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MONEY GROWTH AND MALAYSIAN STOCK PRICES: A TEST OF POLICY INEFFECTIVENESS PROPOSITION

NOOR AZLAN GHAZALI
Faculty of Economics and Business
Universiti Kebangsaan Malaysia

WONG SEN MIN
Foreign Exchange Administration Department
Bank Negara Malaysia

ABSTRACT

The policy ineffectiveness proposition proposed by Lucas (1972) and Sargent and Wallace (1975) along the rational expectation model is tested in this study. The proposition claims that unanticipated changes in monetary aggregates exert significant influence on real economic activities while anticipated policy is neutral. In line with this, the efficient market hypothesis indicates that in an efficient market share prices incorporate anticipated information instantaneously leaving only the unanticipated components of the information set to affect share prices. We investigate this proposition on the Malaysian stock returns. Specifically the response of share returns toward changes in actual and decomposed (anticipated and unanticipated) growth of monetary aggregate is analysed. The single equation regressions and the system estimation of Vector Autoregressions (VAR) both point toward the validity of the proposition. The results indicate that positive reactions of share returns to actual money growth are due to the unanticipated components. Movement of share prices is neutral with respect to the anticipated monetary growth. The findings generally favour the policy ineffectiveness proposition that leads to an efficient pricing process for Malaysian shares.

ABSTRAK

Usul ketidakberkesanan polisi yang dicadangkan oleh Lucas (1972) and Sargent and Wallace (1975) seiring dengan model jangkaan rasional diuji dalam kajian ini. Usul ini berpendapat bahawa perubahan agregat monetari luar jangka memberi kesan yang signifikan ke atas aktiviti ekonomi benar,

sementara perubahan polisi yang dijangka adalah neutral. Selari dengan usul ini, hipotesis pasaran cekap menyatakan bahawa di dalam pasaran cekap, harga saham menyerap semua maklumat yang dijangka secara serta merta, meninggalkan hanya komponen maklumat luar jangka sahaja yang mempengaruhi harga saham. Kajian ini menyelidik usul tersebut bagi pulangan saham di Malaysia. Secara khususnya, tindak balas pulangan saham terhadap perubahan agregat monetari sebenar dan yang terurai (dijangka dan luar jangka) dikaji. Regresi satu persamaan dan anggaran Sistem Vector Autoregresi (VAR) kedua-duanya menunjukkan kesahihan usul ini. Keputusan menunjukkan bahawa reaksi positif pulangan saham terhadap pertumbuhan wang sebenar adalah berpunca daripada komponen luar jangka. Perubahan harga saham adalah neutral terhadap pertumbuhan monetari yang dijangka. Penemuan ini secara umumnya cenderung kepada usul ketidakbekesanan polisi yang mewujudkan proses perletakan harga yang efisien bagi saham-saham di Malaysia.

INTRODUCTION

The stylised fact that changes in the growth of money supply precede economic cycles has been documented by various researchers. Beginning with Friedman and Schwartz (1963) many have investigated the impact of money on various measures of economic performance. With the development of rational expectation hypothesis (REH) by Muth (1961) and Lucas (1972), a string of studies were performed investigating the *policy ineffectiveness proposition* due to Lucas (1972) and Sargent and Wallace (1975) whom argued that only unanticipated policy is effective in exerting changes on real output while anticipated growth is neutral.[1] The debate on policy ineffectiveness proposition has also been extended to the study of behaviour of stock prices. On theoretical grounds, monetary influence on stock prices is channeled through its influence on the risk free interest rates that is a component of the required rate of return demanded by the shareholders. As an example, an expansionary monetary policy that pushes interest rates down will lead to a decline in the cost of funds. Thus, given the expected dividends stream, share prices react positively.[2] Sprinkel (1964), Homa and Jaffee (1971), Hamburger and Kochin (1972), Rozeff (1974, 1975) provided earlier empirical evidence supporting the effect of money on stock prices. Evidence based on vector auto regression (VAR) techniques by Dhakal, Kandil and Sharma (1993), Thorbecke and Coppock (1996), and Patelis (1997) also supported the significant effect of money on stock prices. In an efficient market, stock prices capture all vital information of the future state of the real economy. Thus, if changes in monetary policy are followed by significant changes in share

prices, the effect must be due to the unanticipated component of monetary growth.[3]

