Impact of RMB Exchange Rate on Shanghai Stock Exchange Composite Index in China

By

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Abstract

This thesis explore the relationship between macroeconomic factors and Shanghai stock exchange composite index , Such as exchange rate（Normal Effective Exchange Rate）,inflation rate, interest rate, money supply(M1), foreign direct investment(FDI),GDP,export and currency policy（dummy variable）, Data period from July 2005 to March 2014 which contains a monthly data set of 105 observation by using multiple regression analysis, The result shows that the exchange rate(NEER) ,inflation rate,money supply and export have a significant on shanghai stock exchange composite index.

Key words: Exchange rate（Normal Effective Exchange Rate）,Inflation rate, Interest rate, Money supply, GDP, Foreign direct investment(FDI), Export and Currency policy (dummy variable).

1 Introduction

1.1 Background of the Research

Financial market as stock market is the center where most Chinese investors focus on, and this can provide more potentials and opportunities for common people in Chinese stock market (He et al., 2014).

However, Chinese stock market may be different from western stock market which its regulation and management are under perfect condition (Johansen & Sornette, 2001). When considering to practical marketing situation, Chinese investors find it possible to experience the uneven market and feel unstable to make investment decision. For example, China adjusted its exchange rate after 2005, and investors are then excited about the increasing trend of stock market (Qiao, 2007).

China has more opportunities to make businesses with international market and thus the value of RMB plays an important role international business. Chinese government tends to further increase RMB, which consequently leads to more stable stock market and relationship between RMB and stock market

(Ozdenoren & Yuan, 2008). As a consequence, this thesis will discuss the effect of RMB exchange rate on Chinese stock market, and the result of this thesis will benefit not only investors, but also governments.

1.2 Research Objectives

By reviewing a number of researches, exchange rate and stock price should have a certain relationship, namely, exchange rate may influence stock market . Therefore, this dissertation will mainly complete one objectives.

To investigate relationship between Shanghai Stock Exchange Composite Index with the macroeconomic factors with focus on the exchange rate .

In this paper, we will use the nominal effective exchange rate(NEER) as a measure for RMB exchange rate. A nominal effective exchange rate (NEER) is the un-adjusted weighted average value of a country's currency relative to all major currencies being traded within an index or pool of currencies. The weights are determined by the importance a home country place on all other currencies traded within the pool, as measured by the balance of trade.

1.3 Research Questions

Foreign currency market and stock market are regarded as important sub field markets of financial market, which can directly reflect the real situation of the whole economy. In particular, their relationship between these two markets is relevant to economic stability and development, and thus it is necessary to explore their relationship under this situation. As a consequence, starting from the point of RMB exchange rate is indispensable to guide economic development and create meanings for investors and governments. Thus, the effect of RMB exchange rate on Shanghai Stock Exchange

Composite Index   will be explored. NamelyThe relationship between RMB exchange rate and Shanghai Stock Exchange Composite Index.

(1)   Is there a significant relationship between RMB exchange rate and Shanghai Stock Exchange Composite Index ?

(2)   Do macro-economic factors influence Shanghai Stock Exchange Composite Index?

1.4 Expected Benefit

For these researches, it can be found that macroeconomic factors have a direct effect on stock market, worth noticed by investors who chase for more returns.

(1) Investor may look into the finding in this paper for estimating the future movement and direction of the equity prices.

(2) Investor can formulation investment decision.

(3) Investor can identifying accessible investment prospect.

Besides, most governments actually have a strict control in managing stock market where people with different backgrounds may be depended on stock market.

Investors in Shanghai Stock Exchange Composite Index want to obtain more returns and they find it impossible to curb their expectations

2 Literature review

2.1 Review of Literature

Stock price is an important indicator for portfolio management. Many of the researchers are interested to identify the significant effect between the macroeconomic variable and stock market.

