

Spring 2018

International Debt Impact on the Value of South Korean Currency

Wonjin Song
Eastern Illinois University

Follow this and additional works at: http://thekeep.eiu.edu/lib_awards_2018_docs



Part of the [International Economics Commons](#)

Recommended Citation

Song, Wonjin, "International Debt Impact on the Value of South Korean Currency" (2018). *2018 Awards for Excellence in Student Research and Creative Activity – Documents*. 6.
http://thekeep.eiu.edu/lib_awards_2018_docs/6

This Book is brought to you for free and open access by the 2018 Awards for Excellence in Student Research and Creative Activity at The Keep. It has been accepted for inclusion in 2018 Awards for Excellence in Student Research and Creative Activity – Documents by an authorized administrator of The Keep. For more information, please contact tabruns@eiu.edu.

Wonjin Song

International debt Impact on the value of South Korean currency

Abstract

This paper will analyze how international debt for South Korea affected the value of Korean currency from 1983 to 2014 by using the Ordinary Least Square model. The result is that international debt for South Korea had a clear influence on the value of Korean Won. The exchange rate of Korean currency per US dollar moves the same direction as amounts of international debt. In other words, as the Korean Won depreciates, more Won must be spent to purchase U.S dollars. That is, Korean currency depreciates when amounts of international debt increase. As the result, Korea has not yet reached the stage of having a developed and stable economy. In order to improve Korea's economy, the structure of Korean economy should not rely on capital from abroad. Korea has to develop its own economy based on its main industries, such as a technology-intensive industry or human capital rather than the high dependence on international debt.

Introduction

Since I am studying abroad in the United States and have to pay my tuition fees using Korean currency, I am consumers of U.S. dollar. The money that I have to pay changes a lot depending on the economic situation between Korea and America. For example, even though I paid the same amount in U.S. dollars, the difference of Korean money that I paid between now and 2 years ago is one million Won. If the exchange rate this year had stayed the same as 2 years

ago, I could have bought twenty pairs of nice Nike shoes in Korea. It has been noticed that the value of Korea currency has been steeply fluctuating in recent decades. How did it happen?

If a country is not able to borrow abroad in its own currency, when it accumulates a net debt it will have an aggregate currency mismatch on its balance sheet. If the country suffers from the problem of currency mismatch, Barry Eichengreen, one of renowned experts in international economics, refers to it as "original sin" (Eichengreen, 2003). This is what developing countries normally go through. Such a country can utilize various ways to eliminate that mismatch or prevent it from the beginning. In an extreme case, they can decide not to borrow. On the other hand, a financially secure country will not have currency mismatch, because it rarely has international debt.

This unbalanced economic situation between developing countries and financially secure countries clearly has caused a lot of financial pressure on developing countries (Eichengreen, 2003). For instance, Korea, a country whose currency is not a global currency, has to forgo all the benefits in order to overcome the economic pressure. To be specific, if Korean currency depreciates, Korean companies with external debt denominated in foreign currency would suffer from its increased debt on its balance sheet due to the currency mismatch. It can cause a decrease in a credit rating on the companies, which may restrict lucrative opportunities that the companies could have utilized. So, Korean companies ended up selling Korean products at a cheaper price in foreign markets to accumulate U.S. dollars or decreasing Korean consumption of products from foreign markets. As an alternative, the Korean government can accumulate foreign reserves to match its foreign obligations. In this case, the Korean government eliminates its currency mismatch by eliminating its net debt, such as matching its foreign currency borrowing with

foreign currency reserves. But this requires a lot of expense because the yield on reserves is remarkably below the opportunity cost of funds. That is, the money that Korean government could have made by funding is bigger than the yield on reserves.

All of this may seem relatively complicated and unimportant. However, macroeconomic stability, according to the traditional economic theory, reflects the stability of a country's currency value. The value of Korean currency has been steeply fluctuating, and it represents that the Korean economy has been unstable and unpredictable. International debt for Korea has increased as well in recent decades. This research focuses on analyzing why the value of Korean currency has been fluctuating and will attempt to show that the composition of international debt is a key determinant of exchange rates.