The link between money and Malaysian stock performance has been investigated by a number of researchers. Existing findings on the Malaysian experience are rather mixed. Habibullah and Baharumshah (1996) evaluated the efficiency of the Malaysian stock market based on cointegration analysis among real output, money supply and share prices. Market efficiency is supported as the cointegration hypothesis is rejected between share prices and these macroeconomic variables. Based on dynamic VAR analysis, Ghazali and Yaakob (1998) concluded that the reactions of Malaysian share prices are short term in nature. In the long-run, positive reactions to monetary expansion diminish, reflecting the long-run neutrality of money. Ibrahim (1999) concluded in favour of a long-run link between share prices and three macroeconomic variables, i.e. the price level, credit, and official reserves. Share prices are shown to react significantly to deviations from the long-run equilibrium path specified by the cointegration equation. In line with Ghazali and Yaakob (1998), Ibrahim and Aziz (2003) also reported similar evidence of immediate liquidity effects of money on share prices. In the long-run, however, money exerts a negative influence on share prices due to its contribution to inflation instability and the resulting contractionary effects. The authors caution on the destabilising effect of monetary shocks that could possibly arise from the share prices-real economy linkages. We provide further evidence on this issue with respect to the Malaysian stock market. Our focus is on the issue of policy anticipation implied by the rational expectation model and policy ineffectiveness proposition described earlier. We employ both, the single and system equations in investigating relationships between money and share prices. Based on the decomposed series (anticipated and unanticipated), our single equation and system analysis show that the Malaysian stock prices are subject to the ineffectiveness proposition. Stock returns are neutral to anticipated money growth but responds significantly to unanticipated money growth pointing towards the efficiency of the Malaysian stock market. This paper is organised as follows: Section 2 presents the data set and empirical methodology used in this study. The results and discussion are presented in Section 3 and Section 4 ends the paper with a brief summary and conclusion.

DATA AND EMPIRICAL METHODOLOGY

Our analysis in this study employs two sets of data. The first set of data is composed of monetary aggregates (M1-money) and four

macroeconomic variables (Kuala Lumpur Interbank Offer Rate (IBR), Consumer Price Index (CPI), Industrial Production Index (IPI), and exchange rates (RM/US$ denoted as EXR).[4] This data set is used to generate the money growth equation that allows decomposition of the actual money growth into anticipated and unanticipated components. The second data set involves four major share indices of the Kuala Lumpur Stock Exchange (KLSE), which are the Composite Index (COMP), Industrial Index (IND), Finance Index (FIN) and Property Index (PROP), and they are used as proxy for share prices. Monthly observations of the annual growth rate of these indices are used as measures of stock market performance. The data used in this paper spans from 1988:1 to 1996:12.[5] The macroeconomic data set is sourced from the Monthly Statistical Bulletin of Bank Negara Malaysia (the Central Bank of Malaysia) while the stock indices are gathered from the Investors Digest published by the KLSE.

Our analysis comprises of two stages similar to the rational expectations model developed by Barro (1977) and Sorensen (1982). In the first stage we estimate the money growth equation. This is specified as a function of four macroeconomics variables as follows:[6]

$$\Delta M_t = \alpha + \sum_{i=1}^{p} \beta_{t-i} IBR_{t-i} + \sum_{i=1}^{q} \theta_{t-i} \Delta CPI_{t-i} + \sum_{i=1}^{r} \phi_{t-i} \Delta IPI_{t-i} + \sum_{i=1}^{s} \delta_{t-i} EXR_{t-i} + \varepsilon_t \qquad (1)$$

Where Δ denotes annual percentage change of the respected variables. We adopt a sequential process similar to Hsiao (1979a, 1979b) in determining the optimal lag length (*p, q, r,* and *s*) for each of the independent variables in the money growth equation. First we estimate an autoregressive process with only the first lagged dependent variable entering the equation and choosing the optimal number of lag, *p*, that minimises the Akaike's Information Criteria (AIC). (Akaike, 1970). With *p* chosen, Equation 1 is expanded to include lagged values of the alternate independent variable and the lag length test is repeated in choosing the second lag length *q*. The similar process is repeated until all lag length is determined. The anticipated money growth (ΔAM) is then calculated using parameters estimated from Equation (1).[7] Subtracting the anticipated money growth (ΔAM) from actual money growth (ΔM) yields the unanticipated money growth (ΔUM) component as follows:

