2016

Effects of Exchange Rate Changes on S&P 500 Price Movement

Amy E. Fellers
amy.e.fellers@siu.edu

EFFECTS OF EXCHANGE RATE CHANGES ON S&P 500 PRICE MOVEMENT

by

Amy E. Fellers

A.A., Lincoln College, 2010
B.S., Wilmington University, 2013

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Arts

Department of Economics
in the Graduate School
Southern Illinois University Carbondale
December 2016

RESEARCH PAPER APPROVAL

EFFECTS OF EXCHANGE RATE CHANGES ON S&P 500 PRICE MOVEMENT

By

Amy E. Fellers

A Research Paper Submitted in Partial
Fulfillment of the Requirements
for the Degree of
Master of Arts
in the field of Economics

Approved by:
Dr. Zsolt Becsi, Chair

Graduate School
Southern Illinois University Carbondale
October 5th, 2016

AN ABSTRACT OF THE RESEARCH PAPER OF

AMY E. FELLERS, for the Master of Arts degree in ECONOMICS, presented on OCTOBER 5, 2016, at Southern Illinois University Carbondale.

TITLE: EFFECTS OF EXCHANGE RATE CHANGES ON S&P 500 PRICE MOVEMENT

MAJOR PROFESSOR: Dr. Zsolt Becsi

This paper investigates the relationship between the S&P 500 stock price movements compared to the currency exchange rate movement of the five largest trading partners of the United States. The top five countries that the United States trades with are Canada, China, Germany, Japan, and Mexico. The purpose of this research is to answer the following question: Can the movement of the S&P 500 be determined by the currency exchange rates of the top five countries the United States trade with the most? For this paper, we assume that exchange rates explain the trading patterns of countries. To further analyze our question, we looked at the movement of China, Canada, Germany, Japan, and Mexico stock market indices based on their closing prices as well. Our regression estimates that the main dependent variable, the S&P 500, is significantly correlated with exchange rate movements. Furthermore, Canada has the most significant effect on the S&P 500 through both the money market and the goods market. Other dependent variables, the stock indices of China, Canada, Germany, Japan, and Mexico, show significant correlation between trading patterns and the indices. However, our findings indicated that China's index was not significantly correlated with any of the independent variables.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

FIGURES PAGE

INTRODUCTION

The objective of this study is to examine the S&P 500 stock price movements in relationship to the currency exchange rate movements of Canada, China, Germany, Japan, and Mexico. These being the top five predominant countries the United States trades with, we believed the results would show a significant correlation between the variables. To further analyze the S&P 500 stock price movement, we also examined the stock price movements of the five countries listed above. We looked at a time frame from 1997 to 2015 for the currency exchange rate movements as well as the stock price movements. This paper uses a sample of 990 observations for each exchange rate, and then another 899 data points for each stock market indices closing price.

By analyzing the stock price movements and the currency movements in countries, it allows us to have a better understanding of how the stock market reacts to changes in the goods market and the money market. Research of the stock price movement and the exchange rate could eventually lead to predicting the exact moment a stock index movement will occur.

By doing a growth regression with the Newey West Procedure with a lag of 1 and a difference in square, we were able to pinpoint significant evidence that prove correlated movements between the S&P 500 stock price and the currency exchange rate of Canada, Germany, Mexico, and Japan. Correlation between the S&P 500 stock prices and the stock price movements of the five countries became apparent as well through the model, but were not as frequent. An overwhelming result that carried throughout the model was that, the Chinese exchange rate and stock index did not hold any correlation to the movement of the S&P 500 stock prices.

With our data, we assume trading patterns can be explained by currency exchange rates, when compared to the stock price movement. For this, we looked at changes in both fiscal and monetary policy. The model that we used to describe such a relationship is the AA-DD Model. With shifts in the AA curve, we can see how changes in monetary policy can appreciate or depreciate the domestic currency in relationship to foreign currency, which will have a direct effect on capital flow. With shifts to the DD curve, we can see changes in the fiscal policy, which can result in a change in the real exchange rate. A change in the real exchange rate is a change to the goods market. This means that domestic goods relative to foreign goods will either be less or more expensive, which will affect net exports.

LITERATURE REVIEW

Several classical theories suggest a relationship between stock prices and exchange rates. Many models have been developed to explain such an interaction. Dornbusch and Fischer did extensive research with the Flow-Orientated Model. Their research focused on the association between the current account and the exchange rate (Dornbusch and Fischer 1980). Their research, on the current account, is very similar to the research we will be discussing in the paper. However, the variation in our research comes from looking at different countries while their research focused on firms. Dornbusch and Fischers' Flow-Orientated model describes how exchange rate movement affects output levels of firms and the trade balance of an economy. Their evidence led them to determine that if stock prices reduce this will cause a reduction in capital flow. Furthermore, if capital flow in the economy is reduced, then interest rates in turn will be reduced, and exchange rates of the domestic country will depreciate.

