Foreign Exchange Exposure: A Case Study of Non-financial Firms in UK

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ABSTRACT

This paper examines the foreign exchange exposure of UK non-financial listed companies over the period January 2005 to December 2010 and compares to two sub periods - pre-recession period (2005-2007) and recession/post-recession period (2008-2010). The Jorion (1991) model is used to estimate the exchange rate exposure - change in exchange rate is regressed on firms' abnormal returns. The findings reveal no supporting evidence for a contemporaneous relationship over total sample period and recession/post-recession sub period but the existence of a contemporaneous relationship during the pre-recession sub period cannot be rejected. Given the change in economic conditions around the recession period (the year 2008 is chosen as the break point) The analysis may be beneficial to financial managers in formulating hedging strategies, as hedging requires additional cost along with forgone profit if hedging is not the optimal decision, when faced with favorable/adverse economic conditions. This study may also be beneficial for investors to make informed investment decisions.

Keywords: Exchange-rate, Exposure, Non-financial, Recession, Abnormal Returns

INTRODUCTION

With the adoption of a floating exchange rate regime and rapid globalization - firms constantly attempt to look for new investment opportunities and markets beyond their immediate borders which account for the increasing exposure of firms to foreign exchange risk in recent times (Zubeiru et. al, 2007). The adoption of floating exchange rate regimes by many industrialized countries during the 1970s heralded a new era of increased exchange rate volatility (Abdalla and Murinde, 1997) which acted as a major source of macroeconomic uncertainty affecting firms (Asaolu, 2011).

The frequent changes in foreign exchange rates is of prime concern to firms, financial analysts and economists due to their effects on firm operations, revenues and valuation. Exchange rates can also have an impact on a firm's level of competitiveness due to its exposure to exchange rate risk (El-Masry et al., 2007). Due to exchange rate exposure a company's competitive profile may alter considerably and result in a loss of market share or reduced profit margins (Dhanani and Groves, 2001).

Furthermore, firms without foreign revenues, costs or operations might be indirectly affectedby exchange rate changes through their impact on foreign competition or broader macroeconomic conditions (Parsley and Popper, 2002). Hence, persistent exchange rate volatility and the increasing globalization of businesses make foreign exchange exposure management a key component of corporate strategy (Booth and Rotenberg, 1990) and given the difficulty in anticipating exchange rate movements, corporate managers, investors devise means of investing or managing optimally to neutralize exchange rate risks (Zubeiru et. al, 2007). Therefore for managers, creditors and investors alike the challenge is then to accurately assess the magnitude and impact of foreign exchange exposure as it is important to assess the problem first before it can be managed (Booth and Rotenberg, 1990). This paper is aimed to shed some light in this regard.

Given the change in economic conditions around the recession period (the year 2008 is chosen as the break point) The analysis may be beneficial to financial managers in formulating hedging strategies, as hedging requires additional cost along with forgone profit if hedging is not the optimal decision, when faced with favorable/adverse economic condition. This study may also be beneficial for investors to make informed investment decisions.

EXCHANGE RATE EXPOSURE AND ITS SOURCES

Foreign exchange rate risk can be defined as a change in a company's earnings due to Unexpected - changes in currency exchange rates (Jacque, 1996). The 'standard textbook' definitions of foreign exchange exposure state that "transactional operating exposure exist because of unexpected changes in future cash flows" (Eiteman et. al., 2010, p. 283). Adler and Dumas (1984) deems currency risk and foreign exchange exposure separately. The authors' point of view suggests that currency risk is the volatility of the exchange rates which does not have any specific implication on firm's value. On the other hand foreign exchange exposure is the actual change in firm's value due to change in exchange rates.

SOURCES OF EXCHANGE RATE EXPOSURE

Firms can be exposed to exchange rate exposure via various sources such as export, import of factors, competition with domestic, foreign and other multinational firms, investments denominated in other currencies etc.

The value of foreign sales, in terms of domestic currency, changes when exchange rate changes. Changes in exchange rates naturally impact the cash flows of multinational firms with subsidiaries and operations in various locations worldwide (Bredin and Hyde, 2010). Multinationals may source inputs from abroad, thereby increasing exchange rate exposure; although exporting with the same currency may have an offsetting effect (Jong et. al, 2006). One important source of foreign exchange exposures may come from competition within an industry and the degree of substitutability they face between local and foreign factors of production (Marston, 2001).