$$\Delta UM = \Delta M - \Delta AM \qquad (2)$$

Our next task is to examine the effect of money growth on changes in stock prices. We perform this analysis in two ways. Firstly, we run a series of regression and correlation analyses with changes in stock

prices (ΔINDEX) as our dependent variable and the components of monetary growth as the independent variables as follows:

$$\Delta INDEX_t = \alpha_0 + \alpha_1 \Delta M_{t-i} + \upsilon_t \quad (3a)$$

$$\Delta INDEX_t = \alpha_0 + \alpha_1 \Delta AM_{t-i} + \upsilon_t \quad (3b)$$

$$\Delta INDEX_t = \alpha_0 + \alpha_1 \Delta UM_{t-i} + \upsilon_t \quad (3c)$$

The above regression analysis isolates the impact of three measures of changes in money supply (actual, anticipated and unanticipated) on stock prices. We run each regression up to 12 month lags.[8] The coefficient of interest, α_1, denotes the response of changes in the stock prices to previous money growth. If α_1 is significantly different from zero, money therefore affects stock prices significantly. Our emphasis will be on differentiating the influence of anticipated and unanticipated money growth. We also report the correlation between current changes in stock prices and all three money growth measures. This gives us the linear associations between changes in money and stock market performance.

Our next analysis employs the vector autoregression (VAR) methodology of Sims (1980) that includes the variables of interest. A vector of m variables $X_t = (x_{1t}, x_{2t}, ..., x_{mt})'$ can be represented in a VAR system as follows :

$$\begin{bmatrix} x_{1t} \\ x_{2t} \\ . \\ x_{mt} \end{bmatrix} = \begin{bmatrix} \phi_{10} \\ \phi_{20} \\ . \\ \phi_{m0} \end{bmatrix} + \begin{bmatrix} \phi_{11}(L) & \phi_{12}(L) & . & \phi_{1m}(L) \\ \phi_{21}(L) & \phi_{22}(L) & . & \phi_{2m}(L) \\ . & . & . & . \\ \phi_{m1}(L) & \phi_{m2}(L) & . & \phi_{mm}(L) \end{bmatrix} \begin{bmatrix} x_{1t} \\ x_{2t} \\ . \\ x_{mt} \end{bmatrix} + \begin{bmatrix} v_{1t} \\ v_{2t} \\ . \\ v_{mt} \end{bmatrix} \quad (4)$$

where ϕ_{i0} represents the intercept terms and $\phi_{ij}(L)$ is the polynomials in the lag operator L such that $L^k x_t = x_{t-k}$. The error terms v_{it} has mean zero, $E[v_t] = 0$, and the covariance matrix $\Sigma_v = E[v_t v_t']$ for all t. Furthermore, v_t and v_s are uncorrelated for $t \neq s$.[9]

We run two separate VAR systems. The first includes actual money growth $\{\Delta M_t, IBR_t, \Delta IPI_t, \Delta CPI_t, \Delta Index_t\}$ while the second decomposes the money growth term into anticipated and unanticipated component $\{\Delta AM_t, \Delta UM_t, IBR_t, \Delta IPI_t, \Delta CPI_t, \Delta Index_t\}$. Based on the estimated VAR system we report two forms of analyses; the variance decomposition (VDC) analysis and impulse response function (IRF)

analysis. The VAR analysis is appealing in our study since it provides the dynamic interrelationships between money growth and stock prices taking into account its interrelationship with several other key macroeconomic variables. The VDC quantifies the contributions of the system's innovations to the 12-months step-ahead forecast errors for each variable in the model. Our focus will be on the contribution of money growth on movement of stock prices particularly with respect to anticipated and unanticipated money growth. The dynamic relationship between the two is further strengthen by the IRF that depicts the response of stock prices towards one standard deviation shock in the growth of the monetary aggregate.

EMPIRICAL RESULTS

Regression and Correlation Analyses

The regression and correlation results are presented in Tables 1a through 1d, and Table 2. The first columns of Tables 1a through 1d show the response coefficient of changes in stock prices towards actual money growth. The reported coefficients indicate that past actual money growth is a significant factor that explains movement in the current movement of stock prices. Stock prices react positively to past changes in money supply and this significant effect ranges up to the maximum of six month lags. The longest impact applies to the Finance Index. The coefficients of determination (R^2) are relatively high for the first two lags of money growth with the largest explanation again goes to the Finance Index of about 43%. On average the one month lagged actual money growth explains about 38% of the current changes in stock prices. The percentage of variations in stock prices explained by actual monetary growth dropped below 10% after three to four months. This shows that despite being a significant variable there are other explanatory factors other than monetary growth that also contribute towards movement in stock prices. In addition it also indicates that the positive effect on share prices does not last long, parallel with the view of money neutrality in the long-run.

