STOCKRETURNS(-5) - 0.05721529355*STOCKRETURNS(-6) - 0.05800836044*STOCKRETURNS(-7) + 0.008394775264*INDPRO(-1) + 0.2393528696*INDPRO(-2) - 0.261062261*INDPRO(-3) + 0.4921471459*INDPRO(-4) + 0.06295328817*INDPRO(-5) + 0.3227039295*INDPRO(-6) - 0.5982262624*INDPRO(-7) + 0.03875986066*M1(-1) + 0.1282314236*M1(-2) + 0.01079111633*M1(-3) - 0.1105154184*M1(-4) - 0.08411991094*M1(-5) -

0.3160045095*M1(-6) + 0.134638289*M1(-7) - 2.335114856*CPI(-1) + 0.6839561376*CPI(-2) + 0.1384143979*CPI(-3) - 0.270943927*CPI(-4) - 0.7128924593*CPI(-5) - 0.9633440598*CPI(-6) + 1.706978877*CPI(-7) + 0.01784583576
INDPRO = 0.001794409364*STOCKRETURNS(-1) + 0.03447906767*STOCKRETURNS(-2) - 0.005593775232*STOCKRETURNS(-3) + 0.0008258180454*STOCKRETURNS(-4) + 0.004100138118*STOCKRETURNS(-5) - 0.0179667586*STOCKRETURNS(-6) - 0.02609443479*STOCKRETURNS(-7) + 0.9662812701*INDPRO(-1) - 0.1188699697*INDPRO(-2) + 0.04500612718*INDPRO(-3) + 0.02414097598*INDPRO(-4) - 0.01257530254*INDPRO(-5) + 0.08231955684*INDPRO(-6) - 0.05149121017*INDPRO(-7) + 0.1198177734*M1(-1) - 0.0632515358*M1(-2) + 0.05092231589*M1(-3) - 0.01490311677*M1(-4) + 0.02267692876*M1(-5) - 0.1294891283*M1(-6) + 0.1084911828*M1(-7) - 0.1446408182*CPI(-1) + 0.4115537675*CPI(-2) - 1.28458389*CPI(-3) + 0.9906907132*CPI(-4) + 0.3616614329*CPI(-5) - 0.1470308911*CPI(-6) - 0.2789991073*CPI(-7) - 0.006392709094
M1 = - 0.04213063896*STOCKRETURNS(-1) + 0.007848261245*STOCKRETURNS(-2) + 0.04834163122*STOCKRETURNS(-3) + 0.03170759339*STOCKRETURNS(-4) - 0.1043644325*STOCKRETURNS(-5) + 0.05536226497*STOCKRETURNS(-6) + 0.04161324785*STOCKRETURNS(-7) + 0.1123192709*INDPRO(-1) - 0.06294646624*INDPRO(-2) - 0.08310940086*INDPRO(-3) + 0.1015922943*INDPRO(-4) - 0.4721188649*INDPRO(-5) + 0.6859249015*INDPRO(-6) - 0.3990525064*INDPRO(-7) + 0.649993717*M1(-1) + 0.2212603377*M1(-2) + 0.03420725907*M1(-3) - 0.1606287158*M1(-4) + 0.1028518531*M1(-5) + 0.1362872839*M1(-6) - 0.1880515429*M1(-7) - 1.48625324*CPI(-1) - 0.3098008843*CPI(-2) + 1.586246961*CPI(-3) + 0.3747646107*CPI(-4) - 0.024455389*CPI(-5) - 0.2711845489*CPI(-6) - 0.01707878075*CPI(-7) + 0.02670210688
CPI = 0.009528970653*STOCKRETURNS(-1) + 0.005774994641*STOCKRETURNS(-2) - 0.01016460008*STOCKRETURNS(-3) - 0.005445591845*STOCKRETURNS(-4) - 0.008838149374*STOCKRETURNS(-5) - 0.002592465856*STOCKRETURNS(-6) - 0.004049126809*STOCKRETURNS(-7) + 0.009793600301*INDPRO(-1) - 0.02954887422*INDPRO(-2) +

0.01882404607*INDPRO(-3) - 0.004653928672*INDPRO(-4) - 0.001661932488*INDPRO(-5) + 0.02192864272*INDPRO(-6) + 0.00654431569*INDPRO(-7) + 0.003146203764*M1(-1) - 0.03587295833*M1(-2) + 0.0426879799*M1(-3) + 0.002196463471*M1(-4) + 0.0005515857235*M1(-5) - 0.01434965701*M1(-6) + 0.01454364588*M1(-7) + 0.8766328574*CPI(-1) + 0.06534501262*CPI(-2) + 0.341377923*CPI(-3) - 0.36757821*CPI(-4) + 0.02212670514*CPI(-5) - 0.1779503131*CPI(-6) + 0.1299857566*CPI(-7) + 0.0001739677255

PHILIPPINES' VAR ESTIMATION OUTPUT
STOCKRETURNS = 0.1202139672*STOCKRETURNS(-1) + 0.08863388825*STOCKRETURNS(-2) - 0.1810426005*STOCKRETURNS(-3) - 0.0121569578*STOCKRETURNS(-4) - 0.1050962173*STOCKRETURNS(-5) + 0.06957225762*STOCKRETURNS(-6) - 0.1546432499*STOCKRETURNS(-7) + 0.06904776479*STOCKRETURNS(-8) + 0.003501254542*INDPRO(-1) + 0.009432639207*INDPRO(-2) + 0.05947624371*INDPRO(-3) + 0.3373501238*INDPRO(-4) - 0.2638986642*INDPRO(-5) + 0.07912603278*INDPRO(-6) - 0.2221902313*INDPRO(-7) + 0.09038624374*INDPRO(-8) + 0.4327543285*M1(-1) - 0.5001044537*M1(-2) + 0.07899008025*M1(-3) - 0.380132726*M1(-4) + 0.449748677*M1(-5) - 0.2683590862*M1(-6) + 0.01943468102*M1(-7) - 0.0006507374707*M1(-8) - 1.468163201*CPI(-1) - 1.488170172*CPI(-2) + 1.926600643*CPI(-3) + 1.333153186*CPI(-4) - 0.8962373543*CPI(-5) + 1.030051529*CPI(-6) - 0.6242062145*CPI(-7) - 0.6436178759*CPI(-8) + 0.002733325283
INDPRO = 0.04833145467*STOCKRETURNS(-1) - 0.06047559221*STOCKRETURNS(-2) + 0.0004483644132*STOCKRETURNS(-3) + 0.03875594524*STOCKRETURNS(-4) + 0.05712420777*STOCKRETURNS(-5) - 0.1024527282*STOCKRETURNS(-6) + 0.1362887833*STOCKRETURNS(-7) - 0.08090249126*STOCKRETURNS(-8) + 0.4352585015*INDPRO(-1) + 0.09927578919*INDPRO(-2) - 0.003157345566*INDPRO(-3) + 0.2161111717*INDPRO(-4) - 0.03075543449*INDPRO(-5) + 0.04928859036*INDPRO(-6) + 0.1996604072*INDPRO(-7) - 0.1825725768*INDPRO(-8) + 0.1663749556*M1(-1) - 0.0260160865*M1(-2) + 0.06591336877*M1(-3) + 0.1619255033*M1(-4) + 0.04805347377*M1(-5) - 0.3449193796*M1(-6) + 0.1238100751*M1(-7) - 0.05221719093*M1(-8) +

0.5160095657*CPI(-1) - 0.556957891*CPI(-2) - 0.5199191456*CPI(-3) + 2.742354741*CPI(-4) - 3.158495128*CPI(-5) - 0.9914829914*CPI(-6) + 1.744118382*CPI(-7) + 0.2972142195*CPI(-8) - 0.008183128486
M1 = - 0.03834946725*STOCKRETURNS(-1) + 0.01958188164*STOCKRETURNS(-2) - 0.02160093907*STOCKRETURNS(-3) + 0.07517390991*STOCKRETURNS(-4) - 0.01328509249*STOCKRETURNS(-5) + 0.001522615794*STOCKRETURNS(-6) + 0.03737075042*STOCKRETURNS(-7) + 0.03737498319*STOCKRETURNS(-8) - 0.04421897281*INDPRO(-1) + 0.1194521495*INDPRO(-2) - 0.0117703263*INDPRO(-3) + 0.03329738012*INDPRO(-4) - 0.1441330773*INDPRO(-5) + 0.06516855162*INDPRO(-6) - 0.01364836168*INDPRO(-7) - 0.04177649698*INDPRO(-8) + 0.7543556517*M1(-1) + 0.1293690585*M1(-2) + 0.08377747945*M1(-3) - 0.2365176854*M1(-4) + 0.1066548945*M1(-5) - 0.0211894319*M1(-6) + 0.04566503982*M1(-7) - 0.07195057632*M1(-8) + 0.5794018878*CPI(-1) + 0.1144483884*CPI(-2) - 0.5696546787*CPI(-3) - 0.7377823794*CPI(-4) + 0.90006608*CPI(-5) - 0.04796957424*CPI(-6) - 1.335327119*CPI(-7) + 1.635786481*CPI(-8) + 0.003399449195
CPI = - 0.005393199358*STOCKRETURNS(-1) + 0.008190844536*STOCKRETURNS(-2) - 0.003306810428*STOCKRETURNS(-3) - 0.008974074007*STOCKRETURNS(-4) - 0.002625135723*STOCKRETURNS(-5) - 0.004972965072*STOCKRETURNS(-6) - 0.006366663041*STOCKRETURNS(-7) + 0.003796672424*STOCKRETURNS(-8) - 0.004134035411*INDPRO(-1) + 0.0176215291*INDPRO(-2) - 0.006137278767*INDPRO(-3) + 0.005780223374*INDPRO(-4) + 0.006774423149*INDPRO(-5) + 0.01334161192*INDPRO(-6) + 0.000296338308*INDPRO(-7) - 0.01046707116*INDPRO(-8) + 0.0005710791221*M1(-1) - 0.004482253371*M1(-2) - 0.01404317589*M1(-3) + 0.002478719147*M1(-4) + 0.05645089011*M1(-5) - 0.04447672918*M1(-6) - 0.01840403001*M1(-7) + 0.01207592217*M1(-8) + 1.082170245*CPI(-1) - 0.04195635138*CPI(-2) - 0.05721424235*CPI(-3) + 0.1133311856*CPI(-4) - 0.0662317821*CPI(-5) - 0.1489402117*CPI(-6) + 0.03654404677*CPI(-7) + 0.004781082271*CPI(-8) + 0.003202240062

SINGAPORE'S VAR ESTIMATION OUTPUT
STOCKRETURNS = 0.1515699738*STOCKRETURNS(-1) + 0.01542032059*STOCKRETURNS(-2) - 0.1387618583*STOCKRETURNS(-3) +

