Conclusion

The FIMS has been developed to provide the central bank with estimates of the financial condition of commercial banks. FIMS has several advantages over the previous off-site surveillance. First, and the most important, is the accuracy of this system in estimating the financial condition of banks as proved by type-1 and type-2 errors. Second, the new system provides a timely measure of financial condition. The FIMS rating and risk rank for an individual bank can be calculated as soon as the bank sends its half-yearly financial statements rather than later, when enough half-yearly are available to calculate meaningful averages. Third, the new system is more flexible than alternative systems. Explanatory variables can be added to or deleted from FIMS with minimal revisions of software or procedures. In addition, the coefficients on the explanatory variables change each period in reflection of the changing conditions in the banking industry. FIMS should continue to be more accurate than existing alternative systems. Finally, the new system can identify deterioration or improvement in the banking industry within peer groups and system-wide. Therefore, the FIMS risk rank can be used as a guidance to monitor the condition of banks more accurately and thoroughly after their unpleasant performances during the recent banking crisis.

References


REAL STOCK RETURNS, INFLATIONARY TRENDS AND REAL ACTIVITY:
Evidence from Malaysia

M. Shabri Abdul Majid

This study explores the relationship between real stock returns and inflationary trends in the Malaysian economy. It attempts to test for the relationship between real stock return and inflation in light of Fisher's hypothesis that asserts the independence of real stock return and inflation and Fama's (1981) proxy effect framework which states that the negative real stock returns-inflation is indirectly explained by a negative real economic activity-inflation and a positive real stock returns-real economic activity relationships. The finding shows that real stock returns are independent of inflationary trends in accordance with the Fisher hypothesis, which implies that the Malaysian stock market provides a good hedge against inflation. The Fama's proxy hypothesis is then tested to check for the consistency of the relationships. The positive relationship between inflation and real economic activity and the positive relationship between real stock returns and real economic activity that totally contradicts the Fama's proxy hypothesis however are found, to some extent, to be consistent with the explanation of conventional macroeconomic theories of the Phillips curve.

Keywords: ARIMA, Fama's (1981) proxy effect; Fisher hypothesis; inflationary trends; Phillips curve; real stock returns.
Introduction

The inquiry of stocks being a better hedge against inflation has been widely researched and documented. The notion that stocks retain real value regardless of the inflation rate fluctuations is consistent with classical investment theories found in Day (1984) and Marshall (1982). However, progressive empirical studies in the developed countries have documented that expected inflation, unexpected inflation, and changes in expected inflation were all negatively related to stock returns which appears contrary to both economic theory and common sense. In the view of Fisher hypothesis, real stock returns are independent of inflationary expectations. This indicates that nominal asset returns should be positively related to both expected and unexpected inflation. The Philips curve shows that a negative relationship between unemployment rate and the rate of inflation implies a positive association between inflation and real economic activity. Therefore, stock returns that are positively correlated with real economic activity, in turn, are expected to show positive association with inflation. The positive relation between stock returns and unexpected inflation suggests that common stocks are a good hedge against unexpected inflation.

There are a number of theories to explain the negative real stock returns-inflation relationship. For example, Charpentier (1997) has adopted Fama's (1981) model to explain the above relationship through a hypothesized chain of macroeconomic linkages that have their basis in the money-demand theory and the quantity theory of money. Geiske and Roll (1983), Kaul (1987 and 1990), Marshall (1992), and Graham (1996) have explored the role of the monetary sector in order to explain this perplexing negative relationship between stock returns and inflation. They found the relationship to vary over time in a systematic manner depending on the influence of money demand and supply factors. Unlike Geiske and Roll (1983), Kaul (1987 and 1990), Marshall (1992), and Graham (1996), Hamburger and Zwick (1981) considered both monetary and fiscal policies in describing the negative real stock returns-inflation relationship.