Decomposition of money growth into anticipated and unanticipated components highlights the theme of this study. The significantly positive contribution of lagged actual money growth in the immediate lags disappears when anticipated money growth is entered as an independent variable. None of the coefficients of response a_1 are significantly different from zero. The same is true for the importance of anticipated money growth as an explanatory variable in the movement of stock prices. All of the R^2 are below 10%. The first four

Table 1a
Composite Index and Money Growth
(Actual, Anticipated and Unanticipated)
$\Delta COMP_t = \alpha_0 + \alpha_1 \Delta MONEY_{t-i} + \varepsilon_t$

	Actual Money Growth			Anticipated Money Growth			Unanticipated Money Growth		
Lag	α_1	T-stat	R^2	α_1	T-stat	R^2	α_1	T-stat	R^2
1	1.826	7.986*	0.376	0.829	1.180	0.013	1.700	7.116*	0.323
2	1.481	5.902*	0.247	0.490	0.694	0.005	1.413	5.514*	0.223
3	1.087	4.038*	0.133	0.090	0.126	0.000	1.087	4.005*	0.131
4	0.822	2.955*	0.076	-0.415	-0.578	0.003	0.907	3.255*	0.091
5	0.509	1.783	0.029	-0.734	-1.017	0.010	0.638	2.230*	0.045
6	0.332	1.155	0.012	-0.991	-1.369	0.017	0.498	1.727	0.027
7	0.159	0.551	0.003	-1.145	-1.576	0.023	0.343	1.183	0.013
8	-0.024	-0.082	0.000	-1.356	-1.863	0.031	0.187	0.643	0.004
9	-0.384	-1.342	0.017	-1.792	-2.481*	0.055	-0.117	-0.400	0.001
10	-0.716	-2.576*	0.059	-1.923	-2.682*	0.064	-0.444	-1.538	0.022
11	-0.870	-3.218*	0.089	-1.676	-2.370*	0.050	-0.649	-2.284*	0.047
12	-1.018	-3.840*	0.122	-1.121	-1.574	0.023	-0.896	-3.223*	0.089

Table 1b
Industrial Index and Money Growth
(Actual, Anticipated and Unanticipated)
$\Delta IND_t = \alpha_0 + \alpha_1 \Delta MONEY_{t-i} + \varepsilon_t$

	Actual Money Growth			Anticipated Money Growth			Unanticipated Money Growth		
Lag	α_1	T-stat	R^2	α_1	T-stat	R^2	α_1	T-stat	R^2
1	1.513	7.363*	0.338	0.838	1.369	0.017	1.384	6.432*	0.281
2	1.233	5.541*	0.225	0.604	0.980	0.009	1.143	5.006*	0.191
3	0.913	3.862*	0.123	0.320	0.513	0.002	0.872	3.639*	0.111
4	0.695	2.853*	0.071	-0.004	-0.006	0.000	0.710	2.887*	0.073
5	0.469	1.885	0.032	-0.238	-0.375	0.001	0.516	2.063*	0.039
6	0.346	1.381	0.018	-0.289	-0.454	0.002	0.400	1.582	0.023
7	0.298	1.186	0.013	-0.335	-0.522	0.003	0.357	1.411	0.018
8	0.201	0.800	0.006	-0.520	-0.808	0.006	0.286	1.130	0.012
9	-0.061	-0.243	0.001	-1.064	-1.662	0.025	0.102	0.400	0.002
10	-0.288	-1.567	0.023	-1.290	-2.032*	0.037	-0.202	-0.794	0.006
11	-0.533	-2.202*	0.044	-1.261	-2.029*	0.037	-0.360	-1.428	0.019
12	-0.647	-2.708*	0.065	-0.813	-1.302	0.016	-0.553	-2.225*	0.045

Notes:1. The Single asterisk (*) indicates significance at 95% level.

lagged R^2 barely touched 1% regardless of the index tested. On the other hand, the last three columns of Tables 1a through 1d validate the policy ineffectiveness proposition of the rational expectation revolution.

