FOREIGN EXCHANGE EFFECTS AND SHARE PRICES

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ABSTRACT

In recent years, U.S. multinational corporations have reported substantial gains and losses due to fluctuations in currency values. Previous studies have examined the impact on share prices of changes in accounting rules for foreign exchange gains and losses as reported on corporate balance sheets with mixed results. We examine the relationship between share prices and foreign exchange gains and losses as reported on cash flow statements using the foreign exchange effects as a proxy for currency risk. We test three models using 2011 second quarter percentage change in share price, monthly dollar change for the first two calendar quarters for 2011, and the monthly percentage change in share prices for the same period as dependent variables. Foreign exchange effects are found to be statistically significantly related to the quarterly change in share prices. Foreign exchange effects were also found to be significant for the March-April period coinciding with the earnings reporting season in the second quarter.

INTRODUCTION

As trade and economic activity over the past several decades increasingly globalized, companies throughout the world have expanded operations outside of their home countries. They have done so to increase market share and sales, improve profit margins, and achieve economies of scale. As the U.S., European, and Japanese economies declined in 2008 or experienced subsequent slow economic growth, firms have shifted their focus onto the emerging economies, especially China, which are currently experiencing rapid growth. FAS 52 took effect in 1981 and specifies the accounting procedures for consolidating foreign operations into the

financial statements of U.S. multinational corporations (MNCs). As a result, an issue in finance

has been the impact of the accounting for gains or losses on converting foreign currency

denominated assets into U.S. dollars. Research in the 1980s and 1990s has produced mixed

results concerning the impact of the transition in the foreign exchange accounting rules from

FAS 8 to FAS 52 on stock returns (and prices).

Financial markets have changed substantially since the publications of previous studies

on the stock market impact of the accounting treatment of foreign exchange gains and losses.

Not only has real economic activity become globalized, financial markets and participants have

as well. Over the past two decades we have seen the growing importance of the equity and fixed

income trading of international investors with the increasing number of hedge funds, institutional

investors, sovereign wealth funds and wealth management firms participating in financial

markets. Since the stock market and economic decline of 2008, the U.S. financial markets have

become dominated by these professional investors as individual investors have remained on the

sideline. Currency trading has become increasingly globalized, and we have witnessed

unexpectedly large changes in value in leading trading currencies such as the depreciation of the

U.S. dollar before the 2008 economic decline and its subsequent appreciation and the more

recent depreciation of the euro. In this new environment of global trade, global financial and

currency markets, and global investing we might expect greater attention paid by investors to the

impact of currency fluctuations on reported earnings and on the financial statements of

corporations. In the second quarter of 2011, the Wall Street Journal reported (Loftus 2011) that

pharmaceutical firms Pfizer and Eli Lilly had benefitted from the recent depreciation in the U.S.

dollar. About one-sixth of Lilly's increase in revenue was attributed to changes in exchange

rates. Loftus cited Johnson and Johnson's annual report which indicated that each 1% change in

the value of the U.S. dollar changes net income by $65 million and revenue by $300 million. Other U.S. multinationals would feel the same impact on earnings and revenue with changes in currency values. In an environment of volatile currency values, we would expect investors to take notice and react accordingly. In efficient markets, the changes of firms' financial conditions caused by fluctuations in exchange rates would be expected to be capitalized into share prices as investors absorb the information.

With the changes in the financial environment in which corporations with international operations exist, the accounting translation process under U.S. and international accounting standards may be more important today than expected in 1981 when the accounting profession modified the standards used to translate assets, liabilities, and equity of corporations. This would be especially true if investors are concerned with the impact of currency volatility on corporate financial conditions. The purpose of this study is to examine whether stock prices reflect the impact of currency risk (fluctuations in currency values) through reported foreign exchange gains or losses reported on corporate cash flow statements. We examine the relationship between stock prices of corporations that are publicly traded in the United States and the foreign exchange gains or losses as reported under FAS 52 and international accounting standards (IASB).