Generally, research results have shown a negative real stock return-inflation relationship, implying that the stock market is not a good hedge against inflation. However, Ram and Spencer (1983) adopt the Mundell-Tobin hypothesis as an alternative to Fama's proxy hypothesis in delineating the negative relationship between stock returns and inflation. The Fama's proxy hypothesis claims that the negative real stock returns-inflation is indirectly explained by a negative real economic activity-inflation and positive real stock returns-real economic activity relationships. In Mundell-Tobin hypothesis, an increase in the expected rate of inflation causes portfolio substitution from money to financial assets, which will reduce the real returns on such assets (for example, stocks). This reduction in real interest will stimulate real economic activity. Therefore, according to Mundell's hypothesis, one would expect a positive relationship between inflation and economic activity and a negative relationship between real stock returns and economic activity. Modigliani and Cohn (1982a) use the theory of rational valuation to explain the negative relationship between real stock returns and inflation. This theory contends that the low value of stocks during periods of high inflation is the result of the failure of investors to adjust corporate profits for the inflation premium components of interest expense (which they argue represents a return of capital rather than an expense) and from the capitalization of corporate profits at the nominal rate (rather than the theoretically correct real rate) of interest.

Wahroos and Berglund (1986) find a significant negative relationship when stock returns were regressed on the rate of inflation. Buimash (1991) says that this negative stock returns-inflation relationship is indicated by the negative sloping curve, where the steepness of the slope depends on the magnitude of money supply changes. The relationship between real stock returns and inflation is further explained by Day (1984) using a multi-period economy with production. He finds that the expected real returns expected inflation relationship depends on the form of the economy's production function and investor preferences. When the production function exhibits stochastic constant returns to scale, the negative relationship between expected real returns and expected inflation is documented. Buimash (1991) on the other hand, adopts the quantity theory of money equation i.e. $MV = PT$ to explain stock returns-inflation relationship. He argues that if $M$ (nominal money growth) does not accommodate changes in $P$ (output) as proxy of real economic activity, $P$ (price) will go up because changes in nominal money supply signal changes in inflation, then $X$ will have to go down, thereby negatively affecting stock price.

Although researchers adopt different economic theories, different measures of inflation expectations and different economic models to delineate the relationship between stock returns and inflation, they generally find that the stock markets in the developed economies were no longer a good hedge against inflation. This phenomenon is, of course, troublesome since it consistently appears to reject both economic theories and common sense. The consistent empirical findings for developed economies motivate a similar study for less developed economy by taking Malaysia as a case study. To the best of our knowledge, no study has been done in this area for the Malaysian stock market. As for the relationship between stock returns and inflation for developing countries, only two studies have been investigated, one on the Philippines case by Gulletek (1983a) and the other was on the Indian stock market by Charrah et al. (1997). Unfortunately, their studies have many shortcomings. The former study ignores the role of expected and unexpected inflation in his model in the Philippines economy, while

---

1 A hedge investment is one that contains two or more components. As the market conditions change, the change in the value of one of these may at least partially offset the change in the other component, if the change in the two positions offset each other exactly, it is a perfect hedge. For example buying a stock and selling short the same stock would create a perfect hedge because as the stock rises in value, the increase in the long position would exactly offset by a fall in value of the short position (French 1989: 419).

2 Among his studies on the developed economies include Fama (1981, 1983, and 1990); Fama and Gibbons (1982); Geiske and Roll (1983); Kohli (1983a and 1983b); Kaul (1987 and 1990); Solnik (1973 and 1983); Boushi and Capistran (1982); and Markit (1982).
the latter study employs too small sample size of data, from 1964 to 1996. Again, the previous studies provided additional motivation for this work, which intends to cover the shortfalls mentioned earlier.

There is, therefore, a growing need to address the question as to whether the Malaysian stock market provides effective hedge against inflation? Does the behaviour of the Malaysian stock market coincide with the findings in developed countries? Is the Malaysian stock market in line with the Fisher hypothesis? Is the stock market of the country a good hedge against inflation? Does the Fama’s proxy hypothesis explain the real stock returns-inflation relationship for the Malaysian market?

To answer the above questions, the paper aims at:
1. Examining the relationship between real stock returns and inflationary trends in the Malaysian stock market, thereby testing the generalized Fisher hypothesis that real stock returns are independent of inflationary expectations.
2. Testing the Fama’s Proxy hypothesis, which states that negative real stock returns—inflation relationship is indirectly explained by a negative inflation-real activity relationship and a positive real activity-stock returns relationship.
3. Exploring whether the Fama’s proxy effect is strong enough to explain negative stock returns—inflation relationship.

