Fluctuations of Exchange Rate on the Valuation of Multinational Corporations as Taiwan’s Samples

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ABSTRACT

The main purpose for this research is to discover the reasons for exchange rate fluctuations affecting operating profits of the Multinational Corporation (MNC). At the same time, the author will research whether stock returns are influenced by fluctuations of exchange rates or not and also discuss what the impact is. This research also explores if stock returns are affected by the current periods or in the future periods. The author will try to find out whether fluctuations of exchange rates impose different impact on stock returns for different periods and seek what the impact of exchange rate fluctuations is on operating profits and stock returns change along with industries.

An understanding of the influence of exchange rate fluctuations on operating profits and stock values is useful for domestic investors while making investment decisions. In addition, an understanding of the influence of exchange rate fluctuations on the operating profits of a MNC company is useful to the corporate manager, who may apply related derived financial tools to avert exchange risks and reduce the impact of exchange risks upon the MNC companies. The influence of exchange fluctuations on stock returns is examined on the first period when exchange rates were under a Taiwan bubble economy and on the second period when exchange rates were affected by the Taiwan Strait Crisis and Asian Financial Crisis.

Keywords: Multinational Corporation (MNC), operating profits, stock values

INTRODUCTION

In recent years, a major macroeconomic policies of Taiwan government emphasizes by encouraging domestic manufacturers to retain the head companies (or the so-called holding companies) and major technology in Taiwan and to establish subsidiaries or branch companies and factories in Mainland China or southeastern Asian countries for the access to cheap labor and rich resources as well as the market locally. Such policy indeed brings a glean hope of survival to domestic labor-intensive required industries. Under this model, revolutionary changes occur in domestic industries and many companies became multi-national corporations (MNCs). To comply with the regulations of the communiqué in Taiwan, enterprises that establish subsidiaries, branches and factories overseas have to incorporate their profit and loss statements to the financial reports at the end of each fiscal year. Therefore, items of foreign exchange profits and losses and translation adjustments show up on corporate financial statements. As financial performance of foreign subsidiaries has to be converted to the currency of their native countries and incorporated to the consolidated financial reports at the end of each fiscal year, translation risks are resulted from different exchange rates between two countries; however, only accounting risks are taken into consideration on book losses and profits. There are two kinds of risks exchange rates impose upon a MNC. One is transaction risk and the other is operation risk. The former refers to the rights and obligations generated from operation of an MNC enterprise and the latter means operating cash flow is affected by exchange rates when unexpected supply and demand on the market changes. Hence, fluctuations of exchange rates are not the only problem for MNC companies, but become a general problem all industries have to confront.

Exchange rate exposure generated from transaction risk reflects the operating profits of the MNC. Transaction and operation risks influence the profiting capability and net cash flow of the MNC companies in a comprehensive way, which are reflected by fluctuations of stock prices on the market. Generally speaking, main influential factors of stock changes consist of company factor, industry factor, market factor and international factor. Besides, domestic and global macroeconomic variables and industrial economic strategies of the government are also important factors affecting stock prices.
Consequently, the purpose of this research is to identify the relationship between the operation status of a MNC and exchange rates as well as different influential levels in different industries. Furthermore, a further understanding of the impact of exchange rates upon immediate or later operating profits of a MNC is also studied. As profiting capability of a MNC company plays a critical role for stock prices, the author became interested in studying the influence of exchange rate changes on stock prices.

**RESEARCH QUESTIONS AND HYPOTHESES**

In order to know if exchange rate fluctuations impose impact upon unexpected operating profits and stock value of a MNC along with resultant effects as well as to decide a contemporary or lagging relationship between a MNC corporate values and fluctuations of exchange rates, three hypotheses were presented as follows:

Hypothesis One: There is a significant relationship between exchange rate fluctuations and rate of return on stocks.

Hypothesis Two: There is a significant relationship between exchange rate fluctuations and unexpected operating profits of the MNC.

Hypothesis Three: There is a contemporary or lagging relationship between exchange rate fluctuations and a MNC company stock values.