LITERATURE REVIEW: FOREIGN CURRENCY TRANSLATION, FASB 52, AND SHARE PRICES

Previous research has focused on two related areas: the impact of FAS 52 on share prices and the impact of currency volatility on share prices (or returns). The earlier studies examined the impact of FAS 52 and the change from the original accounting standard under FAS 8 to FAS 52. Garlicki, Fabozzi, and Fonfeder (1987) examined the investor reaction to earnings impact of the change from FAS 8 to FAS 52 and did not find any significant positive reaction and

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concluded that investors can discern the difference between accounting changes and earnings effects. Ziebart and Kim (1987) examined the pricing impact of the proposal of change in accounting for foreign currency gain or loss and found there were market effects and investors had reacted to the draft of FAS 52. Chin, Comisky and Mulford (1990) looked at the foreign currency translation gains and losses on the variations in security analyst forecasts and found that there was less variation in analyst earnings forecasts related to FAS 52. Kim and Ziebart (1991) examined the price reactions and stock trading volumes occurring with the draft and issuance of FAS 52. They found positive effects with the draft announcement and issuance of the standards. Soo and Soo (1994) found that investors do incorporate foreign exchange gains and losses reported in income into stock prices under FAS 52 and FAS 8 as they reflect on the earnings of firms. Razaee (1994) used event study methodology and found return effects for the release of the draft of FAS 52 that were related to firm size and financial leverage, though no impact was found when the standard went into effect. Bartov and Bodnar (1995) investigated the impact of different currencies under the two accounting rules and found that it did make a difference in investors' ability to discern the impact on firm value. Shin and Soenen (1999) concluded that there was a significant relationship between currency risk (using the U.S. dollar as the benchmark currency) and stock market performance. They also found that the relationship exists with a one-month lag after the fiscal year with the impact decreasing over time. Bazaz and Senteney (2001) found that unrealized foreign currency gains and losses were valued by investors under FAS 52. Pinto (2001), using a sample of 204 MNCs with operations in Germany and Mexico, found that per share foreign currency translation gains and losses predicted changes in earnings per share. Louis (2003), however, found that the translation gain or loss was not important in valuing a sample of manufacturing firms. A related study on stock prices and

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currency risk has been published by Jorion (1991) who found a statistically significant relationship between stock returns and the value of the U.S. dollar. DeBondt (2008) tested a stock price model that indicated fundamental factors beyond a firm's price-earnings ratio, such as exchange risk, are important in determining share price. In general, the results on the return or pricing impacts of the currency accounting under FAS 52 (and relative to its predecessor FAS 8) have been mixed with initial results not indicating significant abnormal returns and later studies providing evidence of some impact as it relates to earnings. Further studies have concluded that financial leverage and other factors along with currency translation effects influence stock prices and returns. Previous work has concentrated on either the pricing or return impact of the change in foreign currency treatment under the old and new accounting standard or on the relationship between the currency translation account in the balance sheet and stock prices/returns.

HYPOTHESIS AND EMPIRICAL MODELS

Hypothesis and General Model

Under FAS 52 gains or losses on the conversion (or remeasurement) of assets and liabilities of foreign entities are to appear as an adjustment in stockholders' equity of parent corporations (Financial Accounting Standards Board, 1981). Additionally, the cash flow statement includes an account titled Effect of Exchange Rate Changes (or foreign exchange effects) which measures the impact of currency translation on a firm's cash account. Its purpose is to be an adjustment to the cash balance of the firm to account for the change in cash and cash equivalents due to changes in currency values (Deloitte, 2010 and International Accounting Standards Board, 2010). The Effect of Exchange Rate Changes appearing on the cash flow statement is an account used to "balance" the change in cash and cash equivalents on that

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statement with the change in the firm's cash account on its balance sheet during its fiscal year. Foreign exchange effects function in a similar way to the foreign currency translation account on the balance sheet which insures that total assets match a firm's liabilities and equities after accounting for the firm's various currencies.