To discuss how the RMB exchange rate influences on Shanghai Stock Exchange Composite Index, this section will begin to explore the relevant researches on this thesis. We will be discussed the factor of Macroeconomy, like Exchange rate (NEER)ịnflation rate, foreign direct investment(FDI), money supply(M1), interest rate, GDP, currency policy(dummy variable)and Export. This section can help reader develop a clear understanding of RMB exchange rate and Shanghai Stock Exchange Composite Index as well as lay the theoretical foundation for this thesis.

Hypothesis 1: The Inflation Rate has an effect on Shanghai Stock Exchange Composite Index.

2.1.1 Inflation Rate Determinant of Stock Market

Li Chun、Luo Jian Mei and Yang Zhi Bing （2001）who discussed the relationship between inflation rate and stock market , used the Shanghai Stock Exchange Composite Index and inflation rate ,the result showed that the inflation rate and stock market has a positive significant.

Maku and Atanda (2010) investigate the inflation rate effect on the Nigerian stock market during 1984 and 2007. They used ECM and ADF test ,The result shows that the relationship between inflation rate and Nigerian stock market have a significant positive.

Kibria, et, al (2014) investigated that the impact of inflation rate variables on the stock market in Pakistan. They applied regression test ,correlation analysis and granger causality test to check the data, period from 1991-2013 . The findings that the inflation rate variable have a significant positive impact on stock market.

Hypothesis 2: The exchange Rate (NEER) has an effect on Shanghai Stock Exchange Composite Index .

2.1.2 Normal Effective Exchange Rate Determinant of Stock Market

Aggarwal (1981) reviews the stock price of American stock market from 1974 to1978, which determines that the price of dollar can develop a positive effect on return of stock market and this effect is much more evident in short-term period than that in long-term period.

Ibrahim and Musah (2014) investigated that the nominal effective exchange rate effect on stock market in Ghana. The data period from September 2000 - September 2010 by using monthly and employed the Johansen multivariate co-integration test and Vector error correction model. The result found that the nominal effective exchange rate has a positive significant impact on Ghana stock market.

Mutuku and Ng'eny (2015) examined that the impact of the nominal effective exchange rate on Kenya stock market, The Data period from 1997-2010 by using quarterly data and employed the Vector error correction and Vector Autoregressive model .The result shows that the nominal effective exchange rate has a positive significant effect on stock market.

Hypothesis 3 :The Foreign Direct Investment has an effect on Shanghai Stock Exchange Composite Index

2.1.3 Foreign Direct Investment Determinant of Stock Market

Foreign direct investment is the main source of international finance cash inflow.

Muhammad Nauman Khan and Sharif Zaman (2009) investigated that the foreign direct investment (FDI) effect on Karachi stock market. The data collection period from 1998-2009. The result finding that the FDI was insignificant with Karachi stock market.

Sulainman Umar Musa （2010）investigate that the impact of FDI on Nigerian stock market ,Data collected period from 1981 - 2010 ,They finding that there is insignificant between FDI and Nigerian stock market.

Hypothesis 4 :The Money Supply has an effect on Shanghai Stock Exchange Composite Index.

2.1.4 Money Supply Determinant of Stock Market

Money supply means the total quantity of money existing in the market at a precise of period (Johson, 1994).

Maysami, Howe and Hamzah (2004) examined that the money supply has a positive effect on Singapore stock market. The causality between stock markets money supply was investigated also by Brahmasrene and Jiranyakul (2007), In their paper that Thai stock market data period during from 1992 to 2003 ,they found a positive relationship between the stock prices and money supply.

Sohail, et, al (2009) used VAR model and investigate short-run and long-run relationships between stock market and money supply ,They use monthly data period from December 2002 - June 2008. The result found that the money supply has a positive effect on stock market .

Hypothesis 5: The GDP has an effect on Shanghai Stock Exchange Composite Index

2.1.5 Foreign Gross Domestic Product (GDP) determinant of stock market

Izodonmi and Abdullahi (2011) investigate the impact of GDP on the Nigerian stock market ,Data during from period 2000 to 2004, They used ordinary least square test (OLS) and the result found that the GDP have no significant impact on the Nigeria stock market

Zakaria, et al. (2012) used VAR and GARCH to examine the relationship between Foreign Gross Domestic Product and Malaysia stock market and employed monthly period from January 2000-June 2012 ,They result found that the GDP have no significant effect on stock market.