**LITERATURE REVIEW**

According to Christos P., Betty J. S. and Paul A. L. (2001), a multinational firm is defined as a firm that has at least one majority owned foreign subsidiary. Mann (1986) reviews “the presented of both aggregate macroeconomic evidence on how changes in the value of the dollar affect overall US export and import prices, and disaggregated microeconomic evidence, including the behavior of prices and profit margins, for a number of individual industries. Analysis indicates that, over the past decade, exchange rate changes have been absorbed into the profit margins of foreign suppliers to a considerable extent and for relatively long periods. Empirical evidence suggests that the long-run relationship between the exchange rate and import prices may be changing. The trend toward buying worldwide by US and foreign multinationals, newly established distributor networks in the US, and a greater ability to hedge foreign currency exposure in international credit markets could mean a smaller long-run pass-through of exchange rate changes to import and export prices. If US producers follow their historical patterns and do not broaden their profit margins on their exports too much, export performance should improve.”

Among the documents on the impact of exchange rate fluctuations upon multi-national enterprises, Jorion (1990) indicated that all firms were susceptible to exchange rate exposure; however, the number of firms affected by exchange rate fluctuations was not high. Also, empirical tests of the sensitivity of stock returns to exchange rate changes, Jorion (1990) failed to find a significant link between exchange rate changes and the stock returns of US firms, and US and Canadian firms respectively. Why the rate of exchange exposure for individual multi-national enterprises was significantly higher in the real world than that in the empirical results of Jorion (1990) was possibly due to exchange rates between the currencies of overseas branches against US dollars. The reason is that Jorion (1990) used the exchange rate of average weighted volume of trade based on the exchange rates between the currencies of major trading countries of America against US dollars. Meanwhile, Jorion (1990) indicated that exchange rate exposure varied with time. Chow, Lee & Solt (1995) proved that the significance of exchange rate exposure increased as duration of the sample extended and exposure type also varied with time.

For the studies on the relationship between MNC companies and exchange rate risks, Aggarwal (1981) and Ajayi & Mougoue (1996) indicated that exchange rate fluctuations affected stock prices significantly in a reverse direction because an apparent positive relationship between stock prices and US dollars existed (depreciation of US dollars leading to decreased stock prices in America). Results of the research conducted by Aggarwal (1981) supported J curve effect because the effect of depreciated local currency on increased export would not be shown after two to three years and domestic impact in the beginning was increase in import costs. Results of the research conducted by Ajayi & Mougoue (1996) show that an increase in aggregate domestic stock price has a negative short-run effect on domestic
currency value. However, in the long run, increases in stock prices have a positive effect on domestic currency value. On the other hand, currency depreciation has a negative short-run and long-run effect on the stock market. Ajayi & Mougoue (1996) used cointegration analysis and error correction analysis and error correction models, found evidence in favor of dynamic linkages between stock prices and exchange rates for eight industrialized economies. They found evidence that exchange rates changes exerted significant dynamic influence on stock returns for eight industrialized countries. Empirical results of the research conducted by Abdalla (1997) also revealed there was a cause and effect relationship between exchange rates and stock prices. He claimed a negative correlation existed between exchange rate fluctuations and stock price indexes for those four industrial countries studied. That is, when the US dollars are appreciated, foreign stock prices corresponding to US stock prices fell except the Philippines; i.e., exchange fluctuations affected export of the corporations and then corporate stock prices at the end.

**METHODOLOGY**

The purpose of this research is to study the impact of exchange rate fluctuations upon rate of return on the MNC company stocks and operating profit of the MNC company. According to the author’s a research hypothesis to set up an empirical models, it will be examined whether the hypothesis is significant relationship or not.

The influence of exchange rate fluctuations on rate of return on the MNC corporate stocks is mainly tested in this hypothesis and exchange rate fluctuations are divided into the current term, one lagging term and two lagging terms. If the coefficients of exchange rate fluctuations for the current term, one lagging term and two lagging terms are significantly different from 0, it means null hypothesis is rejected because exchange rate fluctuations of the current term, one lagging and two lagging terms all affect the rate of return on MNC company stocks remarkably; i.e., exchange rate fluctuations will influence the rate of return on stocks significantly for the current term, one lagging term and two lagging terms.