The above questions are necessary to be answered since the Malaysian economy has recently witnessed several measures, which are increasingly open to foreign investment (Kee 1989). As a result, institutional investors from developed countries such as America, Europe and Asian developed countries were attracted to this market. The spectacular performance of the Malaysian stock market may be related to inflation. Over the 1983 to 1996 period, the Kuala Lumpur Composite Index (KLCI) rose sharply from approximately less than 300 to over 1200, while inflation, on the average, fluctuated from 0.1 percent to 4.4 percent.

The findings of this paper are expected to have important consequences to policymakers, international fund managers, and other institutional investors who seek to diversify into the Malaysian stock market.

The remaining of the presentation of this paper is organized in the following sequence: In the next section, the hypotheses are stated. The methodology and data on which analysis is based are presented in section 3. Section 4 in turns discusses the results and implications of the paper. Lastly, section 6 concludes the paper.

Statement of the Hypotheses
Since the late 1960s and early 1970s, the stock markets in the developed countries have been found to be no longer an effective hedge against inflation (Fama 1982; and Boukhi and Coghill 1982). Many studies have documented that actual, expected, and unexpected inflation are all negatively related to stock returns. These empirical evidences appear contrary to both economic theories and economic sense. Based on the previous empirical findings, the study expects changes in inflation rates to have a significant negative relation on the stock returns, thereby contradicting the Fisher hypothesis. The negative stock return—inflation relation is expected to be strong enough to be explained by the Fama’s proxy hypothesis.

Methodology and Data
Testing Fisher Hypothesis
In this study, we divide inflation into three types: actual, expected and unexpected inflation. Based on this, three econometric models are formulated to test the real stock return relationship to each type of inflation. The first model is between stock returns and annual inflation as in Graham’s (1996) and Chaturath et al.’s. (1997):

\[ \text{SR} = \beta_0 + \beta_1 \text{INF} + \epsilon \]

Where the unexpected inflation rate which is represented by \( E \text{INF} \) is defined as the difference between actual inflation rate and expected rates of inflation, \( \text{INF} - E \text{INF} \).

For the first two equations, (1) and (2), if \( \beta_0 \) and \( \beta_1 \) coefficients equal to zero, the results will be consistent with Fisher hypothesis that states the real rate of return on common stocks are independent of inflation rates. This implies that the stock market is a perfect hedge against inflation and expected inflation respectively. Meanwhile, the \( \beta_0 = \beta_1 = 0 \) in the equation (3a) or (3b) means that the asset in question is a perfect hedge against both expected and unexpected inflation.

Testing Fama’s Proxy Hypothesis
As mentioned earlier, the Fama’s proxy hypothesis says that the negative relationship between stock returns and inflation centres around the linkages between inflation and real activity, and be-
between stock returns and real activity. The first proposition of Fama’s proxy hypothesis—there is a negative relationship between inflation and real economic activity and the second proposition of Fama’s proxy hypothesis—there is a positive association between real activity and stock returns, can individually be tested by the following models:

\[
\text{INF} = \alpha \pm \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (4a)
\]

\[
\text{E}(\text{INF}) = \alpha + \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (4b)
\]

\[
\text{UE}(\text{INF}) = \alpha + \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (4c)
\]

\[
\text{SR} \cdot \text{INF} = \delta_i + \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (5)
\]

Where \( \text{REA}_i \) is the real economic activity that is proxied by the Growth in Industrial Production (GIP), while \( \epsilon_i \) represents the error random term. Leading, contemporaneous, and lagging values of real economic activity are also incorporated in the model.

In line with Chatterath et al. (1997), it models (4a), (4b), (4c), and (5) we incorporate both leads and lags of real economic activity due to lack of prior evidence pertaining to the relationship of real economic activity with inflation and real returns in the Malaysian market. Equations (4a), (4b), and (4c) test the Fama’s proposition (1). The negative relationship between inflation and real economic activity implies that some \( \alpha_i \)’s are significantly negative. Equation (5) tests for Fama’s proposition (2), where a positive relationship between real economic activity and real stock return implies that some \( \delta_i \)’s are significantly positive.