Changes in exchange rates also have an adverse affect on investors holding portfolios consisting of securities from different countries and currencies (El-Masry, 2006). Considering the associated increase in risk for international investments, the choice of currency denomination adds an important dimension to the overall portfolio decision (Ma and Kao, 1990). Alder and Dumas (1984) explain foreign exchange rate risk of a firm in terms of when its share value is influenced by changes in currency values. As firm value represents the present value of future cash flows, exchange rate exposure is the sensitivity of firm value to exchange rate changes (Jong et. al, 2006).

To summarize, three different types of risks under an independently floating exchange rate regime are identified in the existing literatures: transactions exposure - which arises due to gains or losses arising from settlement of transactions stated in foreign currency terms; economic exposure - which arises from variations in a firm's discounted cash flows when exchange rates fluctuate; and operating exposure - which is the sensitivity of the home currency value of the firm to changes in exchange rates (Abdalla and Murinde, 1997; Loudon, 1993). External shocks may also create interdependence between exchange rates and stock returns. Therefore, it is reasonable to expect a connection between exchange rate changes and firm value (Choi and Prasad, 1995).

REVIEW OF LITERATURES

Numerous studies have been conducted to investigate relationship between exchange rate changes and stock returns. Bartov and Bodnar (1994) investigated 208 US firms from the period 1978-1989 and failed to find a contemporaneous relationship between stock return of the companies and the value of the dollar. Jorion (1990) examined the relationships between exchange rates and stock returns of two hundred eighty seven multinational firms of the US. The results showed that the extent of exposure co-efficient of a firm depends on the amount of foreign sales that the firm is involved in, but still a very small portion of his sample firms showed a significant exchange rate exposure. This view is also consistent with Doidge et. Al (2006) whose findings suggest that foreign exchange exposure is related to the level of foreign (trade and finance) activity. In addition to that they also find that the extent to which a firm faces foreign exchange exposure depends on the size of the firm. Choi and Prasad (1995) used a sample of four hundred and nine US multinational firms and found that only fifteen percent of the firms show a significant foreign exchange exposure. Aggarwal (1981) found a minimal relationship between exchange rate changes and stock price movements but he explains that there is a positive relationship between exchange rate changes and stock indices in terms of the relative competitiveness of internationally traded goods.

Donnelly and Sheehy (1996) investigated UK's thirty nine largest exporting firms from 1978 to 1992 and examined the relationship between changes in trade-weighted nominal exchange rate and the monthly abnormal returns of the portfolio. The result of the study was a contemporaneous negative relationship between the foreign exchange rate changes and the abnormal returns of UK exporters. Bodnar and Gentry (1993) studied the relationship between exchange rate changes and industry portfolio returns for firms in Canada, Japan and the United States between 1979 and 1988. The result of the study showed that less than half the industries displayed considerable exposure in these countries at a significant level of 10%. AlDiab et. al (1994) studied the relationship between the dollar exchange rates on daily security returns of US multinational companies. The study which was conducted from 1978 to 1987 showed that there is a weak relationship between stock prices of the multinational companies and exchange rates.

Jorion (1991) examined the sensitivity of the stock prices of US multinationals to changes in dollar exchange rates from the period 1971-1987. His empirical results showed that there is a difference in firm's exposure to movement of the US dollar and an overall result showed that the sensitivity of stock prices to changes in exchange rates are not significant at any accepted level of significance. Amihud (1994) studied the relationship between stock return and trade weighted exchange rates of the US dollar among thirty two of the largest US exporting companies from January 1979 to December 1988 using quarterly and monthly intervals. The results showed that there was no significant contemporaneous relationship between monthly changes in nominal and real exchange rates and the monthly return of these thirty two firms.

El-Marsy et. al (2007) investigated the exchange rate exposure of three hundred sixty four UK non-financial companies from January 1981 to December 2001. The findings show that a high percentage of the UK non-financial companies are exposed to exchange rate changes. A high proportion of firms benefits from an appreciation of UK Pound. In addition, level of foreign sales, as well as foreign assets and foreign income are all significantly negatively related to exchange rate exposure. Asaolu (2011) investigated foreign exchange rate risk exposure of hundred and seventeen Nigerian listed firms between 1996 and 2005 and utilized three currencies exchange rates of the US Dollar, the UK Pound and the Euro. The results showed that under the three currencies investigated, the Nigerian firms are exposed to adverse exchange rate risks with a higher magnitude of exposure to the US Dollar. Ma and Kao (1990) investigated monthly stock indices of six major industrialized countries in relation to corresponding monthly exchange rates. The countries chosen were UK, Canada, France, West Germany, Italy and Japan because of their less controlled foreign exchange markets and more mobile capital markets. The study revealed that high exchange rate levels are associated with favorable stock price movements when investments are denominated in a strong currency.