As we know, there are still significant amounts of variables that play important roles in the ideology of stock price volatility and exchange rates. Researchers, Groenewold and Paterson tried to determine a more concrete link between the two through their study of commodity prices (2013). They took the country of Australia and looked at a relationship, which omits commodity prices. Results concluded that exchange rates and commodity prices have a strong link among each other.

In the study done by Alaqidade, Panagiotidis, and Xu, Z, they investigated the "casual" linkage between stock markets and foreign exchange markets between 5 countries: Australia, Canada, Japan, Switzerland, and UK (2011). The research developed three variations of the Granger Causality Test to determine the hypothesis. Their results were as followed: the cause of

the stock market volatility for Canada, Switzerland, and the UK could be determined through exchange rates.

Throughout history the relationship between stock price movement and exchange rates have been research by many individuals interested in the macroeconomics field of study. Researchers such as, Frank and Young (1972), Aggarwal (1981), Solnik (1987), Smith (1992), Abdalla and Murinde (1997), Phylaktis and Ravazzolo (2000), Granger et al. (2000), and Apte (2001), have all found a significant positive relationship between stock prices and exchange rates. As mentioned above Dornbusch and Fischers (1980) and Groenewold and Paterson (2013), also found significant evidence that stock prices and exchange rates are highly correlated with each other.

Researchers, Ajayi and Mougoue, revealed a study were the results found that a depreciating currency causes a decline in stock prices (1996). Ajayi and Mougue used an Error Correction Model (ECM) of the two variables to simultaneously estimate the short-run and long run dynamics of the variables (1996). One can assume, that consumer expectation plays a role in this. If we were to study this idea further, we could see that a depreciating currency for a domestic country would entice investors to take their money, and invest in other assets such as foreign stock markets were there exchange rate is appreciating in terms of domestic currency verse foreign currency. While currency is being exchanged from domestic stocks to foreign stocks, the results will be the domestic stock index will slowly decrease in value.

Research on the stock price movements in relationship to exchange rates has been heavily discussed through countless papers. Our research helps confirm the underlining assumption that stock price movement is correlated with exchange rate movement in other countries. Many of the previous works were done on countries or firms to link the stock movement to the exchange rate

movement. Our research was based on the S&P 500 stock price movement, and the exchange rate movement for China, Canada, Germany, Japan, and Mexico.

THEORETICAL MODEL

The importance of exchange rates to an economy can be further explained through the AA-DD Model. According to economic researchers, Krugman, P.R. Obstfeld, M. and Melitz, M.J., "The AA curve represents the asset market where equilibrium derived from the money market and foreign exchange markets, and the DD curve represent the goods market (2015).

The goods market, DD line, (Fig. 1) is affected by fiscal policy, which is represented by this formula:

$$DD=C(Y-T) +I+G+CA (EP^*/P, EX-IM)$$

The asset market, AA curve, (Fig1), is affected by the money market and the foreign exchange market, which is represented by these two formulas:

$$R=R^* + (E^e - E)E$$

$$\frac{M}{P} = L(R,Y)$$

R: Interest rate on domestic currency deposits

$R*$: Interest rate on foreign currency deposits

$\frac{M}{P}$: Money Supply

$L(R,Y)$: Money demand

According to International Finance Theory and Policy,

> The AA-DD model will allow us to understand how changes in macroeconomic policy—both monetary and fiscal—can affect key aggregate economic variables when a country is open to international trade and financial flows while accounting for the interaction of the variables among themselves (Suranovic, Steve 2016).

As the variables within the good markets increase or decrease, the exchange rate in the long run is affected as well as the interest rate. However, interest rate and exchange rate are negatively

correlated. The effects of the exchange rate, increasing or decreasing, affects imports and exports too, which represents the trading patterns within countries. By studying the DD line within this model we can easily see the correlation between exchange rates and trading patterns.

Shifts to the DD curve occur when any change in fiscal policy occurs. Changes in the fiscal policy could be caused from the government adjusting its spending levels or tax rates. If there is a demand shift between foreign to domestic goods, people will want to buy more goods produced in the domestic country, which will cause exports to increase, and imports to decline and the DD curve will shift to the right. If prices increase then domestic goods are more expensive relative to foreign goods. The will cause an appreciation of the American dollar and exports will decrease and imports will increase causing the DD curve to shift to the left. If government purchases or taxes increase the then the DD curve will shift to the left. Investment rate increasing or prices decreasing will cause rightward shifts to the DD curve.

Shifts in the AA curve occur when any changes are made to monetary policy. Changes in the monetary policy could be from a change in money supply, expected future exchange rate changes, or a change in foreign interest rates. A rise in the money supply will shift the AA curve upward because now domestic currency relative to foreign currency is depreciating. If price increases the real money supply will be decreasing which will cause interest rates to increase and the AA curve will shift downward.