Since the Fama’s proxy effect explanation is based on an indirect relationship between real stock returns and inflation, a single equation treatment to equations (4a), (4b), (4c), and (5) may yield inconsistent estimates (Johnson 1984; Harvey 1990; and Chatterath et al. 1997). To avoid this inconsistency in the estimates of the relationship between stock returns and the actual, expected, and unexpected inflation, the study adopts Chatterath et al.’s (1997) two-step ordinary least square procedure. The models are as follows:

\[
\text{INF} = \mu_i + \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (6a)
\]

\[
\text{SR} \cdot \text{INF} = \delta_i + \epsilon_i \pm \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (6b)
\]

\[
\text{E}(\text{INF}) = \mu_i + \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (7a)
\]

\[
\text{UE}(\text{INF}) = \mu_i + \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (7b)
\]

\[
\text{S} \cdot \text{INF} = \delta_i + \epsilon_i \pm \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (8a)
\]

\[
\text{SR} \cdot \text{INF} = \delta_i + \epsilon_i \pm \sum_{i=1}^{k} \delta_i \text{REA}_i + \epsilon_i \quad \ldots \quad (8b)
\]

The Data

Fifteen years of quarterly changes in Consumer Price Index (CPI) is used as proxy for inflation and the Growth in Industrial Production (GIP) is used as proxy for real economic activity. The data for stock returns are calculated from the Kuala Lumpur Stock Exchange (KLSE) Composite Index. The analysis are made on the quarterly non-seasonally adjusted data for the fifteen-year period from 1983: Q1 to 1998: Q2. The stock returns are expressed as a percentage earned on a company’s common stock investment for a given period and as a profitability ratio measuring how well equity capital is employed (Fisch et al. 1993). Nominal stock return is computed as follows:

\[
\text{SR} = \log \left( \frac{V_{t+1}}{V_t} \right) - 1 \quad \ldots \quad (9)
\]

Where \( V_t \) is the index value of stock at the end of quarter \( t \) and \( V_{t-1} \) is the index value of stock for previous quarter-end, \( t - 1 \).

Expected and Unexpected Inflation Forecasts

In the developed countries, researchers generally use the Treasury Bill rate as a proxy for expected and unexpected inflation. This could be acceptable because the inflation rates in those countries are relatively constant. Similar to Fama and Gibbons (1982), Leonard and Solt (1986), Kaul (1990) and Chatterath et al. (1997), this study uses Auto-Regressive Integrated Moving Average (ARIMA) model to estimate expected inflation and the forecast errors as the unexpected component of inflation. Another
reason for using ARIMA model in this study is that this particular model can detect large variability of inflation rates; hence it can achieve a greater predictability of the realized inflation rate (Solnik 1993).

**Empirical Results**

**The Test for Stationarity**

In order to obtain credible and robust results for any conventional regression analysis, the data to be analyzed should be stationary (Pankratz 1983; Harvey 1990; Gujarati 1995). Table 1 shows the Dickey-Fuller (DF) test statistics that test the presence of unit root test (non-stationarity) for all time series data, which are analyzed in this study. In the test, the null-hypothesis is that the series is non-stationary. Failure to reject the null-hypothesis indicates no statistical evidence for stationarity, while rejecting the null-hypothesis (accepting the alternative hypothesis) implies evidence for stationarity. Table 1 shows that the inflation rate (INF) is stationary in the log level trend model, with constant and no trend regression model or with constant and trend regression model. However, in the log level trend model, the KLCI is stationary in the regression model with constant and no trend, but non-stationary for the regression model with constant and trend.

Table 1. Dickey-Fuller Unit-Root Test

<table>
<thead>
<tr>
<th>Log Level</th>
<th>First Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Constant and No Trend</td>
</tr>
<tr>
<td>INF</td>
<td>-2.7773***</td>
</tr>
<tr>
<td>KLCI</td>
<td>-5.8488***</td>
</tr>
<tr>
<td>REA</td>
<td>-1.9573</td>
</tr>
</tbody>
</table>

Note: INF is the rate of inflation computed from Consumer Price Index by log (CPI/CPI_0). The Kuala Lumpur Composite Index (KLCI) is used as proxy for stock returns, which is calculated by log (KLCI/KLCI_0). Finally, REA or log (IRFIRP/IRFIRP_0) is the Inverse Production Index that is used as a proxy for the real economic activity. *** indicates a level of significance of 10%.