0.05243539012*STOCKRETURNS(-4) - 0.1646625839*STOCKRETURNS(-5) + 0.1347488782*STOCKRETURNS(-6) + 0.7407335737*INDPRO(-1) - 1.608178487*INDPRO(-2) + 1.501614355*INDPRO(-3) - 1.440631358*INDPRO(-4) + 1.360664666*INDPRO(-5) - 0.3651136236*INDPRO(-6) - 0.463274604*M1(-1) + 0.2571837387*M1(-2) - 0.3433603004*M1(-3) + 0.8214564437*M1(-4) - 0.7175016343*M1(-5) + 0.4481376145*M1(-6) - 0.1495843209*CPI(-1) - 0.07644414482*CPI(-2) - 0.2784987346*CPI(-3) - 0.04978762755*CPI(-4) - 0.2764976506*CPI(-5) + 0.1002359851*CPI(-6) - 0.006472755423
INDPRO = 0.01133886347*STOCKRETURNS(-1) - 0.01795939665*STOCKRETURNS(-2) - 0.05633869906*STOCKRETURNS(-3) - 0.03417232562*STOCKRETURNS(-4) - 0.04995420041*STOCKRETURNS(-5) - 0.02130115928*STOCKRETURNS(-6) + 1.179760234*INDPRO(-1) - 0.401725506*INDPRO(-2) + 0.02579226833*INDPRO(-3) + 0.08819976084*INDPRO(-4) + 0.03756863522*INDPRO(-5) - 0.1258544599*INDPRO(-6) + 0.1300118173*M1(-1) - 0.0199648616*M1(-2) - 0.1498285378*M1(-3) - 0.05366741622*M1(-4) - 0.004674450506*M1(-5) + 0.09081909091*M1(-6) - 0.0180772218*CPI(-1) - 0.02223360129*CPI(-2) - 0.06303084019*CPI(-3) - 0.02572978167*CPI(-4) - 0.01929732999*CPI(-5) + 0.01348520764*CPI(-6) + 0.004131322078
M1 = 0.06798302379*STOCKRETURNS(-1) + 0.01009331668*STOCKRETURNS(-2) + 0.05468995287*STOCKRETURNS(-3) + 0.03054179386*STOCKRETURNS(-4) - 0.09417309559*STOCKRETURNS(-5) + 0.03694057788*STOCKRETURNS(-6) - 0.03014461211*INDPRO(-1) + 0.2279772565*INDPRO(-2) - 0.3583751037*INDPRO(-3) + 0.3660557918*INDPRO(-4) - 0.1735054372*INDPRO(-5) + 0.002460216221*INDPRO(-6) + 0.9778027586*M1(-1) - 0.1315724477*M1(-2) + 0.1964824572*M1(-3) - 0.2289566055*M1(-4) + 0.238889401*M1(-5) - 0.2601305092*M1(-6) + 0.1241267988*CPI(-1) + 0.02678752591*CPI(-2) + 0.06052389428*CPI(-3) + 0.01656731151*CPI(-4) - 0.06650501938*CPI(-5) + 0.05770369748*CPI(-6) + 0.01687478268
CPI = 0.04299067947*STOCKRETURNS(-1) + 0.02059071849*STOCKRETURNS(-2) + 0.06385277069*STOCKRETURNS(-3) + 0.03937954079*STOCKRETURNS(-4) + 0.05182799498*STOCKRETURNS(-5) + 0.01972276444*STOCKRETURNS(-6) - 0.4463009322*INDPRO(-1) + 0.908681283*INDPRO(-2) - 0.5270160267*INDPRO(-3) + 0.2421282255*INDPRO(-4) - 0.4743854252*INDPRO(-5) + 0.1398477005*INDPRO(-6) + 0.2552107068*M1(-1) + 0.02687273475*M1(-2) +

0.20238525*M1(-3) - 0.3247460381*M1(-4) + 0.138905829*M1(-5) - 0.3071361861*M1(-6) + 0.269515059*CPI(-1) + 0.1563096578*CPI(-2) + 0.1783014651*CPI(-3) + 0.1033036291*CPI(-4) + 0.1131275459*CPI(-5) + 0.138582026*CPI(-6) + 0.01213671436

TAIWAN’S VAR ESTIMATION OUTPUT
STOCKRETURNS = - 0.01370603734*STOCKRETURNS(-1) - 0.1391299331*STOCKRETURNS(-2) - 0.05227479159*STOCKRETURNS(-3) - 0.2077572213*STOCKRETURNS(-4) - 0.05413688718*STOCKRETURNS(-5) - 0.3791780553*STOCKRETURNS(-6) + 0.1316714681*STOCKRETURNS(-7) - 0.2319562802*STOCKRETURNS(-8) + 0.2098222333*INDPRO(-1) - 0.332725815*INDPRO(-2) - 0.219925489*INDPRO(-3) - 0.1430182809*INDPRO(-4) + 0.327071862*INDPRO(-5) - 0.1512805376*INDPRO(-6) + 0.01939719001*INDPRO(-7) + 0.1211676763*INDPRO(-8) + 0.6489779095*M1(-1) + 0.07379359759*M1(-2) - 0.01227597296*M1(-3) - 0.2953212094*M1(-4) + 0.3728216901*M1(-5) + 0.00841750915*M1(-6) - 0.03999904142*M1(-7) - 0.5482239739*M1(-8) + 0.360071182*CPI(-1) - 0.9757093665*CPI(-2) - 0.6014208598*CPI(-3) - 1.939866338*CPI(-4) + 3.381012318*CPI(-5) - 1.884000387*CPI(-6) + 1.456117133*CPI(-7) - 0.560319215*CPI(-8) - 0.01073555435
INDPRO = 0.0227855573*STOCKRETURNS(-1) + 0.07702409726*STOCKRETURNS(-2) + 0.002971963368*STOCKRETURNS(-3) - 0.01380224764*STOCKRETURNS(-4) + 0.04997694364*STOCKRETURNS(-5) - 0.03681193361*STOCKRETURNS(-6) + 0.0523948495*STOCKRETURNS(-7) + 0.08277233701*STOCKRETURNS(-8) + 0.06771253721*INDPRO(-1) + 0.09805070256*INDPRO(-2) + 0.1708098188*INDPRO(-3) + 0.05689609697*INDPRO(-4) + 0.2028521285*INDPRO(-5) + 0.1026766695*INDPRO(-6) + 0.03096085796*INDPRO(-7) - 0.1561858741*INDPRO(-8) + 0.3595157497*M1(-1) - 0.0451743043*M1(-2) - 0.03849245606*M1(-3) + 0.1267499363*M1(-4) - 0.2866687219*M1(-5) + 0.308009967*M1(-6) - 0.128287604*M1(-7) - 0.123985951*M1(-8) - 0.4063669632*CPI(-1) + 0.6289568044*CPI(-2) + 0.7742531493*CPI(-3) - 1.156202601*CPI(-4) + 1.535453884*CPI(-5) - 1.015837532*CPI(-6) + 1.008445186*CPI(-7) - 1.20030003*CPI(-8) + 0.01304015482
M1 = 0.119951474*STOCKRETURNS(-1) + 0.01514479604*STOCKRETURNS(-2) -

0.009219836756*STOCKRETURNS(-3) + 0.05275067941*STOCKRETURNS(-4) + 0.07575608914*STOCKRETURNS(-5) + 0.06697805248*STOCKRETURNS(-6) + 0.00704160942*STOCKRETURNS(-7) + 0.01962282885*STOCKRETURNS(-8) + 0.147849293*INDPRO(-1) + 0.006593305981*INDPRO(-2) - 0.04122603928*INDPRO(-3) + 0.01022866048*INDPRO(-4) - 0.01906122574*INDPRO(-5) - 0.2124788673*INDPRO(-6) + 0.1247239144*INDPRO(-7) - 0.03073645502*INDPRO(-8) + 0.278727422*M1(-1) + 0.2280520397*M1(-2) + 0.3153256043*M1(-3) + 0.1022151216*M1(-4) + 0.09198446164*M1(-5) - 0.2140671064*M1(-6) + 0.01527792697*M1(-7) - 0.05359296646*M1(-8) - 0.06193048865*CPI(-1) - 0.1789325368*CPI(-2) - 0.8227438578*CPI(-3) + 0.874628606*CPI(-4) + 0.2978105513*CPI(-5) - 0.493452653*CPI(-6) + 0.08237413967*CPI(-7) + 0.2563431077*CPI(-8) + 0.01724993227

CPI = 0.02309064831*STOCKRETURNS(-1) - 0.002143979506*STOCKRETURNS(-2) + 0.01221971251*STOCKRETURNS(-3) - 0.01066680625*STOCKRETURNS(-4) + 0.006750386204*STOCKRETURNS(-5) - 0.0005728988407*STOCKRETURNS(-6) + 0.0121297253*STOCKRETURNS(-7) + 0.003475559578*STOCKRETURNS(-8) + 0.02621048667*INDPRO(-1) - 0.0001426853634*INDPRO(-2) - 0.01384564522*INDPRO(-3) + 0.02368818122*INDPRO(-4) - 0.04463710065*INDPRO(-5) - 0.01881741712*INDPRO(-6) - 0.02885834038*INDPRO(-7) + 0.0664376879*INDPRO(-8) - 0.05234245472*M1(-1) + 0.05740107343*M1(-2) - 0.01623992647*M1(-3) + 0.01342436806*M1(-4) + 0.03984659997*M1(-5) + 0.008406471933*M1(-6) - 0.06989027081*M1(-7) + 0.04182851558*M1(-8) + 0.6623529264*CPI(-1) - 0.1220394959*CPI(-2) + 0.0632260501*CPI(-3) + 0.02762649925*CPI(-4) + 0.09998872274*CPI(-5) + 0.07951731278*CPI(-6) - 0.1922300502*CPI(-7) + 0.3501153702*CPI(-8) - 0.001444553528

THAILAND’S VAR ESTIMATION OUTPUT

STOCKRETURNS = 0.004742105158*STOCKRETURNS(-1) + 0.01238595675*STOCKRETURNS(-2) - 0.03405582226*STOCKRETURNS(-3) - 0.1549757695*STOCKRETURNS(-4) - 0.03131944093*INDPRO(-1) + 0.7576946163*INDPRO(-2) - 0.477605265*INDPRO(-3) - 0.248704395*INDPRO(-4) + 0.1530127422*M1(-1) - 0.04710169204*M1(-2) - 0.2005635591*M1(-3) +

0.1010814709*M1(-4) - 1.142997484*CPI(-1) - 4.346228968*CPI(-2) + 3.894575597*CPI(-3) + 0.1062663612*CPI(-4) + 0.01343571873
INDPRO = - 0.05708975856*STOCKRETURNS(-1) + 0.06658638255*STOCKRETURNS(-2) + 6.320602039e-05*STOCKRETURNS(-3) + 0.08459693565*STOCKRETURNS(-4) + 0.5641455697*INDPRO(-1) + 0.1992977057*INDPRO(-2) + 0.2550955219*INDPRO(-3) - 0.1213939939*INDPRO(-4) - 0.005501386012*M1(-1) - 0.04737390953*M1(-2) + 0.06639058333*M1(-3) - 0.03684325011*M1(-4) - 1.662701423*CPI(-1) + 1.313386387*CPI(-2) - 0.4682325391*CPI(-3) + 0.8675294045*CPI(-4) + 0.009845459577
M1 = - 0.04428020923*STOCKRETURNS(-1) - 0.00756729593*STOCKRETURNS(-2) - 0.04300803464*STOCKRETURNS(-3) + 0.0858024585*STOCKRETURNS(-4) + 0.4230214544*INDPRO(-1) - 0.2255841912*INDPRO(-2) + 0.03359947248*INDPRO(-3) - 0.03751815596*INDPRO(-4) + 0.7180013001*M1(-1) + 0.2579324829*M1(-2) + 0.1463953625*M1(-3) - 0.2293988672*M1(-4) - 0.1484782843*CPI(-1) + 0.9573714414*CPI(-2) - 2.140836493*CPI(-3) + 1.331633309*CPI(-4) + 0.003929876333
CPI = - 0.002522383934*STOCKRETURNS(-1) + 0.002589923954*STOCKRETURNS(-2) + 0.006586036061*STOCKRETURNS(-3) - 0.003738955161*STOCKRETURNS(-4) - 0.04008606829*INDPRO(-1) + 0.0006853184455*INDPRO(-2) + 0.03423438972*INDPRO(-3) + 0.008552901028*INDPRO(-4) + 0.01452173034*M1(-1) - 0.009836135077*M1(-2) - 0.01668806625*M1(-3) + 0.009485650994*M1(-4) + 1.098765404*CPI(-1) - 0.05180220467*CPI(-2) + 0.2419272186*CPI(-3) - 0.3208983472*CPI(-4) + 0.001267733148

⇒ Where stockreturns = real stock returns, indpro = industrial production growth, m1 = M1 growth and cpi = inflation rate ü *IMPULSE RESPONSES ANALYSIS*

Next we are going to analyze the impulse responses of the macroeconomic variables (industrial production growth, M1 growth and inflation rate) to a Cholesky (d.f. adjusted) one standard deviation shock in stock returns for a horizon of 4 years (48 months), divided in two sub periods (1 – 24, 25 – 48) which sub periods are divided in other two sub periods each (1 – 12, 13 – 24, 25 – 36, 37 – 48) .