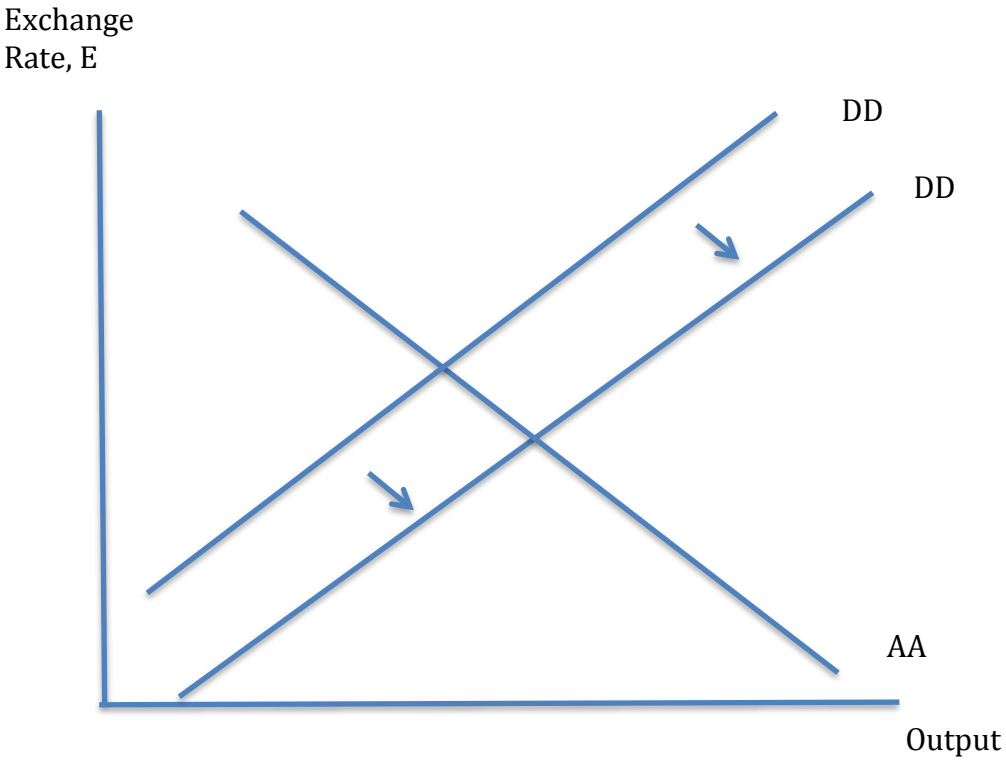

Figure 1: AA curve (Money Market) DD curve (Goods Market)

METHODS AND DATA

Data for this research was obtained from two important sources: Yahoo Finance and Oanda Corporation. Yahoo Finance provided historical data from the year 1997 to the year 2015 for all the closing prices that are used in my regression tables. Oanda Corporation, an online source, provided the research for the exchanged rates using the same historical time series. Each time series consist of weekly historical data ranging from January 1997 to December 2015. Data represents a sample of 990 observations for each exchange rate, and then another 899 data points for each stock closing price for the week. Six different exchange rates were gathered for the purpose of this research to correlate with the six different stock indices that are being tested.

United States currency is the American Dollar, Canada's currency is the Canadian Dollar, Japan's currency is the Yen, China's currency is the Renminbi, Mexico's currency is the Peso, and Germany's currency is the Euro. The six different stock indices that are being tested are as followed: S&P 500 (United States), SHCOMP (China), DAX (Germany), NIKKEII 225 (Japan), MXX (Mexico), GSPTSE (Canada). Each of these stock market indices are chosen for my research purpose because according to United States Census Bureau, these are the stock market indices of the top five countries that the United States trades with.

The S&P 500 index movement was of primary interest. After research was conducted, in order to achieve more accurate results we compared not only the exchange rate movement to the stock price movement, but we compared domestic stock price movement to foreign stock price movement. The domestic country was not always the United States but was rotated between China, Canada, Germany, Japan, and Mexico to obtain a more accurate read on the effects of stock price movement to exchange rate movements. By producing a time series analysis from

1997 to 2015, we achieved strong correlations between stock price movements being dependent on exchange rate movements.

The data output is based off a simple regression formula: $\Delta\hat{Y}=\beta_0+b_1\Delta X_1$. In our model Y is the dependent variable while X is the independent variable. The dependent variables for our research are the stock price movements. From my tables, these stock price movements are represented by the stock index that was chosen for China, Canada, Germany, Japan, Mexico and the United States. The exchange rate movement for these countries' currencies represents the independent variable. For research reasons, the independent variable will also be the stock market indices. This is because we compare the stock price movement with exchange rates, and then later on in the research we compare stock price movement with stock price movements of China, Canada, Germany, Japan, United States, and Mexico.