Hypothesis 6 :The interest rate has an effect on Shanghai Stock Exchange Composite Index.

2.1.6 Interest rate determinant of stock market

Finance theory explains interest rate as a measurement of time value of money which is one of the main determinants in stock prices.

Gan, Lee, Yong and Zhang (2006) investigate that the interest rate and stock prices have a long term negative relationship. In their paper ,

Liu and Shrestha (2008) examine the long run relationship between interest rate and stock indices in China employing heteroscedastic co-integration analysis and finds that the long term relationship does exist between stock market and interest rates.

Hypothesis 7 :The export has an effect on Shanghai Stock Exchange Composite Index

2.1.7 Export Determinant of Stock Market

Hussain, et, al, (2012) used the ADF,VECM ,Co-integration analysis and Granger causality test to examine export variable on the stock prices, Data during from January 2001- December 2010 monthly data. They finding the export have a negative significant effect on the stock prices.

Samontaray, et, al, (2014) studied the relationship between the Saudi export and Saudi stock market ,The data period during December 2003-December 2013 of monthly data. They used the regression analysis and correlation analysis and result shows that the Saudi export have a significant effect on Saudi stock market.
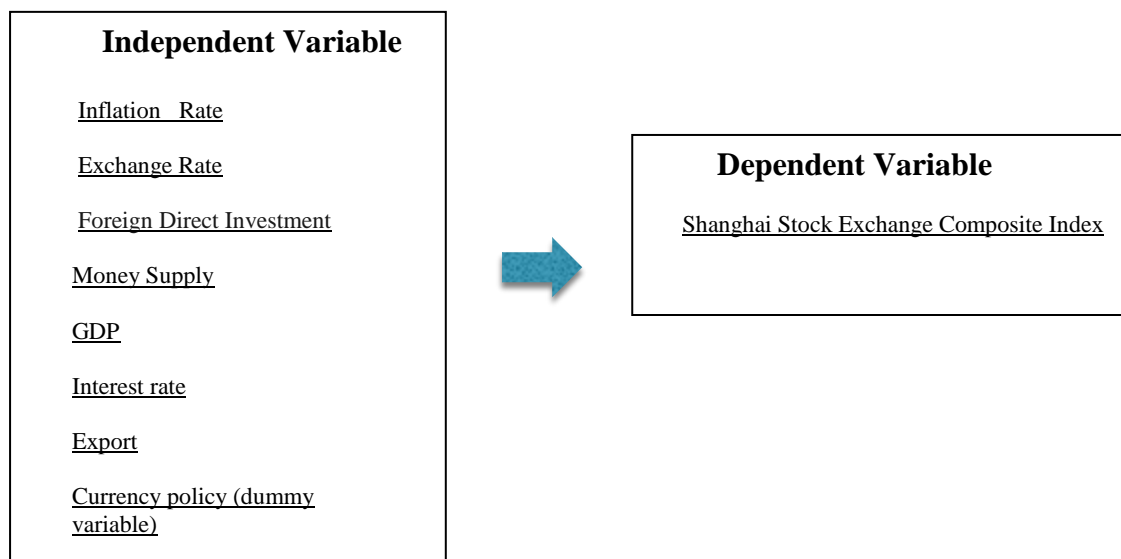
Hypothesis 8 : The Currency policy (dummy variable) effect on Shanghai Stock Exchange Composite Index.

2.1.8 Currency Policy Determinant of Stock Market

Cassola and Morana (2004) used the VAR model and co-integrated to examine the relationship between currency policy and stock prices. they result indicate positive currency policy has a positive impact on stock prices.