The influence of exchange rate fluctuations on unexpected operating profits of the MNC is mainly tested in this hypothesis and exchange rate fluctuations are divided into the current term, one lagging and two lagging terms. If the coefficients of exchange rate fluctuations for the current term, one lagging and two lagging terms are all 0, it means null hypothesis is accepted because exchange rate fluctuations of the current term, one lagging term and two lagging terms do not affect the unexpected operating profits of the MNC remarkably; i.e., exchange rate fluctuations will not influence the unexpected operating profits of a MNC significantly for the current term, one lagging and two lagging terms.

The influence of exchange rate fluctuations on the current period or the following future period of the MNC is mainly tested in this hypothesis and exchange rate fluctuations are divided into the current term, one lagging term and two lagging term. If the coefficient of exchange rate fluctuations at current term is significantly different from 0 and that of one and two lagging terms is 0, it means exchange rate fluctuations of the current term will affect the unexpected operating profits of a MNC; however, those of one and two lagging terms won’t. That is to say, exchange rate fluctuations will only impose impact upon unexpected operating profits of the current term, but not upon those of the following one and two terms, which is the so-called contractual effects.

If the coefficient of exchange rate fluctuations at current term is 0 and that of one and two lagging terms are different from 0, it means exchange rate fluctuations of the current term will not affect the unexpected operating profits of a MNC, however, those of one and two lagging terms will. That is to say, exchange rate fluctuations will only impose impact upon unexpected operating profits of the following one and two terms, but not upon the current term, which is the so-called competitive effects.

If the coefficient of exchange fluctuations at current term, one or two lagging terms is not 0, it means exchange variations will not only influence the unexpected operating profits of the MNC at the current term, but also those at the following one or two terms. Therefore, contractual and competitive effects exist simultaneously.

Jorion(1990) mentioned the exchange rate exposure time series models and the Capital Asset Pricing Model(CAPM) and Arbitrage Pricing Theory(APT) concept as the fundamental Model’s base. Capital Asset Pricing Model(CAPM) is an equilibrium model of asset pricing which states that the expected return in a security is a positive linear function of the security’s sensitivity to changes in the market portfolio’s return. Arbitrage Pricing Theory(APT) is
an equilibrium model of asset pricing which states that the expected return on a security is a linear function of the security’s sensitivity to various common factors. The arbitrage pricing theory (APT) was applied to explore the influence of exchange rate variations on rate of return on the MNC company stocks. In addition to exchange rate fluctuations and the unit factor of average rate of return on market in the Capital Asset Pricing Model (CAPM), other macroeconomic variables affecting stock returns were also taken into consideration. Few variables were selected with the factor analysis method to overcome the multicollinearity problem among macroeconomic variables. Time series of each variable was examined to be stationary or not by unit root test. If it was not stationary, series differencing had to be stationary first and examined with Chow breakpoint test prior to conducting a regression analysis of stock returns for individual share so as to decide if division of two periods of the research term necessary.

As for the influence of exchange rate fluctuations on unexpected operating profit of a MNC company, conduct unit root test to examine if operating profit of each MNC company is stationary or not. If time series of operating profit was non-stationary, series differencing had to be stationary first and assessed with the theory of Walsh (1994) for the impact of operation profit of previous quarters on that quarter. Error term can be obtained through SPSS V12.0 & E-views V4.1-based comprehensive auto-regressive model. Next, it would be examined if error term series have the effect for Auto-Regressive Conditional Heteroscedasticity (ARCH). If ARCH exists, the unexpected operating profit series equals to auto-regressive error term divided by conditional variance. If not, then the unexpected surplus equals to auto-regressive error term. Last, apply Nested hypothesis to test if exchange fluctuations affect unexpected surplus.