Y represents each stock index with a subscript in the regression formula. The subscript is placed on the Y variable to represent the different stock indices that we are working with in the paper. For example, $\hat{Y}_1$ represents the S&P 500 in the formula. $\hat{Y}_2$ represents DAX for Germany. $\hat{Y}_3$ represents GSPTSE for Canada. $\hat{Y}_4$ represents MXX for Mexico. $\hat{Y}_5$ represents NIKKEI 225 for Japan. $\hat{Y}_6$ represents SHCOMP for China. All these hold true within the formulas below as well.

X represents each currency exchange rate with a subscript in the regression formula. The subscript is placed on the X variables to represent the different currency exchange rate for each country. X_1 represents the United States Dollar. X_2 represents the Euro for Germany. X_3 represents the Canadian Dollar for Canada. X_4 represents the Renminbi for China. X_5 represents the Yen for Japan. X_6 represents the Peso for Mexico. All these hold true within the formulas below.

My research will take a more in depth approach to determine if exchange rate movement from China, Canada, Japan, Germany, and Mexico can affect the S&P 500 stock price movements. To obtain a more accurate answer to our research question we will also compare S&P 500 stock price movement with China, Canada, Germany, Japan, and Mexico stock price movements. In our paper, we allow exchange rates to represent trading patterns, and we allow for stock prices movements to represent the flow of money from domestic country to a foreign country.

RESULTS

According to my research (Table 1 and Table 2), which represents S&P 500 stock price movement (United States), exchange rates are more important to the movement of the stock market than the financial reasons. By using an alpha level of .05, we determined that the movement of the S&P 500 is explained by the exchange rate for Canada, Japan, and Mexico because the t-statistics is significantly greater than 1.97 with an alpha level less than .05. However, Germany and China's exchange rates do not significantly affect the S&P 500. While exchange rates reflect trading patterns, we can make an assumption that trade influences the stock market movement as well for the stated countries that were determined to be significant. Table 1 is represented by the following formula:

$$\Delta\hat{Y}_1 = \beta_0 + b_2\Delta X_2 + b_3\Delta X_3 + b_4\Delta X_4 + b_5\Delta X_5 + b_6\Delta X_6$$

Table 2 is comparing the S&P 500 stock price movement to the stock price movement of the five stock indices that we researched: SHCOMP (China), GSPTSE (Canada), MXX (Mexico), NIKKEI225 (Japan), and DAX (Germany).

This is the formula that represents this information:

$$\Delta\hat{Y}_1 = \beta_0 + b_2\Delta Y_2 + b_3\Delta Y_3 + b_4\Delta Y_4 + b_5\Delta Y_5 + b_6\Delta Y_6$$

The only significance comes from GSPTSE and DAX indices. GSPTSE and DAX indices have a significant effect on the S&P 500 stock price movement. This points at something very important, China is the only country that is not significant which implies the amount of trade that China partakes in does not influence the S&P 500 stock price movement, and SHCOMP index has no effect on S&P 500 stock price movement either. If one goes with the assumption that, China's government intervenes more with the Chinese market, then that assumption would hold true according to the research. This could also be an underlining reason as to why the SHCOMP

index and the exchange rate for the Renminbi do not affect the S&P 500 index. Another underline reason could be the result of China suppressing their exchange rate on purpose in order to have a large export market. According to Krugman, Obstfeld, and Meltz, "In recent years, governments have stepped in to increase China's exchange rate so prices can't be as regulated for trade" (Krugman, P.R., Obstfeld, M., & Melitz, M.J., 2015).

Tables 3 data is comparing the DAX (Germany) stock price movement with exchange rate movement. Table 3 has the dependent variable as DAX (Germany) stock price and the independent variable as the exchange rate. The US $ represents the United States currency, United States Dollar. The Canadian $ represents Canada's currency the Canadian Dollar. The Renminbi represents China's currency. The Yen represents Japan's currency. The Peso represents Mexico's currency. This is the formula that represents this information:

$$\Delta \widehat{Y}_2 = \beta_0 + b_1 \Delta X_1 + b_3 \Delta X_3 + b_4 \Delta X_4 + b_5 \Delta X_5 + b_6 \Delta X_6$$

Again, we find that exchange rates are more important to the stock market than the financial reasons between stock markets such as moving money back and forth between domestic and foreign stock markets. This means, that trade patterns affect the DAX movement more significantly than the movement of money. By using an alpha level of .05, we determined that the movement of the DAX is explained by the exchange rate for Canadian Dollar, Yen, and Peso because the t-statistics is significantly greater than 1.97 with an alpha level less than .05. However, the American Dollar and the Renminbi have no significant effect on the DAX. The trading patterns of Canada, Japan, and Mexico all affect the DAX.