Table 1c
Finance Index and Money Growth
(Actual, Anticipated and Unanticipated)
$$\Delta FIN_t = \alpha_0 + \alpha_1 \Delta MONEY_{t-i} + \varepsilon_t$$

	Actual Money Growth			Anticipated Money Growth			Unanticipated Money Growth		
Lag	α_1	T-stat	R^2	α_1	T-stat	R^2	α_1	T-stat	R^2
1	3.950	10.808*	0.425	-0.318	-0.246	0.00	4.035	11.218*	0.543
2	3.417	8.271*	0.392	-0.089	-0.842	0.007	3.632	9.111*	0.439
3	2.656	5.741*	0.237	-1.820	-1.405	0.018	2.994	6.699*	0.297
4	2.100	4.293*	0.148	-2.193	-1.685	0.026	2.505	5.252*	0.207
5	1.561	3.071*	0.082	-2.494	-1.908	0.033	1.995	3.996*	0.131
6	1.177	2.275*	0.047	-2.691	-2.051*	0.038	1.634	3.194*	0.088
7	0.831	1.586	0.023	-2.552	-1.930	0.034	1.251	2.399	0.05
8	0.451	0.854	0.007	-2.487	-1.866	0.032	0.848	1.604	0.023
9	-0.080	-0.152	0.000	-2.824	-2.119*	0.041	0.355	0.664	0.004
10	-0.638	-1.223	0.014	-2.727	-2.049*	0.038	-0.238	-0.445	0.002
11	-0.994	-1.951	0.035	-2.343	-1.780	0.029	-0.673	-1.272	0.015
12	-1.298	-2.584*	0.059	-1.637	-1.250	0.015	-1.109	-2.122*	0.041

Table 1d
Property Index and Money Growth
(Actual, Anticipated and Unanticipated)
$$\Delta PROP_t = \alpha_0 + \alpha_1 \Delta MONEY_{t-i} + \varepsilon_t$$

	Actual Money Growth			Anticipated Money Growth			Unanticipated Money Growth		
Lag	α_1	T-stat	R^2	α_1	T-stat	R^2	α_1	T-stat	R^2
1	3.735	8.260*	0.392	-0.042	-0.030	0.000	3.771	8.341*	0.396
2	3.069	8.173*	0.264	-0.534	-0.376	0.001	3.188	6.462*	0.28
3	2.300	4.300*	0.149	-0.775	-0.542	0.003	2.459	4.620*	0.168
4	1.801	3.259*	0.091	-0.952	-0.661	0.004	1.996	3.610*	0.109
5	1.206	2.122*	0.041	-0.969	-0.667	0.004	1.386	2.431*	0.053
6	0.783	1.362	0.017	-1.178	-0.808	0.006	0.988	1.710	0.027
7	0.312	0.539	0.003	-1.296	-0.884	0.007	0.523	0.897	0.008
8	-0.064	-0.111	0.000	-1.577	-1.070	0.011	0.181	0.309	0.001
9	-0.638	-1.110	0.011	-2.382	-1.621	0.024	-0.286	-0.488	0.002
10	-1.152	-2.044*	0.038	-2.826	-1.937	0.034	-0.756	-1.302	0.016
11	-1.530	-2.793*	0.069	-2.895	-2.030*	0.037	-1.150	-2.009*	0.037
12	-1.887	-3.519*	0.105	-2.775	-1.957	0.035	-1.547	-2.744*	0.066

Notes: 1. The Single asterisk (*) indicates significance at 95% level.

The significance of lagged actual money growth identified earlier remains when unanticipated money growth is employed as the

independent variable. The coefficients of response α_1 remain significantly different from zero up to about five to six month lags. Positive changes in unanticipated money growth causes stock prices to increase significantly. The explanatory power as shown by the R^2 remains relatively large averaging about 39% for the first month lag. The unanticipated money growth significantly explains the larger portion of variation in the Finance and Property Index. About half of the variations in the Finance Index can be explained by changes in money supply. The significant ties between monetary growth and the Finance Index can be explained by the direct link between monetary policy and finance/banking activities. The performances of firms listed in the index are greatly affected by the stance of monetary policy. Changes in monetary policy generally precede changes in the lending activities of the financial institutions, thus, exerting a significantly positive influence on the valuations of financially related firms.[10]

The positive reaction of stock prices to actual and unanticipated money growth is further supported by the correlation coefficients in Table 2.