2.2 Conceptual Framework/ Hypotheses Development :

Figure 2.1: Conceptual Framework

Independent Variable
Inflation Rate
Exchange Rate
Foreign Direct Investment
Money Supply
GDP
Interest rate
Export
Currency policy (dummy variable)

Dependent Variable
Shanghai Stock Exchange Composite Index

We will use multiple regression analysis to find out hypotheses. The common purpose of a multiple regression is to analyse and evaluate the relationship between several explanatory variables and a dependent variable. The general formula representing this multiple regression is the subsequent

Table 2.1 : Proposal Model

$$SMI_t = \beta_0 + \beta_1 INF_t + \beta_2 NEER_t + \beta_3 FDI_t + \beta_4 MS_{t+} + \beta_5 GDP_t \\ + \beta_6 IR_t + \beta_7 EXP_t + \beta_8 DV1 + \beta_9 DV2 + \varepsilon_t$$

3 Methodology

3.1 Data Collection

This section will describe the data collection, So data will be collected from July 2005 to March 2014 in monthly form with a total of 105 observations .which includes Historical closing price of Shanghai Stock Exchange Composite Index and 8 macroeconomic variables data were obtained .Data of Shanghai Stock Exchange Composite Index is the dependent variable, whereas data of exchange rates $(NEER)$, FDI, GDP, money supply (M) , inflation rates, currency policy dummy variable, export and interest rate are the independent variables.

In this paper, all the data from the China national data, Data sources valid.

3.3 Tools

To study the relationship between the variables, Statistic software will be used. The regression equation can be estimated, the important part of this research. Thus, it can reflect whether NEER may have an influence on Shanghai Stock Exchange Composite Index and how much the effect of examining their relationship.

Due the time series data to avoid the spurious regression, it is necessary to determine these data is stable. Namely, unit root test is an effective method before ordinary least square test (OLS). Therefore, Stationary data will be expected

result of the following analysis. In the end, we will use the regression analysis(OLS).including Multicollinearity, Heteroscedasticity and Autocorrelation.

3.3 Methodology

3.3.1 Unit Root Test

It is important to consider unit root test as it define the order of each integration for each series as well as to render the data stationary to test the effect of stationary on its property and behavior.

<div align="center">

Table 3.1 : Hypothesis of ADF Test

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$$H_0 : \delta = 1 \ (\text{ Variable } is \ not \ stationary \ )$$
$$H_1 : \delta < 1 \ (\text{ Variable } is \ stationary \ )$$

The null hypothesis is reject if consists of negative value and significant diverse from zero. Meanwhile the accept of null hypothesis mean variable does not perform stationary and consist of unit root.

3.3.2 Multicollinearity

Multicollinearity occur when there are multiple predictors in a single model which are correlated and give redundant information. The result can be misleading, so that the model can not necessarily significant.. For this part, Examination of correlation matrix and the calculation of variance inflation factor (VIF) are used to detect Multicollinearity problem and identify the correlation between variables.

<div align="center">

Table 3.2: Variance Inflation Factors (VIF)

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$$VIF = \frac{1}{1 - R^2}$$

3.3.3   Ordinary Least Square (OLS)

The ordinary least square is a measuring tool that is employed to estimate unknown parameter in a regression model. This allowed the estimation of real population relationship between variables and detect for any existences of economic problem (Madhuchhanda & Mishra 2004). In this paper OLS test is carried out to understand the long run relationship among variables.

3.3.4 Heteroscedasticity

Heteroscedasticity test is to check on the fitting of a regression model via the behavior of standard deviation and samples variance. A time series regression consists of same variances of distribution. The existence of heteroskedasticity means that variance of distribution is not constant, there is diverse variances across the disturbance. On the other hand, it reflects homoskedastic if all the measurement are constant. White (1980) stated that heteroskedasticity influences the efficiency of estimated parameter and covariance matrix. This will cause misleading the result for hypothesis testing.