Table 4 has the dependent variable as the DAX stock price movement and the independent variable as each index for United States, Canada, China, Japan, and Mexico. This is the formula that represents this information:

$$\Delta\hat{Y}_2 = \beta_0 + b_1\Delta Y_1 + b_3\Delta Y_3 + b_4\Delta Y_4 + b_5\Delta Y_5 + b_6\Delta Y_6$$

Again, China's currency the Renminbi and China's stock exchange SHCOMP index does not have an effect on the Germany's index the DAX. Japan and the United States stock price movements are significantly correlated with the movements of the DAX.

Table 5 has the dependent variable as GSPTSE (Canada) index and the independent variables as the exchange rates for the United States dollar, Germanys Euro, China's Renminbi, Japans Yen, and Mexico's Peso. This is the formula that represents this information:

$$\Delta\hat{Y}_3 = \beta_0 + b_2\Delta X_2 + b_1\Delta X_1 + b_4\Delta X_4 + b_5\Delta X_5 + b_6\Delta X_6$$

Table 6 has the dependent variable as GSPTSE index, and the independent variable as each index for the United States, Germany, China, Japan, and Mexico. This is the formula that represents this information:

$$\Delta\hat{Y}_3 = \beta_0 + b_2\Delta Y_2 + b_1\Delta Y_1 + b_4\Delta Y_4 + b_5\Delta Y_5 + b_6\Delta Y_6$$

We find that when comparing the GSPTSE price movement to exchange rates (Table 5) that exchange rates do not play a role in the movement of the Canadian stock market. All exchange rates are not significant to the GSPTSE for the regression model. Trade patterns can't determine movement within the index. However, one index is significant to the GSPTSE index, the S&P 500. This represents that the S&P 500 stock market movements can influence the stock market in Canada.

Table 7 has the dependent variable as MXX (Mexico) stock price movement, and the independent variables as the exchange rates. US $ represents the United States currency which is the United States Dollar. Euro represents Germany's currency. The Renminbi represents China's currency. The Yen represents Japan's currency. The Peso represents Mexico's currency. This is the formula to describe the information:

$$\Delta\hat{Y}_4 = \beta_0 + b_2\Delta X_2 + b_3\Delta X_3 + b_1\Delta X_1 + b_5\Delta X_5 + b_6\Delta X_6$$

Table 8 has the dependent variable as MXX stock price movements, and the independent variable as each index for United States, Germany, China, Japan, and Canada. This is the formula that describes this information:

$$\Delta\hat{Y}_4 = \beta_0 + b_2\Delta Y_2 + b_3\Delta Y_3 + b_1\Delta Y_1 + b_5\Delta Y_5 + b_6\Delta Y_6$$

According to table 7 and table 8, the trading patterns control more of the MXX index movement than other stock indices. Table 7 shows that trade patterns from the United States has a significant effect on the movement of the MXX index. The Canadian dollar exchange rate portrays a significance effect on the MXX index. On the contrary, Germany, China, and Japan's trading patterns do not affect the MXX stock price movement. On table 8, with the independent variable being stock price movement for these indices: S&P 500, DAX, SHCOMP, NIKKEI 225, and GSPTSE. The dependent variable being MXX stock price movements, and only one index significantly affects the MXX index. The S&P 500 index prices significantly affect MXX index.

Table 9 has the dependent variable as NIKKEI 225 (JAPAN) stock price movement, and the independent variables as the exchange rates. The US $ represents the United States currency, the United States Dollar. The Euro represents Germany's currency. The Renminbi represents China's currency. The Peso represents Mexico's currency. The Canadian $ represents Canada's currency the Canadian Dollar.

This information is described by this formula:

$$\Delta\hat{Y}_5 = \beta_0 + b_2\Delta X_2 + b_3\Delta X_3 + b_4\Delta X_4 + b_1\Delta X_1 + b_6\Delta X_6$$

Table 10 has the dependent variable as NIKKEI 225 closing stock price movement, and the independent variable as each index for the United States, Germany, Mexico, Japan, and Canada. This information is described by this formula:

$$\Delta\hat{Y}_5 = \beta_0 + b_2\Delta Y_2 + b_3\Delta Y_3 + b_4\Delta Y_4 + b_1\Delta Y_1 + b_6\Delta Y_6$$

According to my research (Table 9 and Table 10), which represents NIKKEI 225 closing stock price movement, exchange rates are more important to the stock market than the financial reasons between stock markets. By using an alpha level of .05, we determined that the movement of the NIKKEI 225 is explained by the exchange rate for United States Dollar and the Peso because the t-statistics is significantly greater than 1.97 with an alpha level less than .05. However, the Canadian Dollar, Renminbi, and the Euro exchange rates do not significantly affect the NIKKEI 225 index. While exchange rates reflect trading patterns, we can make an assumption that trade effects the stock market movement as well for the stated countries that were determined to be significant. According to table 10, Germany's DAX is the only index that has any significant effect on Japan's NIKKEI 225 index. All other stock indices, S&P 500, GSPTSE, MXX, and SHCOMP, are not significant to determine movement within the NIKKEI 225 index.