As the operating profits of MNC companies in Taiwan are published quarterly, a quarter-based term of operating profits was studied. The duration of this research started from the first quarter of 1991 to the fourth quarter of 2002 with the fourth quarter of 1996 as the dividing point. There were 24 terms of data in the first period (from the 1st quarter of 1991 to the 4th quarter of 1996) and another 24 terms of data in the second period (from the 1st quarter of 1997 to the 4th quarter of 2002).

Two periods were divided for the study of the influence of exchange rate fluctuations on rate of return on the MNC company stocks and the study of the impact of exchange fluctuations upon operating profits of the MNCs.

**EMPIRICAL RESULTS**

In addition to the average rate of return on market and foreign exchange rate fluctuations, another five variables were considered as influential factors of stock returns, which were Money Supply (M1B), No-Risk Interest Rate(INT), Inflation Rate(INF), Gross Domestic Product (GDP) and Stock Weighted Index(Index). As there is a multicollinearity problem among these variables.

Refer to the eigenval of each major component. Eigenval refers to the variance extracted from every new factor. Since there was only one major component whose eigenval was greater than 1, this one major component was selected. According to the standard for Eigenval value being 1, factor one can explain 74.97% variables.

Refer to correlation coefficients of one factor selected and each variable. Choose the greatest correlation coefficient of each factor. The variable of M1B was chosen for Factor 1.

After determining the variables, the regression model of exchange rate fluctuations against quarterly stock returns is as follows:

\[
RETURN_{it} = \alpha_{it} + \sum_{s=0}^{2} \beta_{is} \Delta Exchange_{it-(s)} + X1_{it} M1B_{t} + \delta_{it} Market_{mt} + \varepsilon_{it}
\]

Return\(_{it}\): rate of return on stocks in MNC company i at term t
\(\beta_{is}\): coefficient of a MNC company i under exchange rate exposure to estimate the impact of exchange rate fluctuations at lagging quarter s upon stock returns; s = 0, 1, 2 standing for the coefficient of exchange rate of the current, one and two lagging terms
\(\Delta Exchange_{it}\): exchange rate fluctuations at term t
M1B\(_{t}\): Money Supply at term t
Market\(_{mt}\): average rate of return on market at term t
Whether time series data were stationary or not was examined by Augmented Dickey-Fuller unit root test in this research. Series data included stock returns, exchange rate fluctuations of current, one and two lagging terms, M1B, average rate of stock return on market and operating profit of each MNC company.

Two periods were divided in this research, series data from the first quarter of 1991 to the fourth quarter of 2002 were used as tested periods. The reason why these time-series data were not tested in two periods respectively was because long-term series data had to be stationary. Stationary meant when t values of stock returns in each MNC company reached to a significant level. Besides, there was no auto-correlation of residuals for all DW values (DW ranged between 1.61 and 2.38 at term 48). All were not stationary cycles except for Pacific Electric Wire, Pacific Const., Ambassador Hotel, China Development Bank. Therefore, one level differencing series was required while conducting the regression analysis of stock returns in all of them except for Pacific Electric Wire, Pacific Const., Ambassador Hotel, China Development Bank.

When raw data are not stationary, differencing is required prior to the unit root test. After one-level differencing stock returns of all of them except for Pacific Electric Wire, Pacific Const., Ambassador Hotel, China Development Bank before the unit root test, stationary cycles were resulted (with significant T values).

As for general Macroeconomics variables, the results of unit root tests for foreign exchange rate for current term, and one lagging term, rejected null hypothesis; i.e., they were both stationary cycles with significant T values and DW values also indicated there was no auto-correlation for residuals (over range between 1.61 and 2.38).

On the other hand, the results of unit root tests for foreign exchange rate for two lagging terms, M1B, and Market Average Stock Return, didn’t reject null hypothesis; i.e., they were not stationary cycles with significant T values though DW values indicated there was no auto-correlation for residuals (between 1.61 and 2.38). Therefore, one level differencing series was required while conducting the regression analysis of foreign exchange rate for two lagging terms, M1B, and market average stock return.