Literature Review

In international research, Edward (1986) claimed that even though devaluating the currency of a developing country causes decreasing GDP in the short term, it does not have significant effects on GDP in the long run. Kamin and Klau (1998) analyzed the effect of devaluation of exchange rate of 27 countries. The result was that depreciating the currency slows down its economy in developing countries, while it has positive economic effects in developed countries. Kamin and Rogers (2000) researched the recession of the Mexican economy after the depreciation of the Mexican peso. Martinez and Werner (2002) analyzed how Mexico's economy got changed when the exchange rate system was switched from a fixed exchange rate to a floating exchange rate. The result was that the floating exchange is more effective in decreasing the experience of an economic shock caused by the exchange rate. Bleakley and

Cowan (2002) researched the inconsistency between the denominated debt of foreign currency and the denominated debt of domestic currency of several companies from five different countries. When the financial crisis occurred in the 1990s, companies which held denominated debt of foreign currency had fewer negative effects than companies with the denominated debt of domestic own currency. Ahmed, Gust, Kamin and Huntley (2002) analyzed the influence of devaluation of currency in developing countries and developed countries by using the VAR model. The result was that regardless of exchange rate policies, the movement of exchange rate makes the economy more unstable in developing countries than in developed countries. Barry Eichengreen (2003) showed that the composition of international debt denominated in foreign currency is a key determinant of the stability of output, the management of exchange rates, the volatility of capital flows, and the level of country credit rating. Furthermore, he demonstrated that the macroeconomic policies on which economic growth and cyclical stability depend are shaped by the denomination of a country's external debts. Bonomo, Martins and Pinto (2003) claimed that the devaluation of domestic currency has negative influence on the flow of cash and capital. Carranza, Cayo and Galdon-Sanchez (2003) analyzed the impact of the volatility of the exchange rate by using financial information of 163 Peruvian companies. The result was that companies, which have a dollar denominated debt, got negative effects on the amount of investment in the devaluation of Peruvian currency. Pratap, Lobato and Somuano (2003) analyzed the deepening impact of inconsistency between currencies due to the depreciation of their own currency by using Mexico's industrial data. The profit and investment of companies with a dollar denominated debt had more negative effects when Mexican currency depreciated. The International Monetary Fund (2011) conducted a survey and found that while new developing countries in the Middle East and Asia typically have a trade surplus, similar to most

developed European countries, the United States has posted a trade deficit in recent decades. Countries which have a trade surplus send American dollars to the U.S. by buying American public bonds. The U.S. increases its amount of consumption based on an enormous amount of capital inflow. Since the business cycle relies on consumers, the U.S. is the only end-consumer in the world economic system, meaning the world economy excessively relies on U.S. consumption.

· In Korean research, Chang-geu Choi (1999) claimed that the increase of volatility of exchange rate and devaluation of Korean currency caused a decrease in investment. Yoonchul Kim and Yoochul Choi found out that devaluation of Korean currency reduced investment of the manufacturing industry. Heeshik Kim analyzed the economic effect of exchange rate in terms of steps of Korean economic development. The result was the devaluation of Korean currency causes economic growth at the period of industrialization, while it slowed down economic growth after industrialization. Kwanshik Kim (2005) analyzed how the international economy affects the Korean business cycle. Kim's research showed that Korean economy suffers negative effects when global oil prices increase. Hyeon seung Ha (2006) researched how the change of trading conditions and the quantity of foreign production affects the Korean economy. The result was that inconsistency of quantity of foreign production and trading conditions had a huge effect on Korea's exporting and importing businesses, and the effect was especially big in the short term. Nho-seon Gwank (2007) studied the main causes of Korean business cycle by separating Korean domestic and overseas impacts. When a positive overseas economic impact occurred, the national income, consumption, and investment of Korea increased. This demonstrated that foreign economic fluctuation has a bigger influence on the Korean economy. Tae-un Gwak (2009) analyzed how real effective exchange rate affects business cycle by comparing the

Korean and Japanese economies. The result was that Japan's economy is bigger than Korea's, and depreciation of Korean currency (Won) slowed down the Korean economy, while depreciation of Japanese currency (Yen) boosted the Japanese economy.

After considering all the previous research, I reached the conclusion that the composition of international debt denominated in foreign currency is one of the key determinants of the stability of exchange rates. A country whose currency is not a globally credible currency has to suffer from an economic pressure to achieve trade surplus. If they do not have enough U.S. dollars, they have to take out international debt to boost their economy. The more they borrow money, the more debt they get, which lowers the level of country credit rating and then ultimately depreciates the country's currency. For the purpose of this study, I make the assumption that the more international debt a country has, the less the country's currency value becomes. This research focuses on finding whether or not the amount of international debt for South Korea crucially affects the Korean economy.