The following table shows the impulse responses, while the graphs are found in the appendix.

Impulse Responses of macroeconomic variables (industrial production growth, M1 growth, inflation rate) and real stock returns themselves to an one standard deviation shock of real stock returns (Cholesky d.f. adjusted)

Country	Steps Ahead (Period)	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate
Australia	1 – 12	0,004269	0,003126	0,012472	-0,00168
	13 – 24	0,000285	-0,00142	-0,00029	-0,00069
	1 – 24	0,002364	0,000852	0,00609	-0,00118
	25 – 36	9,29E-06	0,000508	-0,00196	0,000188
	37 – 48	-0,000229	-2,4E-05	0,0004	0,000182
	25 – 48	-0,00011	0,000242	-0,00078	0,000185
China	1 – 12	0,01239	-0,00266	0,013213	-0,00534
	13 – 24	0,005258	-0,00238	0,001479	-0,00558
	1 – 24	0,008824	-0,00252	0,007346	-0,00546
	25 – 36	0,003833	-0,00153	0,000785	-0,0039
	37 – 48	0,002625	-0,00106	0,000586	-0,00269
	25 – 48	0,003229	-0,00129	0,000685	-0,0033
	1 – 12	0,003351	0,007083	0,013921	0,000987

Honk Kong	13 – 24	-0,00457	0,002637	-0,00316	0,003981
	1 – 24	-0,00061	0,00486	0,005379	0,002484
	25 – 36	-0,00174	-0,00097	-0,00356	0,00234
	37 – 48	-0,00047	-0,00061	-0,00019	0,000912
	25 – 48	-0,00111	-0,00079	-0,00188	0,001657
Indonesia	1 – 12	0,020678	0,004579	-0,00133	-0,01433
	13 – 24	-0,00181	-0,00077	0,004055	0,000764
	1 – 24	0,0094342	0,001904	0,001363	-0,00678
	25 – 36	-0,00135	0,000257	-0,00078	0,001621
	37 – 48	0,001385	0,000334	-0,00036	-0,00141
	25 – 48	1,7625E-05	0,000295	-0,00057	0,000105
Japan	1 – 12	0,004604083	0,005968	-0,00045	-2,4E-05
	13 – 24	-0,0005549	-0,00049	-0,00568	0,000276
	1 – 24	0,002025	0,002739	-0,00306	0,000126
	25 – 36	8,47325E-05	-0,00284	0,004101	-0,00029
	37 – 48	0,000219833	0,001747	0,001601	-1E-05
	25 – 48	0,000152	-0,00055	0,002851	-0,00015
Korea	1 – 12	0,01123233	0,015223	0,010851	-0,00283
	13 – 24	-0,001681	0,004629	0,003058	-0,00027
	1 – 24	0,004776	0,009926	0,006954	-0,00155
	25 – 36	-0,00081492	-0,00047	-0,00077	0,000307
	37 – 48	-0,00007117	-0,0005	-0,00055	0,000105
	25 – 48	-0,00044	-0,00048	-0,00066	0,000202
Malaysia	1 – 12	0,008844	0,007539	0,015599	-0,00074
	13 – 24	-1,23E-04	6,39E-03	7,12E-03	-3,15E-04
	1 – 24	0,004361	0,006962	0,011361	-0,00053
	25 – 36	-0,00021	0,002781	0,001938	-9,4E-05
	37 – 48	-0,00011	0,000836	0,000209	-1,4E-05
	25 – 48	-0,00016	0,001809	0,001074	-5,4E-05
New	1 – 12	0,002849033	0,001117	0,003084	-0,00043
	13 – 24	-0,00074173	0,000698	-0,00156	0,000343
	1 – 24	0,001054	0,000908	0,000761	-4,2E-05

Zealand	25 – 36	0,000134033	-0,00043	-0,00019	3,54E-05
	37 – 48	3,83508E-05	1,38E-05	0,000471	-1E-04
	25 – 48	8,62E-05	-2,06E-04	1,41E-04	-3,21E-05
Philippines	1 – 12	0,008894	-0,00075	0,000502	0,000632
	13 – 24	-0,00027	0,000562	0,000687	0,000323
	1 – 24	0,00431	-9,2E-05	0,000594	0,000478
	25 – 36	-0,00018	0,000381	0,000409	0,000223
	37 – 48	-0,00012	0,000239	0,000262	0,000152
	25 – 48	-0,00015	0,00031	0,000335	0,000188
Singapore	1 – 12	0,022671	-0,0056	-0,00634	-0,01586
	13 – 24	-0,0015	-0,00171	-0,00281	0,001184
	1 – 24	0,010585	-0,00365	-0,00458	-0,00734
	25 – 36	-0,00245	0,000382	0,003488	0,002322
	37 – 48	0,001058	0,000443	-0,001	-0,00102
	25 – 48	-0,0007	0,000413	0,001244	0,00065
Taiwan	1 – 12	0,00530033	0,009892	0,012254	0,000151
	13 – 24	-0,003513	-0,00095	-0,00421	0,000738
	1 – 24	0,000894	0,004472	0,004023	0,000445
	25 – 36	0,00154292	-0,00311	-0,003	0,000161
	37 – 48	8,29167E-05	0,002532	0,003356	0,00021
	25 – 48	0,000813	-0,00029	0,000176	0,000186
Thailand	1 – 12	0,008742	0,003867	0,007032	-0,0003
	13 – 24	-0,00031	0,001288	0,006507	-9,6E-05
	1 – 24	0,00421646	0,002578	0,006769	-0,0002
	25 – 36	-0,00011	-0,00044	0,000661	6,06E-05
	37 – 48	0,000133	-3,8E-06	-0,00014	-6,4E-05
	25 – 48	1,10333E-05	-0,00022	0,000258	-1,6E-06

⇒ The impulse response analysis has led us to the following conclusions.

Real stock returns respond immediately to a their own, which of course it is acceptable. Their response is quite big in every country we examine, but the shock fades very quickly (after 3 to 7 months) and it becomes quite negligible. Industrial production growth responds to an one standard deviation shock of real stock returns in all the countries we examines. The impulse of industrial production remains strongly positive for the first period, whose length varies from country to country (from 14 months in Singapore and Taiwan to 24 months in Honk Kong and 26 months in Korea) and then the effect starts to get quite negligible. We must underline that in Malaysia the impulse response stays positive throughout all the 48 month and its decline is quite low contrary to that of China. We must also note that in Honk Kong, Indonesia, Taiwan, Singapore and New Zealand the response of industrial production growth turns negative for a period of time but it recovers and it becomes negligible.

M1 growth also responds to an one standard deviation shock of real stock returns in every country we examine. With the exception of Singapore, all the other responses are strongly positive with a variation on the time which they start to decline, become negligible (from 8 months in China to 15 months in Australia, to 30 months in Malaysia ,New Zealand, and Thailand and 40 months in Indonesia and Japan). We must also cite that for some period of time in some of the countries the impulse response of the M1 growth, turns negative (for example Japan, Honk Kong, Taiwan and Philippines – the latter during the first 3 months of the shock).

Finally inflation rate also responds, but not so strongly as the other two macroeconomic variables do, to a shock in real stock returns. In 8 of the 12 countries we examine the response of inflation rate is negative (strongly or negligible). Only in Honk Kong and New Zealand stays positive for a period of time after the shock and in Philippines and Taiwan is positive but is quite negligible very close to zero.

⇒ Next we are going to present the impulse response of real stock returns to a Cholesky (d.f. adjusted) one standard deviation shock in macroeconomic variables of our model (industrial production growth, M1 growth and inflation rate) for a horizon of 4 years (48 months), divided in two sub periods (1 – 24, 25 – 48).

The following table shows the impulse responses, while the graphs are found in the appendix.

Impulse Responses of real stock returns to an one standard deviation shock of macroeconomic variables (industrial production growth, M1 growth, inflation rate) (Cholesky d.f. adjusted)				
Country	Steps Ahead (Period)	Industrial Production Growth	M1 Growth	Inflation Rate
Australia	1 – 12	0,000868	0,000378	-0,00417
	13 – 24	0,001004	-0,00041	-0,00197
	1 – 24	0,000936125	-1,4E-05	-0,00307
	25 – 36	0,000156	6,86E-05	0,00069
	37 – 48	-0,00029	5,41E-05	0,000533
	25 – 48	-6,58708E-05	6,13E-05	0,000611
China	1 – 12	-0,00953	0,002464	-0,00933
	13 – 24	-0,00763	0,00233	-0,00653
	1 – 24	-0,00858	0,002394	-0,00793
	25 – 36	-0,00535	0,001605	-0,00446
	37 – 48	-0,00369	0,001109	-0,00309
	25 – 48	-0,00452	0,001357	-0,00377
Honk Kong	1 – 12	-0,00672	-0,00202	-0,00542
	13 – 24	-0,00363	-0,00607	-0,00405
	1 – 24	-0,00518	-0,00405	-0,00474
	25 – 36	1,11E-03	-3,26E-03	-1,32E-03
	37 – 48	0,000868	-0,00069	-0,00052
	25 – 48	9,97E-04	-1,98E-03	-9,19E-04
Indonesia	1 – 12	0,016555	-0,02795	-0,02676
	13 – 24	0,009912	0,003957	-0,00013
	1 – 24	0,013233	-0,012	-0,01345
	25 – 36	-0,00509	0,007563	0,004473
	37 – 48	0,001101	-0,00423	-0,00263
	25 – 48	-0,00199	0,001667	0,000919