The Dickey-Fuller test statistics for regression models with constant and no trend and with constant and trend are as follows:

\[ \Delta y_t = \delta_0 + \delta_1 y_{t-1} + \sum_{i=1}^{p} \phi_i \Delta y_{t-i} + \epsilon_t \]

\[ \Delta y_t = \delta_0 + \delta_1 y_{t-1} + \delta_2 \Delta y_{t-1} + \sum_{i=2}^{p} \phi_i \Delta y_{t-i} + \epsilon_t \]

Table 2. ARIMA Models for Expected Inflation

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Expected Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA (1)</td>
<td>-0.1423 (-1.027)</td>
</tr>
<tr>
<td>MA (2)</td>
<td>-0.31463* (-2.640)</td>
</tr>
<tr>
<td>MA (3)</td>
<td>-0.2184*** (-1.707)</td>
</tr>
<tr>
<td>MA (4)</td>
<td>-0.2756** (-1.178)</td>
</tr>
<tr>
<td>MA (5)</td>
<td>-0.22637** (-2.102)</td>
</tr>
<tr>
<td>MA (6)</td>
<td>-0.53808* (-2.179)</td>
</tr>
<tr>
<td>MA (7)</td>
<td>0.1835** (3.168)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.09946* (3.423)</td>
</tr>
<tr>
<td>R²</td>
<td>0.9605</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.9704</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>5.4594</td>
</tr>
<tr>
<td>JB</td>
<td>28.0191</td>
</tr>
<tr>
<td>D-W</td>
<td>1.9372</td>
</tr>
</tbody>
</table>

Note: J-B indicates the Jarque-Bera test for normality, whereas D-W refers to Durbin-Watson's test. The numbers in parentheses are standard errors, while * indicates significance at the 10%, 5%, and 1% levels, respectively.

The ARIMA (2, 2) model is found to be the best model in specifying the expected inflation in the stock market. The goodness of these chosen ARIMA models is shown by Modified Box-Pierce Chi-square statistics where all residuals from the model are insignificant. This indicates that the residuals from the chosen model are white noise. The other criteria for the fitness of the model are indicated by the computed values of the ARIMA (2, 2) model.
Skewness and Kurtosis. The values for these should be around 0 and 3 for normal distribution of the chosen model. If we look at these criteria, our results are not much departing from the normal or ideal values of 0 and 3. For our model, ARMA (0, 7), the computed values of skewness and kurtosis are 0.9704 and 5.4504. Finally, based on normality test of Jarque-Bera (J-B) test, we find the J-B values of 28.0591 and 7.9006, which asymptotically do not reject the normality assumption for our ARMA model. Having identified the appropriate $p$, $d$, and $q$ values, then estimation and forecasting steps are performed.

**The Real Stock Returns and Inflationary Trends**

Table 3 provides the test results for the relationship between real stock returns and inflation, thereby testing the generalized Fisher hypothesis, which states that real stock returns are independent of inflationary expectations.

<table>
<thead>
<tr>
<th>Model</th>
<th>Constant</th>
<th>INF</th>
<th>E(INF)</th>
<th>UE(INF)</th>
<th>$R^2$</th>
<th>F</th>
<th>D-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-1.7925</td>
<td>11.743</td>
<td>-</td>
<td>0.0001</td>
<td>0.968</td>
<td>2.0600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.035)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-1.8740</td>
<td>-34.970</td>
<td>-</td>
<td>0.0004</td>
<td>0.651</td>
<td>2.0750</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.6666)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-1.9521</td>
<td>-43.123</td>
<td>39.020</td>
<td>0.0012</td>
<td>0.439</td>
<td>2.0938</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.7113)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
The numbers in the parentheses are the t-statistics for testing the null-hypothesis that the coefficients are equal to zero. Whereas D-W refers to Durbin-Watson of test.

* ** represent a level of significance of 1%, 5%, and 10%, respectively.

The above regression results are obtained from the following models:

Model 1: $R = \beta_0 + \beta_1 \text{INF} + \epsilon$

Model 2: $R = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{E(INF)} + \epsilon$

Model 3: $R = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{UE(INF)} + \epsilon$


**Tests for Fama’s Proxy Hypothesis**

Testing the First Proposition of the Fama’s Proxy Hypothesis: A Negative Relationship between Inflation and Real Economic Activity

Even though the finding shows an independence of stock returns on inflation which contradicts the Fama’s proxy hypothesis, the study still continues to test both the Fama’s propositions. This test is aimed at confirming the consistency of the Fama’s proxy hypothesis in explaining the relationship between stock returns and inflation.