3.3.5 Autocorrelation

Autocorrelation can be classified as the measurement of correlation coefficient. The objective of autocorrelation is to determine the performance of data in a times series model. Durbin-Watson （Durbin & Watson, 1950）test is used to identify whether it has autocorrelation problem. It is also referred as a serial correlation or lagged correlation, a correlation between a series of number over a successive time interval.

4 Data analysis

4.1 Descriptive Statistic

The descriptive statistics analysis related to shanghai stock exchange composite index. This paper would put all the variables into This table shows total number of observation，mean value, median value, maximum value, minimum value and standard deviation of all the variables ,these numeric figures will help to understand and data in proper manner. Descriptive statistics as below:

Table 4.1 Common Statistics of Variables

	SMI (Index)	EXP (RMB Billion)	FDI (RMB Billion)	GDP (RMB Billion)	INF (percent)	IR (percent)	MS (RMB Billion)	NEER (Index)	DV1	DV2
Mean	2579.23	277881.5	338641.7	28401.88	3.054286	2.78593	210241.1	99.2751	0.21048	0.43809
Median	2396.32	272790.3	330450.2	26723.13	2.700000	2.86000	212493.2	99.2500	0.00000	0.00000
Maximum	5954.77	319158.4	734129.2	58144.97	8.700000	6.91610	337291.1	115.630	1.00000	1.00000
Minimum	1083.03	254360.1	36663.61	2902.072	-1.80000	0.94450	97674.10	87.2400	0.00000	0.00000
Std.Dev.	948.110	199722.42	188543.9	11741.80	2.344594	1.21658	75158.78	8.13876	0.41558	0.49853
Observa-tions	105	105	105	105	105	105	105	105	105	105

The table 4.1 showed that descriptive statistic of eight independent variable and one dependent variable.

4.2 Unit Root Test

The unit root test is used to all variable applied in the model. ADF test is to test the stationary level of all variable. The table 4.2 reports the result of Augmented Dicky Fuller (ADF) test using intercept and trend ,The eight variables are found stationary at 5% levels at significant, The P-value less than 10% critical level.

Table 4.2 The result of Augmented Dicky Fuller

	Intercept & Trend		
	Test critical values	Level	p-value
D(lnSMI)	5% -3.453601	-9.512519***	0.0000
D(lnFDI)	5% -2.892879	-7.185485***	0.0000
D(lnGDP)	5% -3.458856	-5.714068***	0.0000
D(lnINF)	5% -3.459397	-4.507084***	0.0025
D(lnIR)	5% -3.453601	-11.77050***	0.0000

D(lnMS)	5%	-3.453601	-11.96148***	0.0000
D(lnNEER)	5%	-3.454471	-3.882983**	0.0162
lnEXP	5%	-3.453601	-9.06290 ***	0.0000

*p< 0.1 , **p< 0.05, ***p< 0.01

4.3 Diagnostic Testing

4.3.1 Multicollinearity

In this paper. There may be a correlation between the independent variables. and it might cause multicollinearity problem. The result of correlation of variables as follows:

Table 4.3 Result of Correlation Test of Variables

	lnEXP	D(lnFDI)	D(lnGDP)	D(INF)	IR	D(lnMS)	D(lnNEER)
lnEXP	1.000000	-0.160459	-0.059606	0.046243	0.003709	-0.021434	0.072606
D(lnFDI)	-0.160459	1.000000	0.314146	-0.046912	0.050903	-0.089270	0.080156
D(lnGDP)	-0.059606	0.314146	1.000000	-0.029169	-0.131351	0.138798	0.095147
D(INF)	0.046243	-0.046912	-0.029169	1.000000	0.095762	-0.049473	-0.161273
IR	0.003709	0.050903	-0.131351	0.095762	1.000000	-0.110274	-0.049766
D(lnMS)	-0.021434	-0.089270	0.138798	-0.049457	-0.110274	1.000000	0.118687
D(lnNEER)	0..072606	0.080156	0.095147	-0.161273	-0.049766	0.118687	1.000000

The table 4.3 result shows that there are have three pairs of independent variables are highest correlation coefficient value is 0.314146 (D(lnGDP and D(lnFDI)) ,0.161273 (D(lnNEER) and D(INF)) and 0.138798 (D(lnGDP) and D(lnMS)). It is low than 0.8. So there is no multicollinearity problem in the model..