The Influence of Exchange Rate Fluctuations on Operating Profit of the MNC

It was discovered that other MNC companies were stationary except for Universal Cement, Chien Tai Cement, Ve Wong, Namchow Chemical, Taiwan Glass, Kuo Bin Ceramic, Long Chen Paper, U-Lead Ind., Nan Kang Rubber Tire, Cathay Const., China container Terminal Co., Wan Hwa Enterprise, Garden Hotel, and Taishin International.

Henceforth, two-level differencing series was required for unit root tests. We can find out all were stationary cycles.

Two periods were divided in the empirical study of the influence of exchange rate fluctuations on stock returns since the duration was longer (from 1991 to 2002), two times Taiwan Straits were conducted the unstable economics situations, the bubble economy in Taiwan resulted from the bull market and extreme appreciation of New Taiwan dollars against US dollars. To examine any significant differences of regressive parameters for both periods as well as the necessity of division, Chow test was applied to examine the stability of the parameters.

First, the duration from the first quarter of 1991 to the fourth quarter of 1996 was based for the unrestricted model 1 and that from the first quarter of 1997 to the fourth quarter of 2002 was based for the unrestricted model 2 as follows:

\[ R_{e\,run\,1} = \alpha_1 + \sum_{x=0}^{2} \beta_{x1} \Delta \text{Exchange}_{t-x} + X1_{t1} R_{e\,turn\,1} + X2_{t1} M1B_{t1} + X3_{t1} \text{Market}_{mt\,1} + \varepsilon_{t1} \]

\[ R_{e\,run\,2} = \alpha_2 + \sum_{x=0}^{2} \beta_{x2} \Delta \text{Exchange}_{t-x} + X1_{t2} R_{e\,turn\,2} + X2_{t2} M1B_{t2} + X3_{t2} \text{Market}_{mt\,2} + \varepsilon_{t2} \]

Add the residual sum of squares for unrestricted model 1 (URSS1) and that for unrestricted model 2 (URSS2); i.e. URSS = URSS1 + URSS2.

Combine these two periods into one for the restricted model as follows:

\[ R_{e\,run} = \alpha + \sum_{x=0}^{2} \beta_x \Delta \text{Exchange}_{t-x} + X1 \text{R}_{e\,turn} + X2 M1B + X3 \text{Market}_{mt} + \varepsilon \]

The residual sum of squares of the restricted model was obtained (RRSS).

\[ H_0: \beta_{11} = \beta_{21}, \beta_{12} = \beta_{22}, ..., \beta_{1k} = \beta_{2k}, \alpha_1 = \alpha_2 \]
The test result showed F value based on residual sum of squares was smaller than F critical value and null hypothesis wasn’t rejected, which revealed there were not significant structural changes of regressive parameters for both groups. As a result, samples should not be divided into two periods for respective tests.

The impact of operating profit of previous quarters upon that of current quarter was decided by the optimum number of lagging terms, which was estimated by the theory of Walsh (1994) by using four lagging terms. The auto-regression model of operating profit can be shown as follows:

\[ OP_{it} = \alpha_i + \sum_{n=1}^{4} \beta_n OP_{i,t-n} + \varepsilon_{it} \]

OP_{it}: operating profit of company i at term t

After using the optimum number of lagging 4 terms, auto-correlation in the auto-regressive model would be tested with Q value.

**Heterogeneity test**

Variances of residuals obtained from the auto-regression model need to be tested for any changes with time. Thus, ARCH was applied with the regression model as the following:

\[ e_{it}^2 = \alpha + \sum \lambda_i e_{i,t-1}^2 + \mu \]

Next, LM (number of observation values * coefficient of determination) will be calculated. If the calculated LM value was greater than the critical value in Chi-square distribution, ARCH effect existed. When ARCH effect was examined (with a significant LM value), conditional variance would be obtained from the ARCH model. The unexpected operating profit of a MNC company equals to the residual in the auto-regression model divided by conditional variance. When ARCH effect was not examined (with a significant LM value), the unexpected operating profit of a MNC company equals to the residual in the auto-regression model. Upon completion of the aforementioned empirical analyses, the impact of exchange rate fluctuations upon all industries can be analyzed with Nested hypothesis. T values of all coefficients were tested to understand positive or negative impact of each coefficient upon unexpected operating profits and stock returns.