Table 4 presents the results for the first Proposition of the Fama’s proxy hypothesis, which tests the presence of negative relationship between inflation and real economic activity. Earlier, we found the stock market to be a good hedge against inflation as suggested by the Fisher hypothesis (Table 3), which contradicts the Fama’s proxy effect. Therefore, the results from the regression of inflation on real economic activity (Table 4) do contradict the Proposition (1) of the Fama’s proxy effect. It contradicts because real stock returns are positively related to real economic activity instead of being negatively related.

Based on Table 4, the FPE-based specification models show that actual, expected and unexpected inflation are not repressed on seven leading, contemporaneous, and lagging values of real economic. The optimal lag-lengths that are incorporated in the model are based on the Akaike’s (1969) Final Prediction Error.
### Table 4. Testing the First Proposition of the Fama's Proxy Hypothesis

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients' Sum of Lead-Lag Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.000635*</td>
</tr>
<tr>
<td></td>
<td>[7.583]</td>
</tr>
<tr>
<td>2</td>
<td>0.000161*</td>
</tr>
<tr>
<td></td>
<td>[26.783]</td>
</tr>
<tr>
<td>3</td>
<td>0.000323</td>
</tr>
<tr>
<td></td>
<td>[1.591]</td>
</tr>
</tbody>
</table>

**Note:** The numbers in [ ] are the F-statistics used for testing the null hypothesis that the coefficients' sum of lead-lag specification is equal to zero. The numbers in ( ) show the optimal lead-lag length based on the Akaike's (1969) Final Prediction Error Criteria. These numbers of leading and lagging values of real economic activity, for example, (-3,3) indicates that three leads and lags plus one contemporaneous value are incorporated in the model.

* and ** denote significance at the 1 percent and 5 percent levels, respectively.

\[
\text{Model 1: INF}_t = \alpha_0 + \sum_{k=-3}^{3} \alpha_k \text{REA}_{t-k} + \varepsilon_t
\]

\[
\text{Model 2: E(INF)}_t = \alpha_0 + \sum_{k=-3}^{3} \alpha_k \text{REA}_{t-k} + \varepsilon_t
\]

\[
\text{Model 3: UE(INF)}_t = \alpha_0 + \sum_{k=-3}^{3} \alpha_k \text{REA}_{t-k} + \varepsilon_t
\]

(FPE) criterion so as to avoid the inefficiency and biased parameter estimates from arbitrarily chosen lead-lag lengths. However, all possible lead-lag combinations with the minimum lead-lag length were also examined, but the discussion only focuses on FPE-based specification.

---

### Table 5. Testing the Second Proposition of the Fama's Proxy Hypothesis

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients' Sum of Lead-Lag Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.9788**</td>
</tr>
<tr>
<td></td>
<td>[2.406]</td>
</tr>
</tbody>
</table>

**Note:** The numbers in [ ] are the F-statistics used for testing the null hypothesis that the coefficients' sum of lead-lag specification is equal to zero. The numbers in ( ) show the optimal lead-lag length based on the Akaike's (1969) Final Prediction Error Criteria. These numbers of leading and lagging values of real economic activity, for example, (-3,3) indicates that three leads and lags plus one contemporaneous value are incorporated in the model.

* and ** denote significance at the 1% and 5% levels, respectively.

\[
\text{Model 1: SR}_t = \alpha_0 + \sum_{k=-3}^{3} \alpha_k \text{REA}_{t-k} + \varepsilon_t
\]

---

**Table 4.** Testing the First Proposition of the Fama's Proxy Hypothesis: Real Economic Activity: (Model 1 and 2) is not only given by the FPE (-7,7) model, but all the lead-lag combination models, which are all significant at the 1 percent level of significance. In general, the FPE-based model compared to the other arbitrarily chosen lead-lag combination models show the highest F-Statistics.

These significant positive relationships are also supported by regressing unexpected inflation on real economic activity. This finding is in contradiction with the first proposition of the Fama's proxy effect, but this fact may be consistent with the Philips' curve model.