Table 11 has the dependent variable as SHCOMP (China) closing stock price movement, and the independent variables as the exchange rates. The US $ represents the United States currency which is the United States Dollar. The Euro represents currency for Germany. The Yen represents currency for China. The Peso represents the currency for Mexico. The Canadian $ represents the currency for Canada, the Canadian dollar.

This formula represents the information:

$$\Delta\hat{Y}_6 = \beta_0 + b_2\Delta X_2 + b_3\Delta X_3 + b_4\Delta X_4 + b_5\Delta X_5 + b_1\Delta X_1$$

Table 12 has the dependent variable as SHCOMP closing stock price movement, and the independent variable as each index for United States, Germany, Mexico, Japan, and Canada. This information is represented by this formula:

$$\Delta\hat{Y}_6 = \beta_0 + b_2\Delta Y_2 + b_3\Delta Y_3 + b_4\Delta Y_4 + b_5\Delta Y_5 + b_1\Delta Y_1$$

We find that when comparing the SHCOMP stock price movement to exchange rates (Table 11) that exchange rates do not play a role in movement of China's stock market. All exchange rates are not significant to the SHCOMP for the regression model. Trade patterns can't determine movement within the stock market index for China. In table 12, closing prices for all stock indices that are researched have no significant effect on the SHCOMP index. Other stock market indices do not influence SHCOMP index movement. These results correlate perfectly with the results from comparing the previous dependent variables. The Chinese market showed no signs of significance when it was independent variable either. Again as stated earlier in the paper, the reasoning could be that the Chinese market may be more heavily monitored by government then the other 5 countries we are researching, which could be the underlining reasoning as to my findings of the SHCOMP index.

SUMMARY AND CONCLUSION

The results of our research provide some clear evidence that exchange rate movements affect the S&P 500 stock price movements. More specifically, the S&P 500 stock price movements are significantly correlated with Canada, Japan, and Mexico. This implies that trade effects the S&P 500 stock price movements. Canada's exchange rate and Canada's stock price movement were both significantly correlated with the S&P 500 stock price movements. This implies that trading patterns and the flow of money for Canada have a significant effect on the United States.

Over all, stock price movement among S&P 500, DAX, GSPTSE, NIKEI225, and MXX are significantly affected by trading patterns determined by exchange rates, but China's stock market index, SHCOMP, seems unaffected by trading patterns and money being transferred between stock markets. This may be the outcome of a more monitored financial market for China. Even though the trading patterns proved to be of greater significances for stock market movement, currency being moved from one stock market still had some significance with my findings.

Previous literature has proven the same idea using different models and evaluations. This research was done in order to determine if the S&P 500 stock price movements can be determined by the top five countries the United States trades with. Again, these countries are China, Mexico, Germany, Canada, and Japan. Canada's goods market and money market seem to play on over whelming effect on the S&P 500 stock price movements. From my research it can be concluded that by watching the changes in the goods market and the changes in the money market for Canada we should be able to expect the S&P 500 stock market to shift. The two determining variables that my research has verified as indicators for stock market movement

within the indices are the trading patterns between these six countries as well as the flow of money between the stock indices.

REFERENCES

Abdalla, I.S.A and V. Murinde. (1997), Exchange Rate and Stock Price Interactions in Emerging Financial Markets: Evidence on India, Korea, Pakistan and Philippines, Applied Financial Economics, 7, 25-35

Aggarwal, R. (1981), Exchange Rates and Stock Prices: A Study of the US Capital Markets under Floating Exchange Rates, Akron Business and Economic Review, vol. 12, pp. 7–12.

Ajayi, R.A., and M. Mougoue. (1996), On the Dynamic Relationship between Stock Prices and Exchange Rate, Journal of Financial Research, 19(2), pp.193-207.

Alagidede P, Panagiotidis T, Xu Z. Causal relationship between stock prices and exchange rates. Journal of International Trade and Economic Development. February 2011; 20(1):67-86.

Apte, P.G. (1997), Currency Exposure and Stock Prices, Journal of Foreign Exchange and International Finance, XII (2):135-143.

Dornbusch, R., and S. Fischer. (1980), Exchange Rates and Current Account, American Economic Review, 70, 960-71.

Frank, P., and A. Young. (1972), Stock Price Reaction of Multinational Firms to Exchange Realignments, Financial Management, Winter, pp.66–73, Principles of Economics, New York, McGraw Hill/Irwin.

Granger, C.W.J., B. Huang and C. Yang. (2000), A Bivariate Causality between Stock Prices and Exchange Rates: Evidence from Recent Asian flu, Quarterly Review of Economics and Finance, 40 (3) pp.337-354.