Table 2
Correlations Between Growth of Stock Indices and Lagged Monetary Growth (Actual, Anticipated, and Unanticipated)

	Composite Index			Industrial Index			Finance Index			Property Index		
Lag	ΔM	ΔAM	ΔUM	ΔM	ΔAM	ΔUM	ΔM	ΔAM	ΔUM	ΔM	ΔAM	ΔUM
1	0.613*	0.180	0.532*	0.582*	0.132	0.530*	0.724*	-0.024	0.737*	0.626*	-0.003	0.629*
2	0.497*	0.174	0.430*	0.474*	0.095	0.437*	0.626*	-0.082	0.663*	0.514*	-0.037	0.532*
3	0.365*	0.149	0.326*	0.351*	0.050	0.333*	0.487*	-0.135	0.545*	0.385*	-0.053	0.409*
4	0.276*	0.098	0.273*	0.267*	-0.001	0.270*	0.385*	-0.162	0.454*	0.302*	-0.064	0.331*
5	0.171	0.070	0.194*	0.180	-0.036	0.196*	0.286*	-0.182	0.362*	0.202*	-0.065	0.230*
6	0.112	0.051	0.147	0.133	-0.044	0.152	0.216*	-0.195	0.296*	0.131	-0.078	0.164
7	0.053	0.017	0.112	0.114	-0.051	0.136	0.152	-0.184	0.227*	0.052	-0.086	0.087
8	-0.008	0.002	0.041	0.077	-0.078	0.109	0.083	-0.178	0.154	-0.011	-0.103	0.030
9	-0.129	-0.055	-0.042	-0.024	-0.159	0.039	-0.015	-0.202	0.064	-0.107	-0.155	-0.047
10	-0.243*	-0.060	-0.133	-0.150	-0.194	-0.077	-0.120	-0.195	-0.043	-0.195*	-0.185	-0.125
11	-0.298*	-0.008	-0.165	-0.209*	-0.193	-0.137	-0.186	-0.171	-0.123	-0.262*	-0.193	-0.191
12	-0.349*	0.072	-0.201*	-0.254*	-0.126	-0.211*	-0.243*	-0.121	-0.202*	-0.323*	-0.187	-0.258*

Notes: 1. ΔM, ΔAM, and ΔUM refer to actual, anticipated and unanticipated money growth respectively.
2. The reported correlation coefficients are correlation between growth of stocks indices at time t ($\Delta INDEX_t$) and lagged monetary growth ($\Delta MONEY_{t-i}$, i = 1 to 12).
3. The Single asterisk (*) indicates coefficients are significantly different from zero at 95% significance level.

The positive linear association is significantly different from zero up to six month lagged actual money growth and up to seven month lagged unanticipated money growth (these maximum linear associations are both recorded for the Finance Index). On average, the significantly positive associations of changes in stock returns and lagged monetary growth (actual and unanticipated) stood at 0.43 and 0.41 respectively. The Finance Index once again is found to be closely associated with movement in the actual and unanticipated money growth with the highest correlation coefficients of 0.72 and 0.74 respectively. The policy ineffectiveness proposition is again supported since none of the stock indices are linearly associated with the anticipated portion of money growth. Anticipated money growth exerts no significant influence and possesses zero linear association with changes in stock prices. In Malaysia, only unanticipated policy variations matter. This also supports the notion of market efficiency since the market is neutral towards anticipated changes but react significantly to unanticipated variables.

Variance Decompositions and Impulse Response Functions

Our next set of results was derived from the VAR analysis involving two vectors of variables, i.e. $\{\Delta M_t, IBR_t, \Delta IPI_t, \Delta CPI_t, \Delta Index_t\}$ and $\{\Delta AM_t, \Delta UM_t, IBR_t, \Delta IPI_t, \Delta CPI_t, \Delta Index_t\}$. The VDC for 12-months ahead forecast error is presented in Table 3. Since our focus is on the impact of monetary growth on changes in stock prices we only report the proportion of the forecast error variance of the stock prices which is due to monetary growth. The VDC indicates that the importance of variations in actual monetary growth is limited to the short horizon. Up to about 20% of the forecast error of stock prices for the one-month ahead is due to errors in forecasting actual money growth.[11] Despite the low percentages reported in Table 3, our emphasis is on decomposing these percentages into proportions accounted by anticipated and unanticipated money growth. The percentages reported for DAM and DUM columns validate the policy ineffectiveness proposition. Consistent with the preceding analyses, only unanticipated money growth (DUM) possesses significant influence on the variation of stock prices. The percentage of forecast error due to variations in actual money growth described earlier is largely due to the unanticipated components of monetary growth. On average, unanticipated money growth reflect more than 90% of the percentages of forecast error which is explained by the actual money growth, signifying irrelevance of the anticipated money growth component.