---

**Table 5.** Testing the Second Proposition of the Fama's Proxy Hypothesis: Real Economic Activity: (Model 3) shows significant positive relationship at the 1 percent significant level, The lead-lag combinations of [-3,3] and [-5,5] are also significantly positive at the 5 percent level. This result, however, is not inconsistent with the Fama's proxy effect of proposition (2). However, the positive relationship...
Table 6. Real Stock Returns, Inflationary Trends, and Real Economic Activity

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[-3.3]</td>
<td>1.9764**</td>
<td></td>
<td>0.2475</td>
</tr>
<tr>
<td></td>
<td>(2.0930)</td>
<td></td>
<td>(0.258)</td>
</tr>
<tr>
<td>[-5.5]</td>
<td>2.4855**</td>
<td></td>
<td>-23.414</td>
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<tr>
<td></td>
<td>(2.054)</td>
<td></td>
<td>(-0.0467)**</td>
</tr>
<tr>
<td>[-7.7]</td>
<td>2.0470</td>
<td></td>
<td>1.3104**</td>
</tr>
<tr>
<td></td>
<td>(1.298)</td>
<td></td>
<td>(1.015)</td>
</tr>
<tr>
<td>[-9.9]</td>
<td>-0.7356</td>
<td></td>
<td>D-W = 1.6459</td>
</tr>
<tr>
<td></td>
<td>(0.556)</td>
<td></td>
<td>J-B = 373.911</td>
</tr>
<tr>
<td>[-11.11]</td>
<td>-0.5045</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.425)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(-3.3)</td>
<td>83.314</td>
<td></td>
<td>0.2285</td>
</tr>
<tr>
<td></td>
<td>(0.2576)</td>
<td></td>
<td>(0.639)</td>
</tr>
<tr>
<td>(-5.5)</td>
<td>1.1875</td>
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<td>-0.2415</td>
</tr>
<tr>
<td></td>
<td>(3.407)</td>
<td></td>
<td>(0.744)</td>
</tr>
<tr>
<td>[-7.7]</td>
<td>0.7622</td>
<td></td>
<td>0.8274</td>
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<tr>
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<td>(0.487)</td>
<td></td>
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<tr>
<td>[-9.9]</td>
<td>-0.038</td>
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<td>0.1180</td>
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<tr>
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<tr>
<td>[-11.11]</td>
<td>-0.6584</td>
<td></td>
<td>0.3322</td>
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<tr>
<td></td>
<td>(0.756)</td>
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</tr>
<tr>
<td><strong>Model 3</strong></td>
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</tr>
<tr>
<td>(-3.3)</td>
<td>0.2271</td>
<td></td>
<td>0.0465</td>
</tr>
<tr>
<td></td>
<td>(0.586)</td>
<td></td>
<td>(0.306)</td>
</tr>
<tr>
<td>(-5.5)</td>
<td>-0.2358</td>
<td></td>
<td>1.3104</td>
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<tr>
<td></td>
<td>(0.697)</td>
<td></td>
<td>(1.015)</td>
</tr>
<tr>
<td>[-7.7]</td>
<td>0.8404</td>
<td></td>
<td>D-W = 1.6459</td>
</tr>
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<td></td>
<td>(1.298)</td>
<td></td>
<td>J-B = 373.911</td>
</tr>
<tr>
<td>[-9.9]</td>
<td>-0.0267</td>
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</tr>
<tr>
<td></td>
<td>(0.380)</td>
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</tbody>
</table>

Note:
The numbers in ( ) and [ ] are the t-statistics and F-statistics, respectively, used for testing the null hypothesis that estimated and coefficients are equal to zero. The [ ] is the optimal lag length based on Akaike's Information Criteria (AIC) and the Schwarz's Information Criterion (SIC). The ** and *** denote levels of significance of 1 percent and 5 percent, respectively.

Real Stock Returns, Inflationary Trends, and Real Economic Activity

The following regression model was estimated:

\[
\text{SR}_{it} = \beta_0 + \beta_1 \text{INF}_{it} + \sum \beta_k \text{REA}_{it-k} + \epsilon_{it}
\]

The results are reported in Table 6. The model shows a significant positive relationship between real stock returns and real economic activity, with the coefficient on real economic activity being statistically significant at the 1% level. The model also includes an AR(1) term for the inflation rate, which is significant at the 5% level.