**The influence of exchange rate fluctuations on unexpected operating profits on MNCs industries**

The regression model for exchange rate fluctuations against unexpected operating profits is expressed as follows:

Unrestricted model:

\[ UOP = \alpha_{it} + \sum_{s=0}^{2} \gamma_{is} \Delta Exchange_{t-s}^{e_{(t-s)}} + \varepsilon_{it} \]

Restricted model 1: \( \gamma_0=0 \)

\[ UOP = \alpha_{it} + \sum_{s=1}^{2} \gamma_{is} \Delta Exchange_{t-s}^{e_{(t-s)}} + \varepsilon_{it} \]

After having residual sum of squares (URSS) from the unrestricted model and that (RRSS1) from restricted model 1, F value can be calculated through the following equation:

\[ F = \frac{(RRSS1-URSS)/q}{URSS/(n-k)} \]

If F value is greater than F critical value, the null hypothesis of \( \gamma_0=0 \) is rejected, which means exchange rate fluctuations of the current term impose significant impact upon unexpected operating profit in that industry. The same rule can be applied to stock returns for one and two lagging periods for all industries so that whether exchange rate variations of the current term affect unexpected operating profits for the following one and two terms will be known. Refer to empirical results for exchange rate fluctuations against unexpected operating profit for current, one lagging term, two lagging terms.

It was discovered that exchange rate fluctuations didn’t affect the unexpected operating profits for all industries, which meant risks generated from exchange rate variations usually did not reflect on the financial reports of the current
term, one lagging term, two lagging terms directly. More substantially, related derived financial instruments were possibly used to avert risks, which indirectly influenced sales revenues and purchase costs of the MNC companies leading to product the operating profits. It indicated a negative correlation between exchange rate fluctuations of current term, one lagging term, two lagging terms and unexpected surplus; i.e. exchange rate variations are negatively correlated to the unexpected operating profit for the following current term, one term and two terms. In other words, when New Taiwan dollars were appreciated, operating profit of a MNC company as a whole would increase. On the contrary, when New Taiwan dollars were depreciated, operating profit of a MNC company as a whole would decrease.

The influence of exchange rate fluctuations on rate of stock returns on the MNCs industries

The regression model of exchange rate fluctuations against stock returns can be shown as follows:

Unrestricted model:

\[
\text{Return}_{it} = \alpha_i + \sum_{s=0}^{2} \beta_{is} \Delta \text{Exchange}_{it-s} + X_{1i} M1B_t + X_{2i} \text{Market}_{mt} + \epsilon_{it}
\]

Restricted model 2: \( \beta_0=0 \)

\[
\text{Return}_{it} = \alpha_i + \sum_{s=1}^{2} \beta_{is} \Delta \text{Exchange}_{it-s} + X_{1i} M1B_t + X_{2i} \text{Market}_{mt} + \epsilon_{it}
\]

After having residual sum of squares (URSS) from the unrestricted model and that (RRSS1) from restricted model 2, F value can be calculated through the following equation:

\[
F = \frac{(RRSS2 - URSS)}{q} / \frac{URSS}{(n-k)}
\]

q: limited parameter number imposed on the hypothesis
n: number of samples
k: number of independent variables + 1

If F value is greater than F critical value, the null hypothesis of \( \beta_0=0 \) is rejected, which means exchange rate fluctuations of the current term impose significant impact upon stock returns in that industry. The same rule can be applied to calculation of F values between exchange rate fluctuations of one and two lagging terms, M1B, and average rate of return on market against stock returns of the industries to decide if the above factors affect rate of return on stocks. The influence of exchange rate fluctuations of current, one and two lagging periods upon stock returns equals to the impact of exchange rate fluctuations for the current, the following one and two terms upon stock returns.