Table 3
Variance Decomposition of Forecast Error of Stock Returns

	Composite Index			Industrial Index			Finance Index			Property Index		
Step	ΔM	ΔAM	ΔUM	ΔM	ΔAM	ΔUM	ΔM	ΔAM	ΔUM	ΔM	ΔAM	ΔUM
1	19.76	0.67	18.40	18.47	1.45	16.79	19.62	2.47	18.53	18.52	1.28	17.16
2	15.83	0.52	14.09	16.61	1.10	14.48	13.33	2.27	12.37	10.84	1.36	9.74
3	12.93	0.61	11.66	15.19	1.14	13.63	9.53	2.58	9.115	7.35	1.84	6.57
4	11.08	0.64	10.00	14.31	1.20	12.95	7.39	2.90	7.173	5.98	2.04	5.54
5	9.89	0.67	8.99	13.76	1.29	12.55	6.10	3.32	5.989	5.76	2.26	5.51
6	9.10	0.68	8.30	13.41	1.38	12.26	5.33	3.77	5.266	6.28	2.40	6.23
7	8.58	0.68	7.86	13.18	1.45	12.05	4.86	4.25	4.818	7.15	2.53	7.23
8	8.23	0.68	7.58	13.02	1.52	11.88	4.59	4.74	4.546	8.20	2.62	8.39
9	8.01	0.67	7.42	12.91	1.59	11.74	4.43	5.24	4.381	9.29	2.69	9.54
10	7.88	0.66	7.34	12.83	1.64	11.62	4.36	5.72	4.282	10.32	2.75	10.61
11	7.81	0.65	7.34	12.76	1.69	11.52	4.33	6.18	4.223	11.24	2.79	11.54
12	7.78	0.64	7.38	12.71	1.73	11.43	4.32	6.60	4.186	12.01	2.82	12.31

Notes: 1. ΔM, ΔAM, and ΔUM refer to actual, anticipated and unanticipated money growth respectively.
2. The percentages due to ΔM are derived from VAR system composing of ΔM, IBR, ΔIPI, ΔCPI, and ΔINDEXG.
3. The percentages due to ΔAM and ΔUM are derived from VA system composing of ΔAM, ΔUM, IBR, ΔIPIG, ΔCPIG, and ΔINDEX.

The IRFs depicting reactions of stock prices to a one-standard deviation shock to monetary growth are plotted in Figure 1. Each plot includes the point estimate of the IRF (solid line) and its one-standard deviation bands (dotted lines). The IRFs in the first row of Figure 1 indicate that stock prices react positively towards innovations in actual money stock in the first two to three months. Despite remaining positive shortly after, the lower interval estimates falls below zero after two to three months indicating insignificant reactions. Similar to the preceding VDC analysis, no significant response are traced when anticipated monetary shocks are considered. The significantly positive response traced for the actual money growth is largely due to the unanticipated component. IRFs plotted in the last row of Figure 1 verify the importance of unanticipated money growth in driving changes in the stock prices. The initial positive response up to two to three months ahead is also identified for the case of unanticipated money growth.

The results of linear regressions and system estimations that we have presented suggest a strong validation for the policy ineffectiveness proposition of the rational expectation hypothesis. Changes in money growth are shown to affect movement in the KLSE stock prices in a positive fashion, in line with the theoretical framework of the dividend

valuation models as well as the monetary portfolio model. The foremost importance of the results presented is the irrelevance of anticipated money growth in influencing movement in stock prices. The significance of actual money growth movement in influencing stock performance largely reflects the importance of the unanticipated component of money growth. Unanticipated changes in money growth exert significant influence on real economic activities. This real effect is dictated by movement in share prices. Inference on market efficiency can also be based on these results. In an efficient market, share movement incorporates all anticipated information, thus, only unanticipated policy exerts significant influence on variations in share prices. The irrelevance of anticipated information suggests efficiency in the Malaysian share market.