Groenewold, N. and Paterson, J. E.H. (2013), Stock Prices and Exchange Rates in Australia: Are Commodity Prices the Missing Link? Australian Economic Papers, 52: 159–170. doi: 10.1111/1467-8454.12014

Krugman, P.R., Obstfeld, M., & Melitz, M.J. (2015). International economics: Theory and Policy (10th ed.). Boston, MA: Pearson.

Oanda Corporation. (2016). Oanda Solution for Business http://www.oanda.com/solutions-for-business/historical-rates/main/html

Phylaktis, K., and F. Ravazzolo. (2000), Stock Prices and Exchange Rate Dynamics, pp. 17–37. www.cass.city.ac.UK/emg/workingpapers/ stock-prices-andexchange.

Smith, C. (1992), Stock Markets and the Exchange Rate: A Multi-Country Approach, Journal of Macroeconomics, 14(4), pp.607–29.

Solnik, B. (1987),Using Financial Prices to Test Exchange Rate Models- A Note, Journal of Finance, 42, pp.141-149.

Suranovic, Steven M. (2016), International Finance Theory and Policy. http://internationalecon.com/finance/fch60/fch60.php

Top Trading Partners-March 2016. "United States Census Bureau." 2 Mar. 2016 https://www.census.gov/foreign-trade/statistics/highlights/toppartners.html

APPENDIX

Table 1: SP500 Stock Price Movement Relative To Other Countries Exchange Rate

Variable	Coefficient	Newey-West SE	t-value
EURO	0.172	0.172	1
CANADIAN $	-0.821***	0.156	-5.25
RENMINBI	0.064	0.113	0.56
YEN	0.004***	0.001	2.9
PESO	-0.071	0.014	-4.93
CONS	0.002	0.001	1.63

***,**,* significant at 1%, 5% and 10% respectively

Note: SP500 (United States Stock Market), Euro (Germany Currency), Canadian $ (Canada Currency), Renminbi (China Currency), Yen (Japan Currency), Peso (Mexico Currency)

Table 2: SP500 Stock Price Movement Relative To Other Countries

Variable	Coefficient	Newey-West SE	t-value
DAX	0.347***	0.025	13.79
GSPTSE	0.058**	0.025	2.3
SHCOMP	0.005	0.007	0.71
NIKKEI 225	0.082	0.055	1.5
MXX	0.012	0.006	1.83
CONS	0.001	0.001	0.65

***,**,* significant at 1%, 5% and 10% respectively

Note: SP500 (United States Stock Market), DAX (Germany Stock Market), GSPTSE (Canada Stock Market), SHCOMP (China Stock Market), NIKKEI 225 (Japan Stock Market), MXX (Mexico Stock Market)

Table 3: DAX Stock Price Movement Relative To Other Countries Exchange Rate

Variable	Coefficient	Newey-West SE	t-value
US $	1.574	0.825	1.91
CANADIAN $	-1.101***	0.19	-5.79
RENMINBI	-0.04	0.116	-0.34
YEN	0.007***	0.002	4.22
PESO	-0.105***	0.017	-6.08
CONS	0.003	0.002	1.48

***,**,* significant at 1%, 5% and 10% respectively

Note: DAX (Germany Stock Market), US $ (United States Currency), Canadian $ (Canada Currency), Renminbi (China Currency), Yen (Japan Currency), Peso (Mexico Currency)

Table 4: DAX Stock Price Movement Relative To Other Countries

Variable	Coefficient	Newey-West SE	t-value
SP 500	0.928***	0.07	13.2
GSPTSE	0.055	0.04	1.38
SHCOMP	0.006	0.012	0.45
NIKKEI 225	0.239***	0.096	2.49
MXX	-0.004	0.011	-0.41
CONS	0.001	0.002	0.63

***,**,* significant at 1%, 5% and 10% respectively

Note: DAX (Germany Stock Market), SP 500 (United States Stock Market), GSPTSE (Canada Stock Market), SHCOMP (China Stock Market), NIKKEI 225 (Japan Stock Market), MXX (Mexico Stock Market)

Table 5: GSPTSE Stock Price Movement Relative To Other Countries Exchange Rate

Variable	Coefficient	Newey-West SE	t-value
US $	1.44	0.955	1.51
EURO	0	0	0.49
RENMINBI	-0.267**	0.136	-1.97
YEN	0.001	0.001	0.96
PESO	0.014	0.026	0.56
CONS	0.001	0.001	0.74

***,**,* significant at 1%, 5% and 10% respectively

Note: GPTSE (Canada Stock Market), US $ (United States Currency), Euro (Germany Currency), Renminbi (China Currency), Yen (Japan Currency), Peso (Mexico Currency)

Table 6: GSPTST Price Stock Movement Relative To Other Countries

Variable	Coefficient	Newey-West SE	t-value
SP 500	0.116	0.053	2.18
DAX	0.042	0.029	1.42
SHCOMP	0.010**	0.011	0.9
NIKKEI 225	0.08	0.089	0.9
MXX	0.005	0.011	0.43
CONS	0.001	0.001	0.78