4.2 Description of the Empirical Model

After the unit root result. Next step is formulate the empirical model. Date from July.2005 – March 2014. The ordinary least square regression method will

be use to research the significant of the relationship between Shanghai Stock Exchange Composite Index and the macroeconomic variable of the model.

Table 4.4 Proposal Model

$$D(ln\,SMI_t) = \beta_0 + \beta_1\,D\,(LNF_t) + \beta_2\,D(lnNEER_t\,) + \beta_3\,D(lnFDI_t\,)$$
$$+ \beta_4\,D(lnMS_t\,) + \beta_5\,D(lnGDP_t\,) + \beta_6 IR_t\, + \beta_7\,lnEXP$$
$$+ \beta_8\,DV_1\, + \beta_9\,DV_2\, + \,\varepsilon_t$$

Where,

$D(lnSMI_t)$: Natural logarithm of Shanghai Stock Market Index

$D(INF_t\,)$:   Inflation Rate

D($lnNEER_t$): Natural logarithm of Normal Effective Exchange rate

$D(lnFDI_t\,)$: Natural logarithm of Foreign Direct Investment

D(lnMS_t) : Natural logarithm of Money Supply

$D(lnGDP_t\,)$: Natural logarithm of Foreign Gross Domestic Product

IR_t :   Interest Rate

lnEXP_t : Natural logarithm of Export

DV1 and DV2 :   dummy variable

ε_t : Error term

Table 4.5 OLS Regression Result of Empirical Model

	Parameter Estimate	Standard Error	Test Statistic	P-value
lnEXP	-0.115339	0.028151	-4.097174	0.0001***
D(lnGDP)	-0.020070	0.026084	-0.769425	0.4436
D(lnFDI)	-0.050429	0.032146	-1.568766	0.1201
IR	-0.010512	0.010947	-0.468344	0.6406
DV1	-0.008843	0.027109	-0.326189	0.7450
DV2	0.037353	0.026953	1.385868	0.1691

D(lnNEER)	4.751506	2.595373	1.830760	0.0703*
D(INF)	3.506549	1.325754	2.644946	0.0096***
D(lnMS)	0.764456	0.450428	1.697177	0.0930*

*p< 0.1 , **p< 0.05, ***p< 0.01

R-squared：0.263544

Adjusted R-squared：0.192274

Prob （F-statistic）：0.000537

The table 4.5 result of the Ordinary Least Square （OLS）model found that lnEXP and D(INF) variable are significant at 1%, D(lnNEER) and D(lnMS) variable are significant at 10%, The D(lnFDI)),D(lnGDP), IR , DV1 and DV2 are insignificant independent variables with p-value of 0.1201, 0.4436, 0.6406, 0.7450 and 0.1691 respectively, more than significant value of 10% , 5% and 1% .

4.3   Autocorrelation Test

According to the result of Ordinary Least Square test. We can know the Durbin-Watson statistics. Durbin-Watson statistics is available below :

Table 4.6 Durbin Watson Test Model

Durbin-Watson statistics	N （sample sizes）	K(explained variable)	d_L	d_U
2.144953	105	9	1.357	1.741

Based on the table 4.6, The Durbin-Watson statistics was 2.144953 ,The 1% significant points of $d_L = 1.357$ and $d_U = 1.741$. $d_U = 1.741 <$ D-W=2.144953< 2.259 = 4-d_U. So there is no autocorrelation problem in the model.

4.4   Heteroscedasticity（White Test ）

Table 4.7 The Result of the White Test

F-statistic	1.2407	Prob. F(37,65)	0.2219
Obs*R-squared	57.033	Prob. Chi-Square(37)	0.2608
Scaled explained SS	64.006	Prob. Chi-Square(37)	0.1044

Based on the result on table 4.7 . The p-value is 0.2608 greater than the 0.05 alpha value. There is no heteroscedasticity problem in the model.