The focus of this study is on the relationship between foreign currency gains or losses as measured by the foreign exchange effects on the cash flow statement and share prices. Our main hypothesis is that variations in stock prices are related to the foreign currency translation account as measured by the foreign currency effect in a firm's cash flow statement. Specifically, the general empirical model to be tested is:

$$SP_t = \alpha + \beta 1 \ FXE + \beta 2 \ LEV + \beta 4 \ PBV + \beta 4 \ EPS + \varepsilon \qquad (1)$$

Where: SP_t = share price in month t
FXE = foreign exchange effect per share in fiscal year n
LEV = long-term debt to equity in fiscal year n
PBV = price to book value in fiscal year n
EPS = earnings per share in fiscal year t
ε = error term

LEV, PBV, and EPS are control variables to account for other factors that have been found to explain stock returns and prices in prior studies (Fama and French, 1992; Rezaee 1994, Dhaliwal, Subramanyam and Trezevant, 1999 and Hahn and Lee, 2009). We hypothsize there is a statistically significant relationship between the foreign exchange effect (gain or loss) that appears on firms' cash flow statements and the share prices of firms. Given the changes in financial and currency markets that have occurred, we expect, *a priori*, that investors would incorporate into stock prices the risk of volatile currencies in addition to the fundamental company factors found by previous studies to effect stock returns and prices. FXE is interpreted as a cash flow statement account that is a proxy for currency risk. We expect that investors would be more concerned with the impact of currency risk on a firm's cash flows than with the

existence of an accounting entry (consistent with the conclusion of Garlicki, et. al.). Our hypothesis predicts a statistically significant and positive relation between FXE and share prices.

Empirical Models Tested

Given the general model in equation 1 we tested three models using different dependent variables which are shown in Table 1. The explanatory variables are the same for each of the three models. First, the explanatory variables were regressed against the 13-week percentage change in share prices (Model 1). The dependent variable measures the change in share prices over the period of June to April, representing the change over the second quarter of 2011. Model 1 determines the relationship of share price change and foreign exchange effects over a quarterly period. Model 2 disaggregates the quarterly change examined in Model 1 into monthly dollar change. The explanatory variables were regressed against the monthly dollar change (April-May, March-April, February-March, January-February, and December-January) producing five estimated equations for Model 2. We expect that information about foreign exchange gains or losses made public would be reflected in the changes in share prices rather an reflected in the end-of-the-month prices reported in the database. Model 3 examines the relationship between the explanatory variables and the monthly percentage price change to determine whether the change in share prices relative to the initial price captures the impact of foreign exchange effects.

DATA

The data is taken from the Stock Investor Professional database of the American Association of Individual Investors for 2010 and 2011. The total sample consists of 2,461 corporations that have shares traded on exchanges in the United States (the sample includes both U.S. domestic and non-U.S. firms with shares traded on U.S. exchanges) and have foreign currency gains or losses (foreign exchange effects) on the statement of cash flows. Of the total

sample, 1,158 of the firms reported losses in 2010 and 1,303 reported gains. Companies with missing data were deleted as were financial firms (consistent with Fama and French, 1992). Using the listing rules of NASDAQ, firms with share prices below one dollar were deleted from the sample. The usable sample is composed of 1,851 corporations.

The data for the independent variables were collected for the 2010 fiscal year and were regressed against the end-of-the-month closing share prices for each month of the first and second calendar quarters of 2011. The data for foreign exchange effects came from the 2010 cash flow statements of our sample firms. The data for LEV, PVB, and EPS were also for 2010. We expect the impact of foreign exchange effects on share prices would occur after the issuance of the firms' financial statements for 2010 and would tend to diminish over time similar to the findings of Pinto, and Shin and Soenen. That is, with the public disclosure of financial statements in early 2011, we expect share prices to then change in reaction as investors discount the currency impact information into prices.

RESULTS

Descriptive Statistics and Correlations

Descriptive statistics for the explanatory variables are in Table 2. The median foreign exchange effect (FXE) per share reported on the sample cash flow statements was a loss of $0.28 in 2010 with a standard deviation of $5.56 a share. For the independent variables, the variation as measured by standard deviation is relatively large, especially for LEV. Both EPS and FXE have large deviation relative to the mean values. Table 3 contains the Pearson correlation coefficients which indicate generally low association among the independent variables. In Table 3, EPS is negatively associated with financial leverage (LEV) and price-to-book ratio. Higher earnings per share are associated with lower levels of long-term debt and lower price-to-book

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value. Higher EPS may be consistent with lower share prices relative to the book value per share, perhaps implying a lower valuation for companies that have higher earnings in 2010.