Japan	1 – 12	-0,00134	-0,00123	-0,00209
	13 – 24	-0,00046	0,000671	-0,00032
	1 – 24	-0,0009	-0,00028	-0,0012
	25 – 36	0,000227	-0,00069	-0,00055
	37 – 48	0,000253	-0,0003	-0,00016
	25 – 48	0,00024	-0,00049	-0,00035
Korea	1 – 12	-0,00022	-0,00061	-0,00575
	13 – 24	-0,00311	-0,00074	-0,00065
	1 – 24	-0,00166	-0,00067	-0,0032
	25 – 36	-0,00052	-1,4E-05	0,000568
	37 – 48	1,20E-04	7,10E-05	1,99E-04
	25 – 48	-0,0002	2,86E-05	0,000383
Malaysia	1 – 12	-0,00155	0,002656	-0,00032
	13 – 24	-0,00076	6,95E-05	-9,4E-05
	1 – 24	-0,00115571	0,001363	-0,00021
	25 – 36	-0,00017	-0,00028	-3,8E-05
	37 – 48	-2,90E-07	-1,83E-04	-1,03E-05
	25 – 48	-8,61367E-05	-0,00023	-2,4E-05
New Zealand	1 – 12	0,0002	-0,0007	-0,0027
	13 – 24	-0,00048	-0,002	0,000454
	1 – 24	-0,0001	-0,0013	-0,0011
	25 – 36	0,000418	0,000616	-0,00035
	37 – 48	-0,0001	-2,9E-05	-1,7E-05
	25 – 48	0,000156746	0,000293	-0,00018
Philippines	1 – 12	-0,00036	-0,00075	-0,00471
	13 – 24	-0,00268	-0,00089	-0,00144
	1 – 24	-0,00152	-0,00082	-0,00307
	25 – 36	-0,00182	0,000299	-0,00205
	37 – 48	-0,00158	-0,00042	-0,0003
	25 – 48	-0,0017	-5,9E-05	-0,00117
Singapore	1 – 12	-0,0003	-0,00904	-0,01577
	13 – 24	0,007278	0,00736	-0,00385

	1 – 24	0,00349	-0,00084	-0,00981
	25 – 36	-0,0015	-0,00035	0,002598
	37 – 48	-0,00082	-0,00092	-6,9E-05
	25 – 48	-0,00116	-0,00064	0,001265
Taiwan	1 – 12	-0,0006	0,00157	-0,00201
	13 – 24	0,000238	-0,00413	-0,00053
	1 – 24	-0,00018	-0,00128	-0,00127
	25 – 36	0,000709	0,001753	-0,00043
	37 – 48	-0,00023	-0,00017	-0,0007
	25 – 48	0,000239	0,000793	-0,00056
Thailand	1 – 12	0,004518	-0,00196	-0,01202
	13 – 24	-0,00241	0,002177	-0,00148
	1 – 24	0,001055	0,000107	-0,00675
	25 – 36	-0,00035	0,001061	-2,2E-05
	37 – 48	0,000406	9,68E-05	-0,00074
	25 – 48	0,00003	0,000579	-0,00038

According to the above table, and the graphs that are in the appendix, stock returns respond to a Cholesky one standard deviation shock of industrial production growth, with the exception of Taiwan, New Zealand and Malaysia where the impulse is rather small and declines quickly. In the majority of the countries, the impulse response of real stock returns to a shock in industrial production growth is positive (though we find countries like China where the response is negative or becomes negative for a period). Finally the period where the response starts to decline, become negligible varies from 10 and 15 months to 30 and 40 months.

On the other hand, real stock returns respond to a Cholesky one standard deviation shock of M1 growth in 7 out of 12 countries we examine, while in Australia, China, Honk Kong, Thailand and Korea the impulse response is small and declines/ reaches zero very quickly. In almost all the countries we examine the response of real stock returns to a shock in M1 growth is positive although we find cases where the response turns negative for a period of time until it starts to become negligible. The period where the response becomes negligible varies from 10 months to 20 months.

Finally, with the exception of Japan and Malaysia, in all the other countries, real stock returns respond strongly, to a Cholesky one standard deviation shock of inflation rate. In all the countries the response of real stock returns to a shock of inflation rate is negative and the period where it starts to become negligible varies from 10 months (in the majority of the countries we examine) to 20 and 25 months.

ü ***FORECAST ERROR VARIANCE ANALYSIS (VARIANCE DECOMPOSITION ANALYSIS)***

By using the variance decomposition option of the VAR model we can examine whether shocks in stock returns can significantly affect the fluctuations of the selected macroeconomic variables (industrial production growth, money supply growth and inflation rate). By examining this issue, we may be able to shed some light on the sources of their volatility. Therefore, for each country's VAR model, we also present the percentage of 24 – month forecast error variance explained by innovations in each variable based on our four variable (stock returns, industrial production growth, money supply growth and inflation rate). We also going to present the average percentage of this forecast error variance during the 24 to 48 month period after the shock that is attributable to innovations in stock returns.

More specifically, the contribution of an innovation in the m^{th} variable to the k – period ahead forecast error variance in the n^{th} variable is given by:

$$\text{Percentage of error variance} = \sum_{i=0}^{k-1} B(i)^2_{m,n} / \sum_{m=1}^{s} \sum_{i=0}^{k-1} B(i)^2_{m,n}$$

Where $B(i)_{m,n}$ is obtained from the orthogonalized moving average representation of Zt (where Zt is a 4 by 1 vector consisting of stock returns, industrial production growth, M1 growth and inflation rate).

The examination of the 24 month forecast error variance can also help us with our study since it can give us a hint, shed some light on the causality relationships among the variables of the model that we are going to examine next.

The percentage of the 24 month forecast error variance explained by innovations in each variable based on our four variable (stock returns, industrial production growth, money supply growth and inflation rate) model for every country we have chosen to examine is given by the following tables.

AUSTRALIA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	74,30918	8,306639	4,962181	10,68276	0.043355
Industrial Production Growth	9,408588	86,04311	3,512918	1,048496	0.042812
M1 Growth	28,7212	2,828469	64,16697	4,283359	0.074083
Inflation Rate	12,99932	5,604222	8,648961	72.7465	0.016985

As we can see from the above table, in Australia, 74.31% of the 24 month forecast error variance of real stock returns are explained from their innovations while a substantial fraction of their variance (8.31% and 10.68%) is explained by industrial production growth and inflation rates innovations. On the other hand almost all the 24 month forecast error variance of industrial production growth is explained by its own innovations (86.04%) with a substantial part (9.41%) being explained by innovations in real stock returns, while 64.17% of M1 growth's variance is explained by its own innovations and 28.72% (a really substantial part) by real stock returns innovations. Finally 72.75% of the 24 month forecast error variance of inflation rate is explained by its own innovations while a 13% is explained by innovations in real stock returns.

CHINA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	84,50477	7,317566	1,360395	6,817264	0.045092
Industrial Production Growth	12,696762	77,21038	1,873026	8,219835	0.0585
M1 Growth	5,824807	8,22315	85,37809	0,57894	0.0634
Inflation Rate	16,01744	22,46458	4,97205	56,54593	0.05728

The above table indicates that 84.5% of the 24 month forecast error variance of real stock returns in China is explained by their own innovations, 7.32% by industrial production growth innovations and 6.82% by inflation rate innovations. 77.21% of the 24 month forecast error variance of industrial production growth is explained by its own innovations while a very substantial part (12.7%!) is explained by real stock returns innovations. On the other hand 85.38% of the 24 month forecast error variance of M1 growth is explained by its own innovations while a 8.22% is explained by industrial production growth. Finally, 56.55% of the 24 month forecast error variance of inflation rate is explained by its own innovations while a substantial part (16.01% and 22.46%) is explained by real stock returns and industrial production growth innovations.

HONK KONG					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	76,49138	15,28424	2,232701	6,002141	0.086752
Industrial Production Growth	14,94367	73,82292	6,203616	5,029662	0.069208
M1 Growth	15,07865	10,96947	74,26088	0,436421	0.04594
Inflation Rate	9,892211	16,92399	9,564717	63,61908	0.031057

As described by the above table, 76.49% of the 24 month forecast error variance of real stock returns, in Honk Kong, is explained by its own innovations, while a substantial part (15.28%) is explained by industrial production growth. On the other hand 73.82% of the 24 month forecast error variance of industrial production growth is explained by its own innovations with 14.94% of this variance being interpreted by innovations in real stock returns while 74.26% of the 24 month forecast error variance of M1 growth is explained by its own innovations. This last variance is also explained equally by stock returns and industrial production growth innovations. Finally 63.61 of the variance of inflation rate is explained by its own innovations while a very big part of this variance (16.92%) is explained by innovations in industrial production growth, and stock returns and M1 growth innovations explain equal parts (9.89% and 9.56%).

INDONESIA					
	By Innovations In				
Variables Explained	Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	64,21399	9,708207	14,07596	12,00185	0.03455
Industrial Production Growth	10,596141	75,31162	3,808404	10,28383	0.0287
M1 Growth	4,241253	7,102479	81,27641	7,379856	0.0761
Inflation Rate	15,60205	15,64815	25,71107	43,03618	0.08852

The above table shows, that 64.21% of the variance of real stock returns, in Indonesia, is explained by its own innovations. We must underline that innovations in M1 growth and inflation rate explain really substantial parts of the 24 month forecast error variance of stock returns (14.08% and 12% respectively). On the other hand 75.31% of the 24 month forecast error variance of the industrial production growth is explained by its own innovations while inflation rate and stock returns innovations seem to explain equal parts of this variance (10.59% and 10.28). 81.28% of the variance of M1 growth is explained by its own innovations while innovations in industrial production growth and inflation rate explain equally the 24 month forecast error variance of M1 growth (7.1% and 7.38% respectively). Finally, innovations of all the variables of the model seem to explain part of the inflation rate (15.6% of real stock returns, 15.65% of industrial production growth, 25.71% of M1 growth and 43.04% of inflation rates innovations).

JAPAN					
	By Innovations In				
Variables Explained	Real Stock Returns (%)	Industrial Production Growth (%)	M1 Growth (%)	Inflation Rate (%)	Standard Error
Real Stock Returns	81,14745	10,588616	6,76023	1,498995	0.0727
Industrial Production Growth	18,53363	78,09109	2,288462	1,086821	0.04886
M1 Growth	9,386416	10,60746	76,05724	3,948884	0.05409
Inflation Rate	7,213124	4,166403	7,22233	80,61129	0.008641

As shown from the above table, in Japan, real stock returns and inflation rates innovations explain a very big part of their 24 month forecast error variances (81.15% and 80.65 respectively), although innovations in industrial production growth in the first variance and in M1 growth in the second explain a substantial part (10.58% and 7.22%). 78.09% of the 24 month forecast error variance of industrial production growth is explain by its own innovations while innovations in real stock returns seem to explain a big part of this variance (18.53%). Finally, 76.06% of the 24 month forecast error variance of M1 growth is explained by its own innovations while a substantial part of this variance is explained by industrial production growth and real stock returns innovations (10.61% and 9.39%).

KOREA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error

	(%)	(%)	(%)	(%)	
Real Stock Returns	84,02056	8,31548	0,591715	6,375275	0.06584
Industrial Production Growth	33,62146	56,02497	0,405372	9,943694	0.081471
M1 Growth	10,05264	3,800151	73,227	12,92021	0.07582
Inflation Rate	20,02821	2,862234	5,797725	71,31183	0.020137

As shown from the above table, 84.02% of the 24 month forecast error variance of real stock returns, is explained by their own innovations while a 8.32% of this variance is explained by innovations in industrial production growth. On the other hand 56.02% % of the 24 month forecast error variance of industrial production growth is explained by its own innovations while a very substantial part of this variance is explained by innovations in real stock returns (33.62%). 73.23% of the 24 month forecast error variance of M1 growth is explained by its own innovations. 10,05% and 12.92% of this variance are explained by innovations in real stock returns and inflation rate. Finally, 71.31% of the 24 month forecast error variance of inflation rate is explained by its own innovations while real stock returns explain a substantial part (20.03%).