The results suggest that real economic activity has a positive impact on real stock returns, with a one-unit increase in real economic activity leading to a significant increase in real stock returns. This finding supports the view that real economic activity is an important driver of real stock returns.

Real Stock Returns, Inflationary Trends, and Real Economic Activity

The following regression model was estimated:

\[
\text{INF}_{it} = \alpha_0 + \sum \alpha_k \text{REA}_{it-k} + \epsilon_{it}
\]

The results are reported in Table 6. The model shows a significant positive relationship between inflation and real economic activity, with the coefficient on real economic activity being statistically significant at the 1% level. The model also includes an AR(1) term for the inflation rate, which is significant at the 5% level.

The results suggest that real economic activity has a positive impact on inflation, with a one-unit increase in real economic activity leading to a significant increase in inflation. This finding supports the view that real economic activity is an important driver of inflation.

Models 1 and 2 show that real economic activity and inflation are positively correlated, with a one-unit increase in real economic activity leading to a significant increase in inflation. This finding supports the view that real economic activity is an important driver of inflation. The results also suggest that real economic activity and inflation are positively correlated, with a one-unit increase in real economic activity leading to a significant increase in inflation. This finding supports the view that real economic activity is an important driver of inflation.

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for Malaysia (Table 3) still exists even the effect of real economic activity on inflation has been controlled for. The study does not reject the null hypothesis that the finding is still in line with the Fisher hypothesis. It is indicated by the insignificance of $\beta_1$, $\beta_2$, and $\beta_3$. Since the Fama’s proxy hypothesis explains the negative relationship between stock returns and inflation, therefore, this theory cannot be used to explain the independence between variables as observed for Malaysia. In general, the results from Table 5 and Table 6 are not much different. These results show that the Fama’s proxy effect framework cannot totally explain the independence of real stock returns on inflationary trends.

Conclusions

The well-documented negative relationships between real stock returns and inflationary trends in the developed countries are not supported by the findings for the Malaysian economy. The real stock returns are found to be independent of inflationary trends as suggested by the Fisher hypothesis, which implies that the real stock returns is a good hedge against inflation.

In an effort to explain the relationship between real stock returns and inflation, the study examined both propositions of the Fama’s proxy effect framework, which centers around a negative relationship between inflationary trends and real economic activity and a positive relationship between real stock returns and real economic activity. A positive real economic activity-inflation and a positive real economic activity-real stock returns relationship were recorded, which totally contradict the Fama’s proxy effect, but however are in line with the conventional macroeconomic Phillips’ curve theory. The consistency of the Fama’s proxy hypothesis was tested by introducing a two-step estimation that controlled for the inflation-real economic activity relationship. The study still found independence between real stock returns and inflation, which consistently against Fama’s proxy hypothesis.

References


31 Once the effect of real economic activity on inflation has been controlled for, the inflationary trends that were significant should not be. For this purpose, Waldron and Bergland (1985) simply tested their model by including the real economic activity as an independent variable into the real stock returns expected and unexpected relationship's models. Their results are not much different with this study.


AN EMPIRICAL EXAMINATION OF THE DIVIDEND INFORMATION CONTENTS IN THE BALANCE SHEET: A Signaling Approach∗

Agus Sartono
Anna Maria Sri Asih

This study examines whether the changes in the financial statements and dividends can together provide a better information transmission system to deliver missing private information on the firm among Indonesian firms as the sample. In doing so, this study consider three components in evaluating the dividend signaling theories: the expected content favorableness, the sign of dividend change, and the role of dividend signal. The finding shows that in Indonesia, the market reactions to the dividend announcements depend on the sign of dividend signal, whether it is confirmatory, clarificatory, or unclear. The other finding shows that this market is more concerned to the content expected favorableness rather than to the dividend sign.

∗This study is a contribution to the body of knowledge and the authors wish to express their gratitude to all those who have helped them in completing this paper.

References: dividend-dividend; signaling; role: clarificatory, Indonesia

∗∗We thank Klaus Schoderbek, Frank Mudek, and two anonymous referees for their valuable comments. Any remaining errors are our responsibility.