5 discussion and recommendation

5.1 Implication of the Research

This paper provided the analysis and study of Shanghai Stock Exchange Composite Index movement. From the finding that are found in this thesis indicate that a favorable portfolio investment can be made through the in-depth analysis on the trend of current stock market such as exchange rate （NEER）, inflation rate, export ,money supply. This served as a guideline for China investors who interested to invest in shanghai stock exchange composite index. Based on OLS result from findings, Only   have   the exchange rate （NEER）,export ,inflation rate and money supply have a significant at 90% and 99% confidence level with shanghai stock exchange composite index.

The currency policy did not affect shanghai stock exchange composite index. But the money supply and inflation rate as the currency policy transmission mechanism effect on shanghai stock exchange composite index. Currency policy by using dummy variables to influence the stock market is also a great possibility. it will affect the stock market.

5.2 Discussion of Major Findings

For exchange rate   （NEER） he ordinary least square（OLS） result shows the relationship between NEER and stock Shanghai Stock Exchange Composite Index has a positive significant, This result found with previous research by Aggarwal (1981) and Hasanzadah and Kiavand (2012) investigated there is positive between the nominal effective exchange rate (NEER) and stock market. Besides, Beer and Hebein (2008) believe thought used the EGARCH to examine the NEER have a positive significant effect on the stock market.

For inflation rate, The finding indicates that there is significant positive relationship between the growth rate of inflation and Shanghai Stock Exchange Composite Index. Based on the previous research. Li Chun   ,Jiao Mei and

Yang Zhi Bing（2001）and Xu Bing、Ni Yue Yang（2006）Maku and Atanda (2010) and While Kibria, et, al (2014) results shows the inflation rate variable have a significant positive impact on stock market.

For money supply, The result shows there is statistically significant positive relationship between money supply and Shanghai Stock Exchange Composite Index. Based on the previous research. Maysami, Howe and Hamzah (2004), Al-Sharkas (2004), Brahmasrene and Jiranyakul (2007), SOHAIL, et, al (2009) and Maysami and Koh (2000) examined there is significant positive relationship between the money supply and stock market.

5.3 Limitations of the Research

The limitations is sample size is not large in this research. A smaller sample size may be susceptible to error and misleading. For qualitative research. the larger sample size will have a highly probability of detecting a statistically significant result. The last limitations is use the time series data but not panel data. Because in this research. Based on China the result conducted only considered as case. While other countries may have their background ,political factors and unique status that will directly effect the related stock market. In this research. the result is only useful for the china investor.

5.4 Implication of the Research

This paper provided the analysis and study of Shanghai Stock Exchange Composite Index movement..

Based on OLS result from findings, for other macroeconomic variable, Exchange rate (NEER) effects shanghai stock exchange composite index. This is the most important finding of this thesis.

The money supply as transmission mechanism of currency policy and effect on shanghai stock exchange composite index, It is implemented increase or decrease money supply in the economic market by government. The stock market investor should be take attention more of any new currency policy. It will affect the stock market.

The currency policy did not affect shanghai stock exchange composite index. But the money supply and inflation rate as the currency policy transmission mechanism effect on shanghai stock exchange composite index. Currency policy by using dummy variables to influence the stock market is also a great possibility. It will affect the stock market.

5.5 Recommendations for Future Research

The recommendation for future research to increase the sample size. For example fifteen years or twenty years.

And is encouraged to carry out their study by using panel data replace using time series data. Because the panel data can provides multiple observations for all variable in sample. the panel data can enhance the efficiency of an econometric estimate and obtain larger number of data point.

Last recommendation for future research is need to study the impact of currency policy on the relationship between NEER and Shanghai Stock Exchange Composite Index, Based on previous search data, In this regard just have a Little information ,The future researcher can increase investigate in this part. Maybe there will be a good find and results.

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