MALAYSIA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	96,85195	0,429143	2,672187	0,046718	0.083593
Industrial Production	13,85127	71,86427	13,63781	0,646648	0.07981

Growth					
M1 Growth	21,23412	2,96123	75,65302	0,151634	0.0698
Inflation Rate	5,174398	0,793312	2,684534	91,34776	0.02433

As shown from the above table, in Malaysia, real stock returns and inflation rates innovations explain almost all their 24 month forecast error variances (96,85% and 91.35 respectively). On the other hand, 71.86% of the 24 month forecast error variance of industrial production growth, is explained by its own innovations, while a substantial part (13.85% and 13.63%) is explained by innovations in real stock returns and M1 growth. Finally, 75.65% of the 24 month forecast error variance of M1 growth, is explained by its own innovations while a big part of this variance is explained by innovations in real stock returns (21.23%).

NEW ZEALAND					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	80,2553	3.93673	7.0836	8.7244	0.048865
Industrial Production Growth	7,699324	80,44352	6,8736	4,983554	0.033823
M1 Growth	5,570862	10,94049	75,01056	7,591044	0.051834
Inflation Rate	3,226684	19,4736	10,428184	66,87	0.009781

As shown from the above table, in New Zealand, 80.26% of the 24 month forecast error variance of the real stock returns is explained by their own innovations, and 8.72% from innovations in inflation rate. 80.44% of the variance of industrial production growth is explained by its own innovations while a 7.7% is explained by innovations in real stock returns. Also, 75.01% of the 24 month forecast error variance of M1 growth, is explained by its own innovations, while 10.94% is explained by innovations in industrial production growth and 7.6% by innovations in inflation rate. Finally, 66.87% of the variance of inflation rate, is explained by its own innovations and a really substantial part (19.47%) of this 24 month forecast error variance is explained by innovations in industrial production growth and another big part (10.42%) by innovations in M1 growth.

PHILIPPINES					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	84,27647	5,693917	4,083306	5,946304	0.06254
Industrial Production Growth	7,857197	80,51473	7,4102	3,827994	0.04231
M1 Growth	4,829266	5,228857	79,05057	10,89131	0.067238
Inflation Rate	5,848369	9,29001	5,835397	79,02435	0.025901

As described by the above table, in Philippines, 84.28% of the 24 month forecast error variance of real stock returns is explained by its own innovations. 80.51% of the variance of industrial production growth is explained by its own innovations while innovations in M1 growth explain 79.05% of their variance. Finally, 79.02% of the 24 month forecast error variance of inflation rate is explained by its own innovations while a substantial part (9.29%) is explained by industrial production growth.

SINGAPORE					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	70,02592	8,70694	7,93823	12,50052	0.06875
Industrial Production Growth	14,03102	70,76184	8,346973	6,860164	0.02347
M1 Growth	17,4699	8,8683	59,1078	15,5053	0.08897
Inflation Rate	44,5174	4,9665	7,9911	42,5250	0.02366

The above table, which concerns the case of Singapore, demonstrates that 70.03% of the variance of real stock returns are explained by their own innovations, while a 12.5% is explained by innovations in inflation rate and 8.71% by industrial production innovations. Also, innovations in industrial production growth explain 70.76% of its 24 month forecast error variance while innovations in real stock returns explain 14.03%. 59.11% of the 24 month error variance of M1 growth is explained by its own innovations, while innovations in stock returns, industrial production growth and inflation rate explain 17.46%, 8.87% and 15.51% respectively. Finally, 42.53% of the 24 month error variance of inflation rate is explained by its own innovations while 44.52% (a very big part) is explained by innovations in stock returns.

TAIWAN					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error

	(%)	(%)	(%)	(%)	
Real Stock Returns	73,17986	3,54554	12,72154	10,10798	0.056221
Industrial Production Growth	20,58331	60,52048	13,4587	5,437507	0.07881
M1 Growth	26,3885	2,984305	65,35827	4,90644	0.073584
Inflation Rate	6,688665	8,792281	13,85287	70,66618	0.01526

As shown from the above table, 73.18% of the 24 month error variance of real stock returns is explained by their own innovations, while innovations in M1 growth and inflation rate explain 12.72% and 10.11% of the variance. On the other hand, 60.52% of the variance of industrial production growth, is explained by its own innovations, while a substantial part (20.58%) is explained by innovations in real stock returns. Innovations in M1 growth also explain 13.46% of the variance. Also 65.36% of the variance of M1 growth is explained by its own innovations while real stock returns innovations explain 26.39% of the variance. Finally, 70.66% of the 24 month error variance of inflation rate is explained by its own innovations while innovations in M1 growth explain a substantial part (13.85%).

THAILAND					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	80,07052	7,511893	1,827986	10,5896	0.045688
Industrial Production Growth	9,213652	75,84691	3,221823	11,71761	0.086369

M1 Growth	8,182157	20,92141	63,83912	7,057316	0.074242
Inflation Rate	1,245481	6,328033	4,009859	88,41663	0.027232

As shown from the above table, 80.07% of the 24 month error variance of real stock returns is explained by their own innovations, while 10.59% is explained by innovations of inflation rate. Three quarters of the variance of industrial production growth is explained by its own innovations while a substantial part is explained by innovations in inflation rate and real stock returns (11.72% and 9.21%). 63.84% of the 24 month error variance of M1 growth is explained by its own innovations while a really substantial part (20.92%) is explained by innovations in industrial production growth. Finally, 88.42% of the variance of inflation rate is explained by its own innovations.

The average percentage of the forecast error variance during the 24 to 48 month period after the shock that is attributable to innovations in real stock returns, based on our four variable (real stock returns, industrial production growth, money supply growth and inflation rate) model for every country we have chosen to examine is given by the following tables.

AUSTRALIA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	64,53309	11,55008	3,01808	20,89875	0.046044
Industrial Production Growth	11,63147	80,36369	5,830902	2,17394	0.0435

M1 Growth	25,12081	1,937396	62,12788	10,81392	0.077914
Inflation Rate	28,92041	2,318396	9,71218	61,04901	0.01878

As we can see from the above table, in Australia, 64.53% of the 25 to 48 month forecast error variance of real stock returns are explained from their innovations while a substantial fraction of their variance (11.55% and 20.9%) is explained by industrial production growth and inflation rates innovations. On the other hand a big part of the 25 to 48 month forecast error variance of industrial production growth is explained by its own innovations (80.36%) with a substantial part (11.63%) being interpreted by real stock returns, while 62.12% of M1 growth's variance is explained by its own innovations and 25.12% (a very substantial part) by real stock returns innovations. Finally 61.05% of the variance of inflation rate is explained by its own innovations and a substantial part (28.92% and 9.71%) by innovations in real stock returns and M1 growth.

CHINA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	76,11851	12,88567	1,872624	9,1232	0.051223
Industrial Production Growth	15,09165	71,9879	2,578199	10,34225	0.0621
M1 Growth	5,377534	9,53289	84,41343	0,676143	0.0738
Inflation Rate	23,52137	30,31191	4,719103	41,44762	0.075301

The above table indicates that 76.12% (a quite smaller percentage compared to that of the 24 month error variance) of the 25 to 48 month forecast error variance of real stock returns in China is explained by their own innovations, 12.88% by industrial production growth innovations and 9.12% by inflation rate innovations. 71.98% of the 25 to 48 month forecast error variance of industrial production growth is explained by its own innovations while a very substantial part (15.09%) is explained by stock return innovations. On the other hand 84.41% of the 25 to 48 month forecast error variance of M1 growth is explained by its own innovations while a 9.53% is explained by industrial production growth. Finally, 41.44% of the 25 to 48 month forecast error variance of inflation rate is explained by its own innovations while a substantial part (more than 50%, 23.52% and 30.31%) is explained by innovations in real stock returns and industrial production growth.

HONK KONG					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	66,96487	18,22094	6,566269	8,247922	0.08984
Industrial Production Growth	17,20943	65,57784	11,7062	5,506524	0.070855
M1 Growth	17,75894	17,71858	61,66199	2,478305	0.0562
Inflation Rate	13,902687	20,3771	22,73226	42,98795	0.045815

As described by the above table, 66.96% of the 25 to 48 month forecast error variance of real stock returns, in Honk Kong, is explained by its own innovations, while a substantial part and bigger than that of the 25 to 48 month error variance (18.22%) is explained by industrial production growth. On the other hand 65.58% of the 25 to 48 month forecast error variance of industrial production growth is explained by its own innovations while 61.66% (a quite smaller percentage than that of the 24 month error variance) of the 25 to 48 month forecast error variance of M1 growth is explained by its own innovations. This last variance is also explained equally by real stock returns and industrial production growth innovations. Finally the 25 to 48 error variance of inflation rate is explained only by 42.98% of its own innovations while innovations in industrial production growth , M1 growth and stock returns explain 20.37% , 22.73% - a percentage which is more than double of that of the 24 month forecast error variance - and 13.9% respectively (these percentages are quite bigger than those of the 24 month error variance).

INDONESIA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	54,06734	13,85867	19,97883	12,09516	0.05876
Industrial Production Growth	12,978243	69,69362	5,770664	11,55747	0.0352
M1 Growth	6,01478	8,92028	74,55478	10,51016	0.08928
Inflation Rate	17,191908	18,73339	28,47415	35,60055	0.009654

The above table shows, that 54.07% of the variance of real stock returns, in Indonesia, is explained by its own innovations (a percentage quite smaller than that of the 24 month forecast error variance). We must underline that innovations in M1 growth explain really substantial parts of the 25 to 48 month forecast error variance of real stock returns (19.98%) while industrial production growth and inflation rates innovations explain almost equally parts (13.86% and 12.1%). On the other hand 69.69% of the 25 to 48 month forecast error variance of the industrial production growth is explained by its own innovations while inflation rate and real stock returns' innovations seem to explain a big part of this variance (11.56% and 12.98%). 74.55% of the variance of M1 growth is explained by its own innovations while innovations in real stock returns, industrial production growth and inflation rate explain almost equally the 24 month forecast error variance of M1 growth (6.01%, 8.92% and 10.51% respectively). Finally, innovations of all the variables of the model seem to explain part of the inflation rate (17.19% of real stock returns, 18.73% of industrial production growth, 28.47% of M1 growth and 35.6% of inflation rates innovations).

JAPAN					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	77,88937	11,552696	8,61946	1,938467	0.07334
Industrial Production Growth	24,34185	68,08422	5,764617	1,809319	0.057817
M1 Growth	14,26933	27,21177	49,9318	8,587097	0.077277
Inflation Rate	9,256564	6,418365	14,04334	70,28172	0.009762

As shown from the above table, in Japan, real stock returns and inflation rates innovations explain a big part of their 25 to 48 month forecast error variances (77.89% and 70.28 respectively), while innovations in industrial production growth in the first variance and M1 growth in the second explain big parts (11.55% and 14.04%). 68.08% of the 25 to 48 month forecast error variance of industrial production growth is explain by its own innovations (a quite smaller percentage than that of the 24 month forecast error variance) while innovations in real stock returns seem to explain a big part of this variance (24.34%). Finally, 49.93% of the 25 to 48 month forecast error variance of M1 growth (a quite smaller percentage compared to that of the 24 month error variance) is explained by its own innovations while a very substantial part of this variance is explained by industrial production growth (27.21%!) and real stock returns (14.27%).

KOREA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	81,15071	10,83948	0,704079	7,305725	0.07216
Industrial Production Growth	38,36654	48,42479	0,648404	12,56027	0.08895
M1 Growth	12,53848	4,584378	65,43384	17,4433	0.08173
Inflation Rate	24,02601	5,012006	4,883483	66,07851	0.020319

As shown from the above table, 81.15% of the 25 to 48 month forecast error variance of real stock returns, is explained by their own innovations while a 10.84% of this variance is explained by innovations in industrial production growth. On the other hand 48.42% % of the 25 to 48 month forecast error variance of industrial production growth (a percentage quite smaller than that of the 24 month error variance) is explained by its own innovations while a very substantial part of this variance is explained by innovations in real stock returns (38.37%!). 65.43% of the 25 to 48 month forecast error variance of M1 growth is explained by its own innovations. 12.54% and 17.44% of this variance are explained by innovations in real stock returns and inflation rate. Finally, 66.07% of the 25 to 48 month forecast error variance of inflation rate is explained by its own innovations while real stock returns explain a substantial part (24.03%).