***,**,* significant at 1%, 5% and 10% respectively

Note: GSPTSE (Canada Stock Market), SP 500 (United States Stock Market), DAX (Germany Stock Market), SHCOMP (China Stock Market), NIKKEI 225 (Japan Stock Market), MXX (Mexico Stock Market)

Table 7: MXX Stock Price Movement Relative To Other Countries Exchange Rate

Variable	Coefficient	Newey-West SE	t-value
US $	103.383***	41.487	2.49
EURO	0	0	0.15
RENMINBI	-7.343	5.241	-1.4
YEN	0.063	0.035	1.84
CANADIAN $	-23.629***	6.964	-3.39
CONS	0.012**	0.005	2.43

***,**,* significant at 1%, 5% and 10% respectively

Note: MXX (Mexico Stock Market), US $ (United States Currency), Euro (Germany Currency), Renminbi (China Currency), Yen (Japan Currency), Canadian $ (Canada Currency)

Table 8: MXX Price Stock Movement Relative To Other Countries

Variable	Coefficient	Newey-West SE	t-value
SP 500	0.395***	0.196	2.02
DAX	-0.055	0.133	-0.41
SHCOMP	-0.015	0.047	-0.32
NIKKEI 225	0.258	0.323	0.8
GSPTSE	0.077	0.181	0.42
CONS	0.011**	0.006	2.04

***,**,* significant at 1%, 5% and 10% respectively

Note: MXX (Mexico Stock Market), SP 500 (United States Stock Market), DAX (Germany Stock Market), SHCOMP (China Stock Market), NIKKEI 225 (Japan Stock Market), GSPTSE (Canada Stock Market)

Table 9: NIKKEI 225 Stock Price Movement Relative To Other Countries Exchange Rate

Variable	Coefficient	Newey-West SE	t-value
US $	-75.417***	27.997	-2.69
EURO	0	0	-0.22
RENMINBI	-0.267***	0.136	-1.97
PESO	-1.053**	0.482	-2.18
CANADIAN $	-1.094	8.79	-0.12
CONS	0	0.001	0.22

***,**,* significant at 1%, 5% and 10% respectively

Note: NIKKEI 225 (Japan Stock Market), US $ (United States Currency), Euro (Germany Currency), Renminbi (China Currency), Peso (Mexico Currency), Canadian $ (Canada Currency)

Table 10: NIKKEI 225 Stock Price Movement Relative To Other Countries

Variable	Coefficient	Newey-West SE	t-value
SP 500	0.028	0.019	1.51
DAX	0.030***	0.012	2.52
MXX	0.003	0.003	0.79
SHCOMP	0	0.004	0.13
GSPTST	0.014	0.015	0.89
CONS	0	0.001	-0.49

***,**,* significant at 1%, 5% and 10% respectively

Note: NIKKEI 225 (Japan Stock Market), SP 500 (United States Stock Market), DAX (Germany Stock Market), MXX (Mexico Stock Market), SHCOMP (China Stock Market), GSPTSE (Canada Stock Market)

Table 11: SHCOMP Stock Price Movement Relative To Other Countries Exchange Rate

Variable	Coefficient	Newey-West SE	t-value
US $	24.511	31.647	0.77
EURO	0	0	0.68
YEN	0.036	0.026	1.4
PESO	-0.231	0.322	-0.72
CANADIAN $	-2.332	4.883	-0.48
CONS	0.005	0.006	0.99

***,**,* significant at 1%, 5% and 10% respectively

Note: SHCOMP (China Stock Market), US $ (United States Currency), Euro (Germany Currency), Yen (Japan Currency), Peso (Mexico Currency), Canadian $ (Canada Currency)

Table 12: SHCOMP Stock Price Movement Relative To Other Countries

Variable	Coefficient	Newey-West SE	t-value
SP 500	0.123	0.173	0.71
DAX	0.054	0.12	0.45
MXX	-0.012	0.035	-0.33
NIKKEI 225	0.035	0.273	0.13
GSPTST	0.13	0.139	0.93
CONS	0.006	0.006	0.99

***,**,* significant at 1%, 5% and 10% respectively

Note: SHCOMP (China Stock Market), SP 500 (United States Stock Market), DAX (Germany Stock Market), MXX (Mexico Stock Market), NIKKEI 225 (Japan Stock Market), GSPTSE (Canada Stock Market)

VITA

Graduate School

Southern Illinois University

Amy E. Fellers

Amy.e.fellers@siu.edu

Lincoln College
Associate in Arts, May 2010

Wilmington University
Bachelor of Science, Marketing, January 2013

Research Paper Title:
Effects of Exchange Rates Changes on S&P 500 Price Movement

Major Professor: Dr. Zsolt Becsi