Regression Results

Using Model 1 as a measure of a multi-month period relationship between percentage share price and and FXE, as shown in Table 4, most of the explanatory variables are significant at the 0.01 level with the exception of LEV. The equation is significant at the 0.01 level. The regression coefficient for FXE is similar in magnitude to the coefficient for EPS and PBV implying a corresponding impact of FXE on the percentage change in share prices.   For the second quarter of 2011, the foreign exchange effect on the cash flow statement is statistically significantly and positively related to the percentage share price change. As a proxy for the impact of currency risk (or volatility), FXE is a contributor to the change in share prices.

In Model 2, with the results shown in Table 5, we break out the overall quarterly effect of FXE into monthly changes in share price on a dollar basis. FXE is significant at the 0.10 level for the April-March period, with a positive sign as expected but is not significant for the months prior to and after. EPS is significant at the 0.01 level for each month period; however, the relationship is negative for the March to April and April to May periods. The significance of earnings per share is positive for the earlier periods, consistent with previous studies that have shown net income as an important determinant of share price. This result is also consistent with expectations stock prices discount corporate earnings, though the sign of the coefficients are negative for the last two monthly periods. The significance of PBV and LEV varied over the six month period.   All the regressions are significant at the 0.01 level.

The influence of FXE on the dollar price change occurs during the period when most U.S. firms publicly report their earnings; that is during the earnings season. In an efficient

market, as earnings are reported to the public and with changes in currency values reported as part of the public disclosure process, investors would be expected to react to the new information with share prices changing as a consequence. Once the information has been discounted into stock prices, we would not expect further changes unless new information comes out in regard to currency fluctuations. Overall, the results corroborate our hypothesis that exchange rate effects are associated with share price changes in the short-run, at least.

In Model 3, shown in Table 6, FXE is positively related and significant at the 0.05 level for the February-March and March-April periods, and at the 0.10 level for the April-May periods, though the regression equations are not consistently statistically significant as with Model 2 results. The LEV variable is positively related to the dependent variable and significant at the 0.01 level for the December –January period only. The PBV is also positively related to the dependent variable and significant at the 0.01 level for March-April and significant at the 0.10 for February-March, and is negatively related to the percentage change in share price and significant at the 0.05 level for the December-January period.

CONCLUSION

Using three models to examine the relationship of foreign exchange effects, the results indicate a correlation between exchange rate effects on the cash flow statements and changes in share prices. The strongest relationship is over the thirteen week period from June to April. Over that quarter, exchange rate effects may be capturing the impact of investors capitalizing currency risk into share prices. On a monthly dollar price basis, exchange rate effects have a significant relationship to share price change during the earnings season of the second quarter of 2011 with no impact on share prices in the immediate months prior to or after March-April. This is consistent with an efficient markets expectation that information would be discounted into

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share prices when the information is disseminated publicly. On a percentage basis, FXE has a significant and positive relationship over the second quarter, though the results may not be sufficient to indicate a strong relationship between share price changes and exchange rate effects. Overall, our results are generally consistent with the hypothesis that share prices (or changes in share prices) are positively correlated to exchange rate effects on the cash flow statement and that FXE may be capturing investor reaction to currency risk. In addition to considering the "usual suspects" that explain returns-- market-to-book value, long-term debt-to-equity, and EPS-- currency risk as proxied by cash flow statement exchange rate effects may be another factor that should be taken into consideration by investors. In a world with currency volatility that impacts the earnings of multinational firms, investors may want to include currency risk as one of the factors in evaluating the return potential of stocks.

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Table 1
Descriptions of Variables in Empirical Models

Model 1: 13-Week Price Change in Stock Price
      Dependent Variable   **Explanatory Variables**
      13-week Price Change   FXE,LEV, PBV,EPS

Model 2: Monthly Change in Stock Price
      Dependent Variable   **Explanatory Variables**
      Monthly Price Change   FXE, LEV, PBV,EPS

Model 3: Percentage Change in Stock Price
      Dependent Variable   **Explanatory Variables**
      Percentage Price Change   FXE, LEV, PBV,EPS

Where:
FXE = foreign exchange effects per share in fiscal year n
LEV = long-term debt to equity ratio in fiscal year n
PBV = price-to-book value ratio in fiscal year n
EPS = earnings per share in fiscal year n