MALAYSIA					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	96,48492	0,595501	2,869123	0,05046	0.08864
Industrial Production Growth	18,49744	56,8501	23,95562	0,69684	0.08843
M1 Growth	23,36154	2,792367	73,68727	0,158817	0.07248
Inflation Rate	5,365774	0,845401	3,555141	90,23369	0.024371

As shown from the above table, in Malaysia, real stock returns and inflation rates innovations explain almost all their 25 to 48 month forecast error variances (96,48% and 90.23 respectively). On the other hand, 56.85% of the 25 to 48 month forecast error variance of industrial production growth (a percentage quite smaller compared to that of the 24 month forecast error variance) , is explained by its own innovations, while a substantial part (18.5% and 23.95%) is explained by innovations in real stock returns and M1 growth (which percentage is quite bigger than that of the 24 month error variance). Finally, 73.69% of the 25 to 48 month forecast error variance of M1 growth, is explained by its own innovations while a big part of this variance is explained by innovations in real stock returns (23.36%).

NEW ZEALAND					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	(%)
Real Stock Returns	77.6633	4.331118	8,92742	9,07811	0.049631
Industrial Production Growth	9,569773	70,03103	10,05049	10,34871	0.039619
M1 Growth	8,821045	20,11786	63,3469	7,714196	0.062199
Inflation Rate	3,803129	26,41098	15,862496	52,93339	0.012515

As shown from the above table, in New Zealand, 77.66% of the 25 to 48 month forecast error variance of the real stock returns is explained by their own innovations, and 9.08% from innovations in inflation rate. 70.03% of the variance of industrial production growth is explained by its own innovations (a percentage rather smaller than that of the 24 month error variance), 10.05% by innovations in M1 growth and 10.35% from innovations in inflation rate and 9.57% from innovations in real stock returns. Also, 63.35% of the 25 to 48 month forecast error variance of M1 growth, is explained by its own innovations, while 20.11% is explained by innovations in industrial production growth and 8.82% by innovations in inflation rate. Finally, 52.93% of the variance of inflation rate (a quite smaller percentage compared to that of the 24 month forecast error variance) , is explained by its own innovations and a really substantial part (15.86% and 26.41%) of this 25 to 48 month forecast error variance is explained by innovations in M1 growth and industrial production growth .

PHILIPPINES					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	79,8226	7,785175	4,977644	7,414575	0.078265
Industrial Production Growth	16,8485	64,63843	16,89895	1,601414	0.056624
M1 Growth	10,2233	10,86253	54,31587	24,59833	0.087687
Inflation Rate	7,33744	18,14988	9,387761	65,12499	0.032111

As described by the above table, in Philippines, 79.82% of the 25 to 48 month forecast error variance of real stock returns is explained by its own innovations. 64.64% of the variance of industrial production growth is explained by its own innovations while innovations in M1 growth and inflation rate explain equal parts (16.85% and 16.9%). 54.32% of the variance of M1 growth is explained by its own innovations (a part quite smaller than that of the 24 month forecast error variance) while a substantial part is explained by innovations in inflation rate (24.59%). Finally, 65.13% of the 25 to 48 month forecast error variance of inflation rate is explained by its own innovations while a substantial part (9.39% and 18.15%) is explained by M1 growth and industrial production growth.

SINGAPORE					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	

Real Stock Returns	57,02936	11,137358	11,398472	20,43481	0.079958
Industrial Production Growth	26,86504	50,32023	8,867241	13,94749	0.046311
M1 Growth	23,40893	19,33428	28,62223	28,63456	0.08942
Inflation Rate	44,86655	7,584323	7,177077	40,37205	0.04026

The above table, which concerns the case of Singapore, demonstrates that 57.03% of the variance of real stock returns are explained by their own innovations, while a 20.43% is explained by innovations in inflation rate and 11.14% by industrial production innovations. On the other hand, innovations in industrial production growth explain the half of its 24 month forecast error variance (50.32%) while real stock returns innovations and inflation rate innovations explain very substantial parts (26.86% and 13.95%) . 28.62% of the 25 to 48 month error variance of M1 growth is explained by its own innovation, while innovations in stock returns, industrial production growth and inflation rate explain 23.41%, 19.33% and 28.63% respectively. Finally, 40.37% of the 25 to 48 month forecast error variance of inflation rate is explained by its own innovations while 44.87% (a very big part) is explained by innovations in real stock returns.

TAIWAN					
	By Innovations In				
Variables Explained	Real Stock Returns	Industrial Production Growth	M1 Growth	Inflation Rate	Standard Error
	(%)	(%)	(%)	(%)	
Real Stock Returns	67,07494	4,68623	16,37523	11,8636	0.0672488
Industrial Production	24,30769	48,9876	20,66627	6,038429	0.081979

Growth					
M1 Growth	32,27605	3,326523	59,99713	4,400291	0.090011
Inflation Rate	6,571114	9,689752	22,30946	61,42967	0.01937

As shown from the above table, 67.07% of the 25 to 48 month forecast error variance of real stock returns is explained by their own innovations, while innovation in M1 growth and inflation rate explain 16.38% and 11.86% of the variance. On the other hand, 48.99% of the variance of industrial production growth (a quite smaller percentage than that of the 24 month forecast error variance), is explained by its own innovations, while a really substantial part (24.31% and 20.67%) is explained by innovations in real stock returns and M1 growth. Also 60% of the variance of M1 growth is explained by its own innovations while another 32.28% is explained by innovations in real stock returns. Finally, 61.43% of the 25 to 48 month error variance of inflation rate is explained by its own innovations while 22.31% is explained by innovations in M1 growth.

THAILAND					
	By Innovations In				
Variables Explained	Stock Returns (%)	Industrial Production Growth (%)	M1 Growth (%)	Inflation Rate (%)	Standard Error
Stock Returns	76,04867	9,32806	2,428366	12,1949	0.057411
Industrial Production Growth	13,759583	66,73438	4,129955	15,37609	0.090351
M1 Growth	12,61597	24,48796	44,94153	17,95454	0.08741
Inflation Rate	1,253656	6,992819	4,513355	87,24017	0.03012

As shown from the above table, 76.05% of the 25 to 48 month forecast error variance of real stock returns is explained by their own innovations, while 12.19% an 9.33% is explained by innovations of inflation rate and industrial production growth respectively. Two thirds of the variance of industrial production growth is explained by its own innovations while a substantial part (15.38% and 13.76) is explained by innovations in inflation rate and real stock returns. 44.94% of the 25 to 48 month error variance of M1 growth is explained by its own innovations (a quite smaller percentage compared to that of the 24 month forecast error variance) while a really substantial part (24.49%) is explained by innovations in industrial production growth. Finally, 87.24% of the variance of inflation rate is explained by its own innovations.

ü *Conclusions from the variance decomposition analysis*

The purpose of the variance decomposition analysis is to provide us with some evidence concerning the causal relationships between the macroeconomic variables and the real stock returns of the countries we have selected. The more one variable explains the variance of another, the bigger the probability to granger causes it.

More analytically, from the above analysis we come to the conclusion that real stock returns explain a big part of the error variance of industrial production growth of all the countries we have chosen. We must also underline that almost in every country of our panel, real stock returns' innovations are the only explanatory factor of the variance of industrial production growth. Real stock returns also explain a big part of the error variance of M1 growth of almost all the countries we have chosen (with the exception of China). Finally real stock returns explain substantial parts of the error variances of inflation rate in 8 out 12 countries we have chosen to examine (with the exception of New Zealand, Philippines, Taiwan and Thailand).

On the other hand, innovations in inflation rate seem to explain the error variance of real stock returns in 10 out 12 of the countries of our study (with the exception of Japan and Malaysia). Industrial production growth's innovations seem to explain big part of the error variance of real stock returns, in 9 out of the 12 countries (with the exception of Taiwan, Malaysia and New Zealand). Same as industrial production growth, M1 growth's innovations seem to explain big parts of the variances of real stock returns in eight of the 12 countries (Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, Taiwan and Thailand).

Industrial production growth explains big parts of the variance of inflation rate in Australia, Indonesia, Philippines, New Zealand, Honk Kong, Thailand, Taiwan, Singapore and China while M1 growth explains substantial parts of this variance in 8 out 12 countries (with the exception of China, Korea, Thailand, and Malaysia). This last relationship is vice versa since inflation rates' innovation explain big parts of the variances of M1 growth in half of the countries under examination. Finally, innovations in industrial production growth explain big parts in the variance of M1 growth in 8 out of the 12 countries we examine (with the exception of Australia, Korea, Malaysia and Taiwan). These findings reinforce the theories of the relationship between real activity and inflation, money growth and inflation.

Finally, we must underline that the difference between the percentages of the 24 month forecast error variance and the 25 to 48 month forecast error variance, is due to the fact that, in the first one the percentages for every variable are too small or too big during the first months and then start to decline or rise. Since the percentages of the tables are averages of the periods the difference between them is logical. Finally in all the error variances of all the variables, in every country, the percentage of explanation of every variable due to innovations of another one becomes stable after the 24^{th} month.

To conclude, the variance decomposition analysis seems to reinforce the impulse response analysis. Next, we proceed with the granger causality analysis of the variables.

ü *GRANGER CAUSALITY TESTS IN VAR MODELS*

Country		Australia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	2.54684 (0.01412)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	2.07645 (0.04434)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Australia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	2.88875 (0.006)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	1.04084 (0.41035)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	No

Country		Australia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	4.31611 (0.0016)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.78496 (0.00772)
Causality Direction	Real Stock Returns → Inflation Rate	Yes
	Inflation Rate → Real Stock Returns	Yes

We come to the conclusion from the above tables that in Australia, real stock returns granger cause and they are granger caused by industrial production growth and inflation rate while they cause and they are not caused by M1 growth.

Country		China F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	3.09857 (0.00758)
		F-Statistic (prob.)
	Industrial Production Growth	2.52526

	does not Granger cause Real Stock Returns	(0.02484)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		China F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	2.16666 (0.05333)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	1.90757 (0.08556)
Causality Direction	Real Stock Returns → M1 Growth	No
	M1 Growth → Real Stock Returns	No

Country		China F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	4.57855 (0.00034)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.48085 (0.0272)

Causality Direction	Real Stock Returns $\rightarrow$ Inflation Rate	Yes
	Inflation Rate $\rightarrow$ Real Stock Returns	Yes

We come to the conclusion from the above table that in China real stock returns granger cause and are granger caused by inflation rate and industrial production growth, while there isn't a causal relationship between real stock returns and M1 growth.

Country		Honk Kong F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	10.8382 (2.3E-06)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	8.88715 (2.3E-05)
Causality Direction	Real Stock Returns $\rightarrow$ Industrial Production Growth	Yes
	Industrial Production Growth $\rightarrow$ Real Stock Returns	Yes

Country		Honk Kong F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not	5.11901

	Granger cause M1 Growth	(0.00229)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	1.21896 (0.30588)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	No

Country		Honk Kong F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	4.40838 (0.00557)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.93026 (0.03642)
Causality Direction	Real Stock Returns → Inflation Rate	Yes
	Inflation Rate → Real Stock Returns	Yes

As we can see from the three above tables, in Honk Kong, real stock returns granger cause and they are granger caused by industrial production growth inflation rate while they cause and they are not caused by M1 growth (like the case of Australia).