It implied exchange rate fluctuations influenced stock returns of all industries for the current, the following one and two terms, which means competitive effects for the future can be predicted on the market and investors are quite quick in response to the impact of exchange rate fluctuations upon MNC company values in the future.

Macroeconomic variables, M1B, didn’t affect significantly stock returns in all industries. However, market average returns affected significantly stock returns in all industries. Positive influence of M1B on stock returns was expected. When money supply increase in the money market, investors would be attracted to the stock market where return on investment was greater than the low interest rate in Bank. The result for the increase of money supply will lead to increase the rate of stock return for MNC companies. On the contrary, funds on the market would flow from stocks to bonds and banks when interest rates are high due to lower money supply market. Credit deflation causes increase in loan costs for the MNC companies, decrease in profits and reduction of stock prices.

Market average returns imposes negative impact upon stock returns, which is to say market average return to increase causes stock prices to reduce. As production costs of MNC companies increase, increased costs can’t be shifted on to commodities and it’s also difficult to expand the limited customer market. Therefore, profits will be reduced. Besides, investors transfer their funds from the stock market to value preserved assets as they worry about depreciated capital they invest, leading stocks to fall. Also, it was possibly because sales volume should decrease though domestic production increased. Reduction of profits causes a bear market.
CONCLUSION AND SUGGESTIONS

Conclusion

The main purpose of this research is to study the impact of exchange rate fluctuations upon stock returns and unexpected operating profits of the MNC companies. The arbitrage pricing theory (APT), one macroeconomic variable of M1B selected through factor analysis by extraction from SPSS V12.0, independent variables of average rate of return on market and exchange rate fluctuations of the current, one and two lagging periods were adopted for regression analysis of stock returns. The subjective decision of four lagging periods by the hypothesis of Walsh (1994) and the decision of the optimum number of lagging four terms via the theory of Walsh (1994) were applied to determine if surplus of that current quarter was affected by that of previous quarters. ARIMA model was executed by E-views v4.1 and derived residual series was examined for ARCH. If ARCH exists, the series of unexpected operating profits is residual series divided by conditional variance. If not, the series of unexpected operating profits equals to the original residual series. Exchange rate fluctuations only affect unexpected operating profits of the following two terms for all industries, which develops competitive effects. Substantially, all industries may use related derived financial instruments to avert exchange rate exposure, which influences sales revenues and purchase costs of the MNC companies indirectly and such impact would be delayed and reflected on financial statements at a later time. Exchange rate variations are negatively correlated to the unexpected operating profits of the following two terms. It means when New Taiwan dollars appreciate, integral operating profits of a MNC company increase and vice versa. As properties of each industry are implicit in this approach, analysis of individual industry is required. Exchange rate fluctuations develop contractual effects in the shipping industries since no hedging instruments were taken against exchange rate exposure. The reason why such impact did not extend to the following one and two terms was because they might transfer high import costs to the consumers or the buyer market. Exchange rate fluctuations are positively correlated to the unexpected operating profits in the shipping industry. For the shipping industry, it relies on greater domestic demand than foreign demand. As a result, the shipping industry suffered exchange rate loss due to import contracts and made less profit when New Taiwan dollars depreciated. Competitive effects were developed in the plastics and department store industries. Both industries might take related hedging precautions against exchange rate exposure and no contractual effects came into existence. For the plastics industry, domestic market was the major concern and main raw materials were imported. Thus, exchange rate fluctuations were negatively correlated to the unexpected operating profits for the following two terms. Contractual and competitive effects were developed in the seven industries included the cement, food, textiles, electrical appliances, glass, pulp & paper and construction industries. These industries might not make use of derived financial instruments against exchange rate exposure. For the export-oriented textile and glass industries, they depended on the imported critical petrochemical raw materials extremely though the American market was not large. Therefore, raw material cost increased as New Taiwan dollars depreciated against US dollars, which led to reduction of operating revenues. Exchange rate fluctuations were negatively correlated to the unexpected operating profits in this industry. As for the cement and electrical appliances wire & cable industries, exchange rate fluctuations were positively correlated to the unexpected operating profits but negatively correlated to the unexpected operating profits for the following terms. As both industries accounted for an extremely high export rate, depreciation of New Taiwan dollars increased the operating profits of the MNC company at that current term, but decreased later as import cost increased. Exchange rate fluctuations were positively correlated to stock returns in the food industries whose stock returns were influenced by exchange rate changes, which means stock returns increased as New Taiwan dollars depreciated against US dollars. Negative correlations existed between exchange rate fluctuations and unexpected operating profits of the current term in pulp & paper and construction industries and positive correlations for the following terms. As import rates are quite high in pulp & paper and construction industries, depreciation of New Taiwan dollars may decrease operating profits of the current term; however, operating profits will be increased later due to the decrease in export costs. Exchange rate fluctuations imposed no impact upon unexpected operating profits in the electrical machinery, chemicals, iron & steel, rubber, automobile, electrics, tourist, and banking & insurance industries because it relied on the domestic market mostly. Therefore, MNC companies would designate special personnel to pay attention to the price of raw material and exchange rates in addition to taking proper precautions.
Exchange rate fluctuations affected stock returns significantly at the current and the following one to two terms in all industries. Competitive effects can be reflected on the market as investors respond to exchange rate variations fast. M1B was positively correlated to overall stock returns, which means investors were attracted to the stock market with better return on investment instead of savings and bonds and stock prices were thus rocketing. Market average returns was negatively correlated to overall stock returns since rising prices not only increased costs and decreased earnings for MNC companies, but also caused investors to turn to bonds leading stock prices to fall down dramatically and impact upon stock returns since sales volume decreased though domestic production increased, which forced stocks to come down. For the industries whose stock returns were affected by exchange rate fluctuations, a positive correlation existed between exchange rate fluctuations and stock returns. The possible reason was New Taiwan dollars were expected to appreciate when they were depreciating in fact and foreign investors were confident about the economy in Taiwan for the future. Since domestic investors usually regarded foreign capital as an important index on the stock market, stock returns increased accordingly. When unexpected operating profits were remarkably influenced by exchange rate fluctuations, stock returns were also affected in the foods and electrical appliances, wire & cable. Therefore, when exchange rate variations influenced the unexpected operating profits in these two industries, such impact would be reflected by stock prices immediately. However, exchange rate fluctuations only affected the unexpected operating profits of the MNC companies instead of on stock returns in the cement and textiles industries, which might be due to less foreign investment. Negative correlations existed between exchange rate fluctuations and unexpected operating profits of the current term in pulp & paper and construction industries and positive correlations for the following terms. As import rates are quite high in pulp & paper and construction industries, depreciation of New Taiwan dollars may decrease operating profits of the current term; however, operating profits will be increased later due to the decrease in export costs.