SUMMARY AND CONCLUSION

The policy ineffectiveness proposition of the rational expectation model claims that only unanticipated policy, changes are effective in bringing changes to real activities. In relation to the monetary policy, this indicates that all anticipated changes in money supply will only translate into price inflation, while the unanticipated component affects real output. We explore the validity of this proposition on the Malaysian stock market. The single equation regression analysis and the multivariate system analysis of VAR support the presence of the proposition in the Malaysian capital market. We showed that the significant influence of share prices to changes in money is mainly due to the effect of the unanticipated component. Current share prices react only to the unanticipated component of monetary growth. Variation in monetary policy is an important element that drives fluctuation in stock prices to the extent that it is an unanticipated policy change. The results also indicate the short term nature of the effect which is in line with the neutrality of money in the long-run. The validity of the proposition implies efficiency in the KLSE's pricing process. Current share prices discount all anticipated information instantaneously making them irrelevant for investment strategy. Only unanticipated money growth affects share prices in Malaysia, while the anticipated component is neutral.

ENDNOTE

[1] See also Barro (1976, 1977, 1978), Pearce and Roley (1983), Thornton (1989), Sorensen (1982), Bailey (1988), and Cesarano (1998) for studies on policy ineffectiveness proposition. Rogalski

and Vinso (1977) and Hashemzadeh and Taylor (1988) showed that causation between money and stock prices is bi-directional with money and stock prices affecting each other.

[2] Keran (1971), Homa and Jaffee (1971) and Hamburger and Kochin (1972) proposed this channel of influence which is a direct interpretation of a standard dividend valuation model for share evaluation. Kim and Ghazali (1998, 1999) provided the negative reactions of the interest rates toward monetary injections. An alternative theoretical explanation is based on the monetary portfolio model developed by Friedman (1961), Friedman and Schwartz (1963), Cagan (1972), and Friedman (1988). Within this explanation, share prices are affected when investors adjust their portfolio following changes in monetary policy.

[3] Based on the efficient market arguments, Pesando (1974) and Rozeff (1974) showed that stock prices fully reflect all information (current and anticipated) relevant to the determination of stock prices. Studies by Sorensen (1982) and Pearce and Roley (1983) revealed that as implied by the efficient market hypothesis the stock market is neutral to anticipated monetary activity but react significantly to the unanticipated changes in current and future monetary aggregate.

[4] We use the narrow money aggregate since it does not yield interest returns and therefore allows the portfolio adjustment effect, in order for the monetary portfolio model to be effective.

[5] We limit our data set to 1996:12 so as not to include the chaotic period of the exchange rate crisis in 1997. Examination of the relationship during stable periods is expected to give us a better picture of the true relationship between money and stock returns.

[6] Equation 1 is a naïve equation that incorporates variables that conventionally influenced monetary growth. Our goal is to generate an anticipated money growth series based on the observed macro conditions. The 3-month KLIBOR measures the liquidity status of the domestic credit market. Percentage change in CPI and IPI reflects the inflation and output environment. Exchange rates capture the condition of the external sector.

[7] We do not report the estimated parameters for Equation 1 in our paper to conserve space. Interested readers may request them from the authors.

[8] We test up to twelve month lag to detect the effect of money in the short-run and the long-run. According to Friedman (1970), in

the short-run money affects real variables while in the long-run it is neutral affecting primarily prices.

[9] The estimation procedure is simplified by the autoregssive specification. Since all of the right-hand-side variables are pre-determined and the same time for each equation, ordinary least square (OLS) yields a consistent and asymptotically efficient estimators. Seemingly unrelated regression (SUR) does not add to the efficiency of the estimation because of the identical regressors. The lag length is chosen by minimising the Akaike's AIC following Lutkepohl (1982).

[10] Our regression results also indicate a significantly negative effect for the longer end of lagged monetary growth particularly for the 11 to 12 month lag. This shows the possibility that in the long-run, positive money growth (actual and unanticipated) affect stock prices negatively. In the long run money affects price inflation and pushes interest rates to a higher level, thus, stock prices might react negatively to such conditions. Nevertheless we chose not to emphasise on this possible negative effect since the percentage of stock variations (R^2) explained by longer end of lagged monetary variables are very low, averaging approximately 5% for all of the significantly negative effects.

[11] Our main objective in this study is to evaluate the impact of changes in money on the stock index with respect to the issue of anticipated and unanticipated money growth. These low percentages reported in Table 3 are not inconsistent with our objectives since we acknowledge that variation in stock performance are also affected by other variables such as those included in the VAR system. This is similar to the regressions results that report low R^2 implying omission of other explanatory variables.

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