Country		Indonesia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	10.3824 (3.9E-06)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	6.55308 (0.00038)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Indonesia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	1.35749 (0.25907)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	27.0883 (1.7E-03)
Causality Direction	Real Stock Returns → M1 Growth	No
	M1 Growth → Real Stock Returns	Yes

Country		Indonesia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	11.6900 (8.7E-07)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	4.76963 (0.00353)
Causality Direction	Real Stock Returns → Inflation Rate	Yes
	Inflation Rate → Real Stock Returns	Yes

As we can see from the three above tables, that in Indonesia real stock returns granger cause and they are granger caused by industrial production growth and inflation rate. On the other hand they seem to be caused and not to cause M1 growth.

Country		Japan F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	2.53573 (0.01441)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	2.44288 (0.01815)
Causality	Real Stock Returns →	

Direction	Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Japan F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	2.03148 (0.04936)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	2.22503 (0.03097)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	Yes

Country		Japan F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	2.01775 (0.05)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	0.93077 (0.4944)
Causality Direction	Real Stock Returns → Inflation Rate	Yes

	Inflation Rate → Real Stock Returns	No

By examining the above tables we come to the conclusion that in Japan, real stock returns granger cause and are caused by industrial production growth and M1 growth. On the other hand they cause but they are not caused by inflation rate.

Country		Korea F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	7.74727 (8.9E-05)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	3.73543 (0.01307)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Korea F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	3.74709 (0.01288)

		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	0.34296 (0.79429)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	No

Country		Korea F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	4.87956 (0.00307)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	3.36078 (0.02104)
Causality Direction	Real Stock Returns → Inflation Rate	Yes
	Inflation Rate → Real Stock Returns	Yes

The above three tables show us that, in the case of Korea, real stock returns granger cause and are granger caused by industrial production growth and inflation rate. On the other hand real stock returns only cause M1 growth and they are not caused by it.

Country		Malaysia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	4.30949 (0.01549)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	0.14184 (0.8679)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	No

Country		Malaysia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	5.24269 (0.00651)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	1.75342 (0.17741)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	No

Country		Malaysia F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	0.83388 (0.43676)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	0.00586 (0.99416)
Causality Direction	Real Stock Returns → Inflation Rate	No
	Inflation Rate → Real Stock Returns	No

The above three tables show us that, in the case of Malaysia, real stock returns granger cause industrial production growth and M1 growth, but they are not caused by any variable of our model.

Country		New Zealand F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	2.61514 (0.01550)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	0.59272 (0.76066)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth →	

	Real Stock Returns	No

Country		New Zealand F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	2.10554 (0.04874)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	2.32996 (0.02959)
Causality Direction	Real Stock Returns $\rightarrow$ M1 Growth	Yes
	M1 Growth $\rightarrow$ Real Stock Returns	Yes

Country		New Zealand F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	1.97790 (0.06441)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	4.00245 (0.00062)
Causality Direction	Real Stock Returns $\rightarrow$ Inflation Rate	No
	Inflation Rate $\rightarrow$ Real Stock Returns	Yes

We come to the conclusion, from the above table that in New Zealand, real stock returns granger cause industrial production growth and M1 growth and they are caused by inflation rate and M1 growth.

Country		Philippines F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	2.32943 (0.024)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	2.07381 (0.04464)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Philippines F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	2.22503 (0.03097)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	1.44307 (0.18710)
Causality	Real Stock Returns → M1	

Direction	Growth	Yes
	M1 Growth $\rightarrow$ Real Stock Returns	No

Country		Philippines F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	1.83112 (0.07901)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.08213 (0.04374)
Causality Direction	Real Stock Returns $\rightarrow$ Inflation Rate	No
	Inflation Rate $\rightarrow$ Real Stock Returns	Yes

We come to the conclusion from the three above tables that, in Philippines real stock returns granger cause and are granger caused by industrial production growth. On the other hand they are caused but they do not cause inflation rate while they cause and they are not caused by M1 growth.

Country		Singapore F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	2.7291 (0.01634)

		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	2.30384 (0.03897)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Singapore F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	2.35931 (0.03484)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	2.24442 (0.04393)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	Yes

Country		Singapore F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	14.3472 (4.2E-12)
		F-Statistic

		(prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.45229 (0.02884)
Causality Direction	Real Stock Returns → Inflation Rate	Yes
	Inflation Rate → Real Stock Returns	Yes

As shown from the above tables, in the case of Singapore, all the variables of our model granger cause and are caused by real stock returns.

Country		Taiwan F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	3.32689 (0.00195)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	1.38610 (0.2108)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	No

Country		Taiwan F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not	4.07926

	Granger cause M1 Growth	(0.00029)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	2.63919 (0.01113)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	Yes

Country		Taiwan F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	1.94115 (0.06113)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.06371 (0.04571)
Causality Direction	Real Stock Returns → Inflation Rate	No
	Inflation Rate → Real Stock Returns	Yes

We come to the conclusion from the above tables that for the case of Taiwan, stock returns granger industrial production growth and M1 growth. On the other hand they are granger caused by M1 growth and inflation rate.

Country		Thailand F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Industrial Production Growth	3.95422 (0.00476)
		F-Statistic (prob.)
	Industrial Production Growth does not Granger cause Real Stock Returns	4.43899 (0.00222)
Causality Direction	Real Stock Returns → Industrial Production Growth	Yes
	Industrial Production Growth → Real Stock Returns	Yes

Country		Thailand F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause M1 Growth	3.68205 (0.00729)
		F-Statistic (prob.)
	M1 Growth does not Granger cause Real Stock Returns	1.12631 (0.34744)
Causality Direction	Real Stock Returns → M1 Growth	Yes
	M1 Growth → Real Stock Returns	No

Country		Thailand F-Statistic (prob.)
Null Hypothesis	Real Stock Returns do not Granger cause Inflation Rate	0.45003 (0.77219)
		F-Statistic (prob.)
	Inflation Rate does not Granger cause Real Stock Returns	2.98725 (0.02169)
Causality Direction	Real Stock Returns $\rightarrow$ Inflation Rate	No
	Inflation Rate $\rightarrow$ Real Stock Returns	Yes

According to the above tables, in Thailand real stock returns granger cause and are granger caused by industrial production growth. On the other hand they are only caused by inflation rate and they finally cause M1 growth.

$\Rightarrow$ *We must underline that the lags we have chosen for the granger causality tests are identical to those of the VAR models.*

ü *Conclusions from the granger causality analysis*

The granger causality analysis among the four variables of our models (stock returns, industrial production growth, M1 growth and inflation rate) for the twelve countries we examine has led us to the following conclusions.

First real stock returns seem to granger cause industrial production growth in all the countries we examine. On the other hand, though, industrial production growth seems to granger cause stock returns in 9 out of 12 countries we examine (with the exception of Malaysia, Taiwan and New Zealand).

Also, stock returns granger cause M1 growth in 10 of the 12 countries of our study with the exception of China where M1 growth doesn't granger cause or isn't granger caused by real stock returns and Indonesia. On the other hand, M1 growth seems to granger cause real stock returns in only half of the countries we examine (with the exception of China as we mentioned before, Australia, Honk Kong, Korea, Malaysia, Philippines and Thailand).

Finally real stock returns are found to granger cause inflation rate in 7 out of the 12 countries (with the exception of Malaysia, New Zealand, Philippines, Taiwan and Thailand) while inflation rate granger causes real stock returns in almost every country of our study (with the exception of Malaysia and Japan) .

CONCLUSIONS & CONCLUDING REMARKS

The analysis of the variance decomposition, of the impulse responses and of the granger causality tests of the variables of the VAR models of the twelve countries we examine has led us to the following conclusions.

Firstly, our findings reinforce the theorems that the relationship between M1 growth and stock returns is positive, while that between stock returns and inflation is negative and that of industrial production growth and stock returns is positive, with only a few exceptions for all these relationships.

Secondly, according to the granger causality tests whose results where already reinforced by the findings of the forecast error variances and the impulse responses analysis, real stock returns granger cause industrial production growth in every country we examine while they also seem to explain substantial parts of their forecast error variances. In fact, industrial production growth seems to respond significally to unexpected shifts in domestic real stock returns in most of the countries we examine such as Honk Kong, Indonesia, Korea, Malaysia, Philippines, Singapore and Taiwan. The response of industrial production growth is also significant but not so big as the countries we have mentioned, in Australia, China, Japan and Thailand while in New Zealand it seems to be rather insignificant. A sensible explanation of this finding stems from the fact that stock market developments affect the consumption and investment behavior of economic agents, which in turn affect economic activity. Additionally, stock markets can be considered as efficient in terms of information as they reflect society’s expectations for the evolution of economic activity in a very efficient way.

On the other hand industrial production growth granger causes in 9 out of the twelve countries we examine, with the exception of Malaysia, New Zealand and Taiwan. Actually the response of stock returns to a shock in industrial production growth is quite significant in these nine countries where industrial production growth also explains big parts of the forecast error variance of real stock returns. These findings lead us to the conclusion that in the majority of the countries of the Pacific basin, stock market prices are a vital source of observed fluctuations in real economic activity. These findings also reinforce the fact that the Taiwanese stock market is inefficient since it fails to capture information regarding changes in industrial production growth through the 90's and early zeros. Also, as we are going to mention, the Malaysian stock market and that of New Zealand also seem to be inefficient according the findings so far.

M1 growth is also caused by real stock returns in almost every country we examine with the exception of China and Malaysia. According to the impulse response analysis, M1 growth responds quite significally in Australia, Honk Kong, Indonesia, Korea, Malaysia, Singapore, Taiwan and Thailand while in other countries the response is big but not so significant like the countries we have mentioned. On the other hand M1 growth seems to granger cause real stock returns in 5 out 12 countries we examine (Indonesia, Japan, New Zealand, Singapore and Taiwan). These findings lead us to the conclusion that in the majority of the countries under study, the stock markets fail to interact with this macroeconomic variable (as it is the case of the USA presented by Lee in 1992). This means, that past values of M1 growth are unable to predict future changes in the real stock returns in Australia, China, Honk Kong, Korea, Malaysia, Philippines and Thailand. This can be translated into an incapacity of the mechanism of monetary policy (i.e changes of money supply) to alter distinguishably the equilibrium position of money, thereby altering the composition and price of assets in an investor's portfolio. So in these countries, changes in money supply don't have a impact on real economic variables, thereby having a lagged influence on stock returns.

Real stock returns, as we have mentioned in our analysis granger cause inflation rate in 7 out the 12 countries we examine (with the exception of Malaysia, New Zealand, Philippines, Taiwan & Thailand). The biggest responses of inflation rate to a shock in real stock returns are found in Singapore and Indonesia (the biggest one). On the other hand, inflation rate seems to granger real stock returns in almost every country we examine. The biggest reaction of real stock returns to a shock in inflation rate occurs in China, Indonesia, Singapore, Korea, Philippines, Taiwan and Thailand. This mixed image of the direction of causality between real stock returns and inflation is primarily due to the following fact. In the majority of these countries such as Taiwan, Thailand, Philippines the inflation was high for a substantial period of time (7 – 10%) or it was extremely high (like in Singapore and China where there were periods when it reached 40% and 50% or in Indonesia where inflation peaked at 80%!) or even very negligible like the case of Japan where inflation rate is practically zero.