Aggarwal and Harper (2010) examined foreign exchange exposure of 1047 domestic nonfinancial US firms from January 1990 through December 2003. The results show domestic firms have significant exposures and risk faced by domestic firms is not significantly different from firms engaging in international trade. In addition foreign exchange exposure of domestic firms is positively related to time horizon, level of R&D expenses and financial leverage. Furthermore foreign exchange exposure is inversely related to size, and negatively related to asset turnover, asset tangibility and industry turnover. Abdalla and Murinde (1997) investigated exchange rate and stock price interactions in the emerging financial markets of India, Korea, Pakistan and the Philippines. They found a strong influence of exchange rate changes on stock prices and volume of export.

Joseph (2002) examined 106 firms in four UK industrial sectors for the period 1988 to 2000.Exchange rates and interest changes are found to have adverse effects on stock returns. Booth and Rotenberg (1990) studied the relationship between stock returns and changes in the Canadian Dollar against the US Dollar during the period from 1979 to 1983 for 156 Canadian firms. Values of the firms are found to be adversely affected by a depreciation of Canadian dollar half of the sample exhibiting evidence of foreign currency exposure.

Choi and Kim (2003) investigated the Asian currency exposure of US firms with regard to their risk management and international strategies during the period from 1992 to 1997. The sample of this study consisted of US firms with Asian sales, income and assets. The study29% of US firms with Asian operations have significant impact on its value in relation to contemporaneous changes in exchange rates.

Kiymaz (2003) examines the foreign exchange exposure of one hundred nine Turkish listed firms during the period of 1991-1998. Turkish firms are found to be exposed to foreign exchange risks. Another study by Ng (1998) examined the exchange rate exposure of 171 Japanese firms from 1979 to 1993. The findings reveal that 25% of the sample firms experience economically significant positive exposure effects.

Regression analysis using stock returns have been used in majority of the studies to estimate a firm's foreign exchange exposure to its various uncertainties (Khoo, 1994). Adler and Dumas (1984) show that foreign exchange exposure is best measured with statistical regression techniques, as the coefficients of exchange rates (when domestic inflation is zero) in a multiple linear regression has the dimension of units of foreign currency of an asset's future domestic-currency market price on the contemporaneous foreign exchange rates. One of the most common approach of measuring exchange rate exposure is the regression model used by Jorion (1990) which explains the firm's stock returns by the return on a trade weighted basket of currencies and a correction for the market index (Jong et.al, 2006).

The specifications of regression models for similar studies have been proposed by few authors. Smith et. al (1989) applied regression method to interest rates and exchange rates. They imposed an artificial final relationship between stock rates of returns and movements in risk variables, and the method imply that the economic processes that link the risk variables to cash flows and firm values are important. Bodnar and Wong (2003) have tested the influence of the correction for the market index. Nydahl (2001) used several individual currencies instead of a trade-weighted index. Large-scale international studies undertaken by Jorion (1990); Doidge et. al (2006) find that larger firms and firms with more international sales have larger exposures.

To summarize, there seems to be no empirical consensus on the relationship between exchange rates and stock prices (Abdalla and Murinde, 1997). Given these differences among various studies it is appropriate to test whether currency exposure is priced in the stock market (Jorion, 1991). Considering the ambiguities among the various studies and the different views expressed by various authors including several studies conducted on UK firms, the purpose of this paper is to measure the exchange rate exposure of UK non-financial companies over the total sample period and then break it down to two sub-periods to check if the relation changes when smaller periods are considered.