Statistic	FXE per share (exchange rate effects)	LEV (long-term debt to equity)	PBV (Price to book value ratio)	EPS
Mean	-0.16	49.54	2.65	1.55
Median	-0.28	19.80	1.89	0.98
Standard Deviation	5.56	89.79	2.76	6.18
Minimum	-141.8	0	0.05	-21.79
Maximum	44.33	905.60	48.43	231.69

Table 2
Descriptive Statistics for Explanatory Variables

	FXE	EPS	PBV	LEV
			Table 3	
		Correlation Coefficients of Explanatory Variables		
FXE	1.00			
EPS	0.033	1.00		
PBV	0.0183	-0.0187	1.00	
LEV	0.0343	-0.0168	0.267	1.00

Table 4
Foreign Exchange Effects and 13-Week Percentage Change in Stock Prices
The 13-week percentage change in share prices for the period of June to April 2011 was regressed against the explanatory variables of foreign exchange effects (FXE), long-term debt to equity ratio (LEV), price-to-book value ratio (PBV), and EPS.

Variable	Coefficient	T-statistic
Intercept	-5.518	-8.528*
EPS	0.194	2.675*
PBV	0.525	3.124*
LEV	0.006	1.136
FXE	0.232	2.880*

$R^2 = 0.014$
F statistic = 7.520*

*significant at the .01 level

Table 5
Foreign Exchange Effects and Month to Month Change in Stock Prices
The dollar change in share prices, month-to-month, for the first six months of 2011 were regressed against the explanatory variables of foreign exchange effects (FXE), long-term debt to equity ratio (LEV), price-to-book value ratio (PBV), and EPS. Below each coefficient in parenthesis is the t-statistic.

Period	Coefficients					Regression	
	Intercept	EPS	PBV	LEV	FXE	R^2	F
May-April	-0.151 (-1.45)	-0.295* (-25.33)	-0.037 (-1.36)	-0.0001 -(0.13)	-0.002 (-0.15)	0.26	160.9*
April-March	0.611* (5.35)	-0.064* (-5.02)	0.161* (5.42)	.0003 (0.30)	0.026*** (1.85)	0.03	15.57*
March - Feb	-.235** (-2.06)	0.328* (25.72)	0.168* (5.67)	-0.002** (-2.02)	0.023 (1.59)	0.27	174.2*
Feb - Jan	-0.764* (-5.24)	1.082* (66.36)	0.135* (3.57)	-0.0006 (-0.51)	0.006 (0.31)	0.71	1104.2*
Jan-Dec	0.182 (1.64)	0.066* (5.29)	0.005 (0.18)	0.002*** (1.78)	-0.005 (-0.39)	0.02	7.8*

*significant at the .01 level
**significant at the .05 level
***significant at the .10 level

Table 6
Foreign Exchange Effects and Monthly Percentage Change in Stock Prices
The monthly percentage changes in share prices for the first last month of 2010 and the first five months of 2011 were regressed against the explanatory variables of foreign exchange effects (FXE), long-term debt to equity ratio (LEV), price-to-book value ratio (PBV), and EPS. Below each coefficient in parenthesis is the t-statistic.

	Coefficients					Regression	
Period	Intercept	EPS	PBV	LEV	FXE	R^2	F
April-May	-0.030* (-7.81)	0.0003 (0.67)	0.0002 (0.19)	0.00001 (0.26)	0.0008*** (1.77)	0.002	0.96
March-April	0.012* (3.28)	0.0002 (0.55)	0.003* (2.70)	0.00004 (1.49)	0.001** (2.32)	0.01	4.68*
Feb-March	0.005 (1.22)	0.001 (1.42)	0.002*** (1.82)	-0.00001 (-0.28)	0.001** (2.22)	0.01	2.64**
Jan-Feb	0.040* (8.84)	0.0001 (0.24)	0.0004 (0.38)	0.000004 (0.10)	0.0006 (1.06)	0.001	0.35
Dec-Jan	0.014* (3.44)	-0.0002 (-0.32)	-0.002** (-2.18)	0.0001* (3.05)	-0.0008 (-1.59)	0.01	3.45*

*significant at the .01 level
**significant at the .05 level
***significant at the .10 level