At this point we must , also, underline that M1 growth innovations, explain equally with real stock returns innovations the variance of inflation in Australia, Honk Kong, Japan and Philippines while in Indonesia New Zealand, Taiwan and Thailand M1 growth is the main factor which explains the variation of inflation. This finding reinforces the fact that M1 (money supply in general) is highly and of course positively correlated with inflation rate.

Finally, another aspect that is worth analyzing is that of the relationship between real activity and inflation. The forecast error variance analysis points out that inflation explain very real parts of real activity in Australia, Honk Kong, Japan, Malaysia, Philippines and Taiwan and although it explains substantial parts of the variance of industrial production growth in the other countries, these percentages all smaller of those of the other variables. On the other hand, real activity explains big part of the inflation variation in China, Honk Kong, Indonesia, New Zealand, Philippines, Taiwan and Thailand. This finding reinforce those previous according to which, in Japan, the relationship between real activity and inflation is insignificant. (Finally, we must also cite that the image of the relationship between M1 growth and real activity is mixed in the countries we examine, in others it doesn't seem to be a direct link between them, in others just the one explains big part of the variance of the other, while in Honk Kong, Philippines, Taiwan and New Zealand these to variables explain substantial parts of each other's variance).

According to the above analysis, we come to the conclusion that in the majority of the countries under examination i.e. Australia, Honk Kong, Indonesia, Japan, Korea, Singapore stock returns seem to dynamically interact with their own key macroeconomic factors. On the hand, in the rest countries (i.e. China, New Zealand, Philippines, Taiwan and Thailand) we find a mixed image of interactions between stock returns with some of the chosen macroeconomic variables of our model and not all (i.e. stock returns and industrial production, the most usual, and stock returns and inflation or stock returns and M1 growth and stock returns and inflation).

With the exception of Malaysia, we see reverse causalities in every country's VAR model (at least two in every model). This finding support the conclusion that in these countries stock market is regarded as an important leading factor among leading economic indicator whose changes can be predicted by values of the macroeconomic variables and that there are linkages among stock returns and macroeconomic variables in these countries of the Asia Pacific basin area.

On the other hand, though, the lack of vice versa causalities in the VAR models Malaysia, New Zealand, Philippines, Taiwan and Thailand, where we find only one, lead us to the following concluding and final remarks. Although Taiwan's stock market capitalization is quite big (260.015.000.000$), it fails to be as efficient we would expected to be since (a finding that reinforces those of Fung and Lie (1990)). The lack of vice versa causalities in the VAR models in the other countries is primarily due to the fact that the market capitalization of their stock markets is rather small (as shown in the tables of countries' indicators in the appendix).

Under this perspective, the main policy objectives in these countries of macroeconomic stability and economic development will be pursued in the light of new developments, as increasing capitalization will play a major role for development prospects by promoting allocative efficiency, creating new financial instrument and improving the quality if services provided by financial intermediaries. The Asian crisis of 1997 has also shown that asset markets and particularly stock markets are becoming more and more important in determining the behavior of macroeconomic aggregates and their effects on the economies, especially of countries in transition or developing where policymakers and domestic corporations tend to rely more on foreign savings, through capital inflows from abroad, are becoming stronger . These measures will help the economies of these countries, their stock markets to be more precise, to become more efficient and mature by absorbing more external capital inflows which will help the development of their economies and industries / firms in order to increase the level of domestic processing of raw materials (natural resources) which are quite plenty, into end products. This, will finally push, in the long run, and after the application of proper economic and monetary policies from the part of domestic governments, the economic and monetary convergence among these countries of the Asian Pacific basin, in order to start organizing in the future a common monetary area.

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APPENDIX

TABLES OF

SOME BASIC INDICATORS

AND CHARACTERISTICS

OF THE 12 COUNTRIES

UNDER EXAMINATION

Australia	
Form of government	Republic, Federal System
Capital	Camberra
Area	7.686.849 km^2
Population (2002)	19.544.000
Official Language	English
Currency	Australian Dollar
Religion	Christian
Total Market Capitalization, 2000 (US $ millions, end of period)	427.683
Total Market Capitalization, 2000 (as % of the GDP)	105,9
Total Value Traded, 2000 (as % of the GDP)	26,2
Number of listed domestic companies (2000)	1.217
Average annual growth of GDP (1993 – 2003) (%)	5,85
GDP per capita (2003) in US $	20.700
Unemployment Rate (%) (2003)	6,2
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	1,45433 Australian Dollars

China	
Form of government	Republic Democracy
Capital	Beijing
Area	9.596.961 km^2
Population (2002)	1.294.870.000
Language	Chinese
Currency	Renminbi
Religion	Buddhism

Total Market Capitalization, 2000 (US $ millions, end of period)	580.991
Total Market Capitalization, 2000 (as % of the GDP)	33,4
Total Value Traded, 2000 (as % of the GDP)	38,1
Number of listed domestic companies (2000)	1.086
Average annual growth of GDP (1993 – 2003) (%)	16,8087
GDP per capita (1998) in US $	772
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	8,2768 Chinese Renminbis

Honk Kong	
Form of government	Democracy (Chinese government)
Capital	Victoria
Area	1.046 km^2
Population (2002)	6.980.560
Language	Chinese
Currency	Honk Kong Dollar
Religion	Buddhism
Total Market Capitalization, 2000 (US $ millions, end of period)	609.090
Total Market Capitalization, 2000 (as % of the GDP)	383,2
Total Value Traded, 2000 (as % of the GDP)	51,4
Number of listed domestic companies (2000)	695
Average annual growth of GDP (1993 – 2003) (%)	4,5307

GDP per capita (1998) in US $	26.510
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	7,7989 Honk Kong Dollars

Indonesia	
Form of government	Independent Republic
Capital	Jakarta
Area	2.027.087 km^2
Population (2002)	217.131.000
Language	Bahaza
Currency	Rupiah
Religion	Muslim, Christian, Buddhism
Total Market Capitalization, 2000 (US $ millions, end of period)	26.834
Total Market Capitalization, 2000 (as % of the GDP)	45
Total Value Traded, 2000 (as % of the GDP)	32,9
Number of listed domestic companies (2000)	290
Average annual growth of GDP (1993 – 2003) (%)	19,234
GDP per capita (1998) in US $	435
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	9,423 Indonesian Rupias

Japan	
Form of government	Constitutional Monarchy
Capital	Tokyo
Area	372.313 km^2
Population (2002)	127.478.000

Language	Japanese
Currency	Yen
Religion	Buddhism, Sintoism
Total Market Capitalization, 2000 (US $ millions, end of period)	4.546.937
Total Market Capitalization, 2000 (as % of the GDP)	104,6
Total Value Traded, 2000 (as % of the GDP)	52,5
Number of listed domestic companies (2000)	2.470
Average annual growth of GDP (1993 – 2003) (%)	0,1607
GDP per capita (2003) in US $	31.200
Unemployment Rate (%) (2003)	4,9
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	108,605 Yen

Korea	
Form of government	Republic
Capital	Seoul
Area	98.484 km^2
Population (2002)	47.430.200
Language	Korean
Currency	Won
Religion	Buddhism, Sintoism
Total Market Capitalization, 2000 (US $ millions, end of period)	148.649
Total Market Capitalization, 2000 (as % of the GDP)	75,8
Total Value Traded, 2000 (as % of the GDP)	180,3

Number of listed domestic companies (2000)	704
Average annual growth of GDP (1993 – 2003) (%)	9,128
GDP per capita (2003) in US $	10.000
Unemployment Rate (%) (2003)	3,7
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	1159,5 Korean Wons

Malaysia	
Form of government	Constitutional Monarchy
Capital	Kuala Lumpur
Area	329.749 km^2
Population (2002)	23.965.300
Language	Malaysian, English, Chinese
Currency	Malaysia Ringgit
Religion	Muslim
Total Market Capitalization, 2000 (US $ millions, end of period)	116.935
Total Market Capitalization, 2000 (as % of the GDP)	184
Total Value Traded, 2000 (as % of the GDP)	61,4
Number of listed domestic companies (2000)	795
Average annual growth of GDP (1993 – 2003) (%)	6,785
GDP per capita (1998) in US $	3.072
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	3,8 Malaysian Ringgits

New Zealand	
Form of government	Parliamentary Democracy
Capital	Wellington
Area	268.676 km^2
Population (2002)	3.845.680
Language	English, Maori
Currency	New Zealand Dollar
Religion	Christian
Total Market Capitalization, 2000 (US $ millions, end of period)	28.352
Total Market Capitalization, 2000 (as % of the GDP)	51,9
Total Value Traded, 2000 (as % of the GDP)	21,9
Number of listed domestic companies (2000)	114
Average annual growth of GDP (1993 – 2003) (%)	6,278
GDP per capita (2003) in US $	14.700
Unemployment Rate (%) (2003)	4,5
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	1,59974 New Zealand Dollars

Philippines	
Form of government	Democracy
Capital	Manilla
Area	300.000 km^2
Population (2002)	78.580.200
Language	Philippino, English
Currency	Peso
Religion	Christian
Total Market Capitalization, 2000 (US	

$ millions, end of period)	51.554
Total Market Capitalization, 2000 (as % of the GDP)	62,8
Total Value Traded, 2000 (as % of the GDP)	25,7
Number of listed domestic companies (2000)	230
Average annual growth of GDP (1993 – 2003) (%)	11,3077
GDP per capita (1998) in US $	875
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	56,24 Philippines Pesos

Singapore	
Form of government	Parliamentary Democracy
Capital	Singapore
Area	581 km^2
Population (2002)	4.183.270
Language	Chinese, Malaysian, Tamil, English,
Currency	Singapore Dollar
Religion	Buddhism, Muslim
Total Market Capitalization, 2000 (US $ millions, end of period)	198.407
Total Market Capitalization, 2000 (as % of the GDP)	233,6
Total Value Traded, 2000 (as % of the GDP)	115,4
Number of listed domestic companies (2000)	355
Average annual growth of GDP (1993 – 2003) (%)	6,42
GDP per capita (1998) in US $	26.423

Unemployment Rate (%) (2003)	0,54
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	1,7206 Singapore's Dollars

Taiwan	
Form of government	One Party Democracy
Capital	Taipei
Area	35.961 km^2
Population (2002)	24.680.000
Language	Chinese, Taiwan, Haka
Currency	Taiwan Dollar
Religion	Buddhism
Total Market Capitalization, 1998 (US $ millions, end of period)	260.015
Total Market Capitalization, 1998 (as % of the GDP)	100
Total Value Traded, 1998 (as % of the GDP)	n.a.
Number of listed domestic companies (2000)	437
Average annual growth of GDP (1993 – 2003) (%)	4,8962
GDP per capita (1998) in US $	11.702
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	33,77 Taiwanese Dollars

Thailand	
Form of government	Constitutional Monarchy
Capital	Bangkok
Area	514.000 km^2
Population (2002)	62.193.300

Language	Thai, English
Currency	Baht
Religion	Buddhism
Total Market Capitalization, 2000 (US $ millions, end of period)	29.489
Total Market Capitalization, 2000 (as % of the GDP)	46,9
Total Value Traded, 2000 (as % of the GDP)	33,5
Number of listed domestic companies (2000)	381
Average annual growth of GDP (1993 – 2003) (%)	6,575
GDP per capita (1998) in US $	1.906
Unemployment Rate (%) (2003)	3,7
Exchange Rate (Units of domestic currency equal to 1US$) (2004)	40,98 Thai Bahts