DATA

The cross-sectional data used in the study covers the time period of January 2005 through December 2010. The UK observed a negative growth in its GDP from the first quarter in 2008 (1/11/2011,http://www.ons.gov.uk/ons/site-information/using-the-website/time-series/index.html) till the last quarter of 2009 and a small recovery was seen before it started declining again - for which the total time period is divided into two sub periods namely, pre-recession period 2005-2007 and recession/post-recession period 2008-2010. The Datastream Database is used to obtain quarterly returns of the firms (expected and abnormal returns calculated by the London Business School Risk Management Service) and quarterly nominal exchange rates faced by the firms were obtained from annual reports. The fifty firms included in the sample, which trade in the London Stock Exchange (LSE) and are enlisted in the FTSE 100, had complete information for the time period considered, thus could be included in the study leaving out the rest of the enlisted firms. Additionally, the study is restricted to all non-financial firms quoted in the LSE. Financial firms are excluded from the sample. The decision to exclude financial firms is based on the complexity of foreign exchange rate exposure and risk management practices used by these firms. The decision is also based on the remedy of the exchange rate exposure theory, which considers firms as producers and consumers (El-Masry et. al, 2007).

This study employed data sourced from annual reports to understand the foreign exchange rates that the sample firms were exposed to. The major source of foreign revenue was taken in to consideration while analyzing the annual reports of the sample firms. The UK firms that were exposed to two variants of exchange rate factor namely i) Euro (GBPEURO) and ii) US Dollar (GBPUSD) in terms of revenue, were chosen to be examined against the returns of the firm. It is to be noted that the companies, in their annual reports, do not report of any major change in their foreign currency risk management, i.e. hedging strategies during the period considered.

LIMITATION

Due to lack of resources and limited access to data, only fifty firms could be considered in this study and also it would have been desirable to extend the time period beyond 2011. A time series model with the inclusion of other factors determining abnormal profits could improve the study.

MODEL

Exchange rate exposure is calculated as the sensitivity of a firm's return to exchange rate movements (Asaolu, 2011). Exchange rate exposure has a potentially positive or negative impact on the profitability and value of the firms (Zubeiru et.al, 2007). This notion is realized when exchange rate movements are interpreted in terms of the firm's stock returns. Thus, the measure of exchange rate exposure is the slope coefficient when exchange rate is regressed on firm's returns. Following earlier studies, the model adopted is that of Jorion's (1991) where a firm's exchange rate exposure coefficient can be obtained using time-series equations. In this model, stock return is a function of contemporaneous changes in the exchange rate and market index with firm specific intercept and slope coefficients.

The regression equation of this model is as follows:

$$R_{it} = \alpha_i + \beta_{1i}\, EX_t + \beta_{2i}\, R_{mt} + \varepsilon_{it} \quad (1)$$

Where,
α_i = the constant term;
R_{it} = the stock return for firm *i* at period *t*;
EX_t = percentage change in exchange rate;
R_{mt} = the return on the market;

The coefficients β1i and β2i represent the sensitivity of a company i's stock returns to exchange rate movements and the returns on the market respectively. A positive β1i indicates that a firm's stock returns appreciate with change in the value of the UK Pound Sterling, whilst a negative β1i denotes that stock returns fall with change in value of the UK Pound Sterling. αi is the intercept and εit is the random error term which is the disturbance, assumed to be normally and independently distributed with mean zero and constant variance.

The two factors of the regression model EXt and Rmt , assumed to capture all risk, systematically affect stock returns (El-Masry et. al, 2007). The model of Jorion (1991) asserts the fact that returns are a function of contemporaneous changes in exchange rate and market index with firm specific intercept and slope coefficients. Hence, the market variable is intended to capture the time serial influence of the general market on individual stock returns. Therefore, the abnormal returns of firm's are taken into consideration while measuring the foreign exchange exposure with respect to change in exchange rate. The abnormal returns for firm *i* for each period t was computed as equation (2):

$$R_{abn} = R_{it} - E(R_{it}) \quad (2)$$

Where:
R_{abn} = the abnormal return for firm *i* at period *t*;
R_{it} = the actual stock return for firm *i* at period *t*;
$E(R_{it})$ = The expected return for firm *i* at period *t*.

Therefore, the regression equation to measure the foreign exchange exposure, which will be tested at 5% level of significance in this study, is given below

$$R_{abn} = \alpha_i + \beta_{1i}\, EX_t + \varepsilon_{it}$$

Where:
α_i = the constant term;
R_{abn} = the abnormal return for firm *i* at period *t*;
EX_t = percentage change in exchange rate;

β_{1i} represents the sensitivity of company *i*'s returns to movements in USD and EURO and the abnormal returns on the firm's stock respectively. εit represents the random error term.The stock return being a differenced series (**Rit-1 - Rit**) is not prone to serial and auto-correlation. Similarly the change in exchange rate, being a differenced series is stationary, thus, the chance of a spurious regression can be written off. A linear regression following the ADF tests is reported as follows.