Suggestions

As international trade is quite common in Taiwan, exchange rates might impose significant impact upon profits and stocks of the MNC companies. Since America is the greatest export country to Taiwan, exchange rates of New Taiwan dollars against US dollars became the subject of study. However, volumes of trade with other countries like Japan, Mainland China and nations in southeastern Asia are increasing and play an important role. As a result, the influence of exchange rates between Taiwan and other countries such as Japan, Hong Kong, China and southeastern Asian countries on corporate surplus and stock returns will be a good subject for follow-up studies.

For the study on the relationship between exchange rate fluctuations and corporate surplus, only three variables of exchange variations at current, one and two lagging terms were taken into account. Other variables that might affect operating profits of the MNC companies are not considered, which deserves to be further explored for researchers in the future.

Corporate stock prices will be influenced more or less by fluctuations of exchange rates no matter whether the companies possess overseas subsidiaries/affiliates or not, belong to multinational organizations or are engaged in transactions in foreign currencies. Thus, samples in this research were targeted at larger MNC companies, not general small-middle enterprises. Furthermore, whether the sample MNC companies took derived financial hedging instruments against exchange rate exposure or not was not explored. Consequently, it is suggested that different sample MNC companies be divided based on risk aversion and different responses to exchange rate exposure between these two divided groups be studied in the follow-up researches.

REFERENCES