REGRESSION ANALYSIS

The results from the regressions run, for the three periods considered, are summarized in the following table.

Table - I: Results from Regression

	2005 -2010	2005-2007	2008-2010
β1i	0.00768 (0.114)	-0.4148 (-2.5528)*	0.0016 (0.98745)
Ai	2.8514 (7.58)*	2.6462 (5.525)*	3.5121 (5.8225)*
R-squared	0.000011	0.0108	0.001628

*t- stats are reported in parenthesis, * marked coefficients significant at 5% level*

During the 2005-2010 period and in the 2008-2010 sub-period, the coefficients of exchange rate sensitivity are found to be statistically insignificant at 5% level. In 2005-2007 sub-periods the exchange rate sensitivity coefficient is found significant, thus, supporting the case of foreign currency exposure of the firms.

The estimates of the intercept coefficients in all cases are found to be significant - indicating that the abnormal returns for the sample firms can be expected to be greater than zero when the UK pound sterling does not fluctuate in value. The models have low predictive powers as indicated by the low R squared values in table.

The summary of the results presented above can be explained by several notions discussed below. Firstly, a firm's hedging activities affect the extent to which the firm is exposed to currency fluctuations. Extensive use of hedging instruments should diminish a firm's foreign exchange exposure (He and Ng, 1998). Although none of the firms considered reports of any major change in their hedging strategies but with increased volatility in macro-economic conditions the firms may have been more cautious to increase effectiveness of their strategies, as is evidenced from the recession/post-recession period.

According to El-Masry et. al (2007) bigger firms are more efficient in managing currency risk than smaller firms regardless of whether the foreign exchange exposures are positive or negative. This view can be found consistent with the fact that, sample firms considered in this study are among the top FTSE 100 listed firms which in other words are considered some of the biggest multinational corporations of the world. Chow et. Al (1997) claims that large companies are likely to have access to management expertise which allow them to hedge more than smaller firms. Thus, large companies hedge more than small firms do and hence have lower exchange rate exposure. Secondly, FTSE 100 firms mostly being large multinationals may have foreign cash inflows almost offsetting foreign cash outflows. This view can be found consistent with Choi and Prasad (1995) who state that the value of the firms with almost similar net exposure on the foreign cost side and on the foreign revenue side will be less affected by changes in exchange rates even if they have extensive foreign operations. Finally, listing of all the sample firms in London Stock Exchange means that they are heavily dependent on external financing. According to Froot et. al (1993) due to a firm's dependence on external financing and access to costly external financing, firms tend to hedge to reduce the underinvestment problem. This view is also consistent with El-Masry et. al (2007) and Choi and Kim (2003) who state that UK firms with higher growth opportunities and higher leverage have more incentive to hedge, thus reducing the firm's exchange rate exposure.

In addition, the significance of the intercept coefficient in the total period and recession/post-recession sub-period analysis is quite high compared to the pre-recession period. This can be explained by the notion that abnormal returns are also determined by several other macro economic factors including the volatility of exchange rates. Chor and Manova (2009) argue that collapse in trade credits during recession has contributed immensely to the breakdown in international trade. According to Chalmers et. al (2001) during recession when employee bonuses, profit sharing and salaries are cut back, an adverse effect on firm's trade volume is reduced. Mattera (1991) also stated that high inflation during recession can reduce the spending power of consumers, resulting in the reduction in business volume of companies. Hence, the views expressed by these authors explain the higher significance of intercept coefficient during the overall period and the post recession sub-period. Thus macro economic factors other than the volatility of exchange rates, especially inflation, unemployment, economic condition and collapse in trade credit, possibly impacted on the abnormal returns of the firms more than the volatility of exchange rates during recession.

CONCLUSION

In conclusion, the findings from empirical tests suggest that there is no contemporaneous relationship between the change in the value of the sample firms and the exchange rates during the recession/post-recession sub-period and the overall period. Although, a contemporaneous relationship of foreign exchange exposure during the pre-recession period cannot be rejected. These variations in results could be due to both macro and firm specific factors.

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