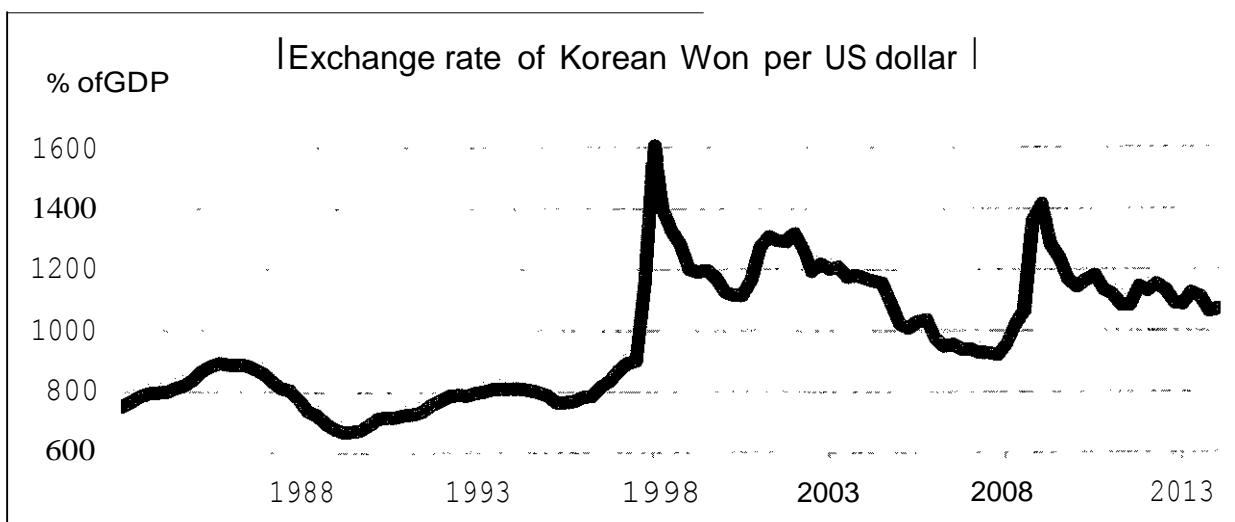
Data

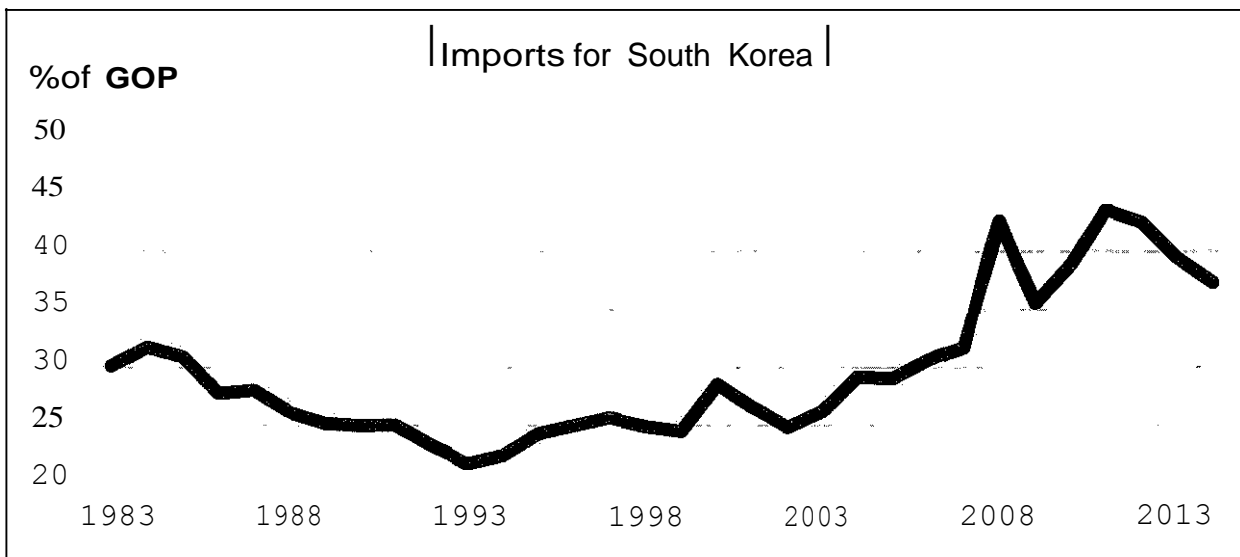
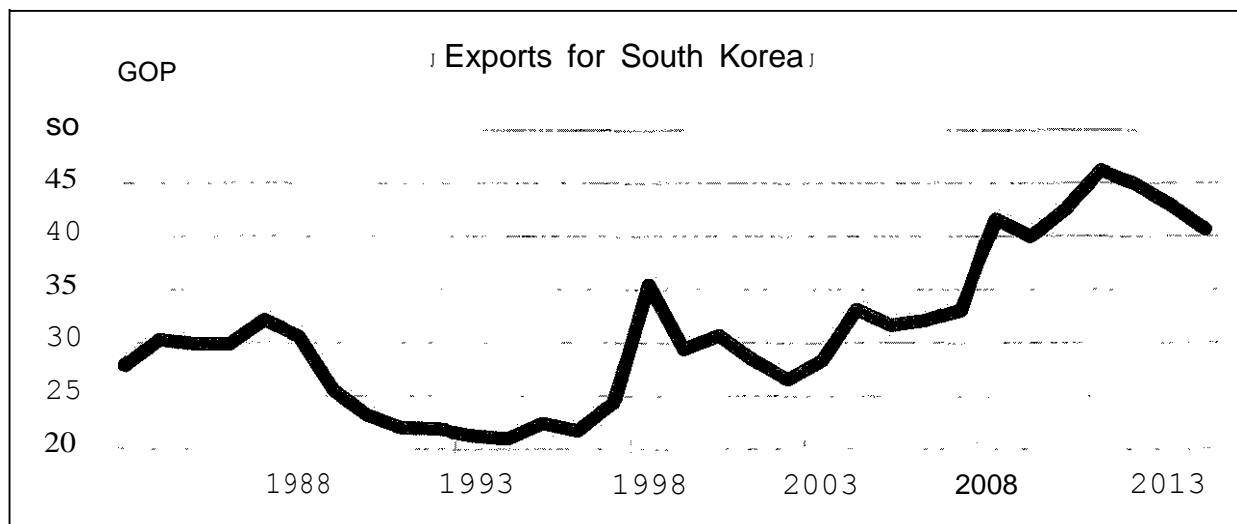
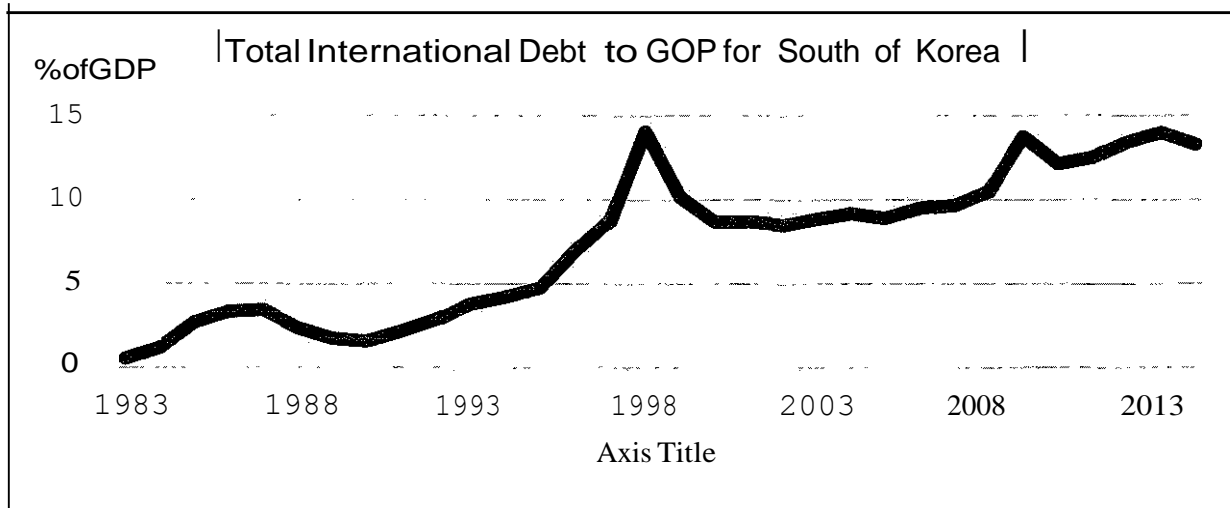
Various factors determine exchange rates, and all are related to the trading relationship between two countries. The trading relationship is made up of two parts: trading of goods and trading of capital. Imports and exports are direct indicators of the trading of goods. The main factors affecting the flow of capital are interest rates and money that people lend and owe internationally. So, imports, exports, interest rates, and international debt are usually referred to as the main determinants of exchange rates. For this reason, international debt will not be the sole independent variable of this research. Instead, this research will include imports, exports,

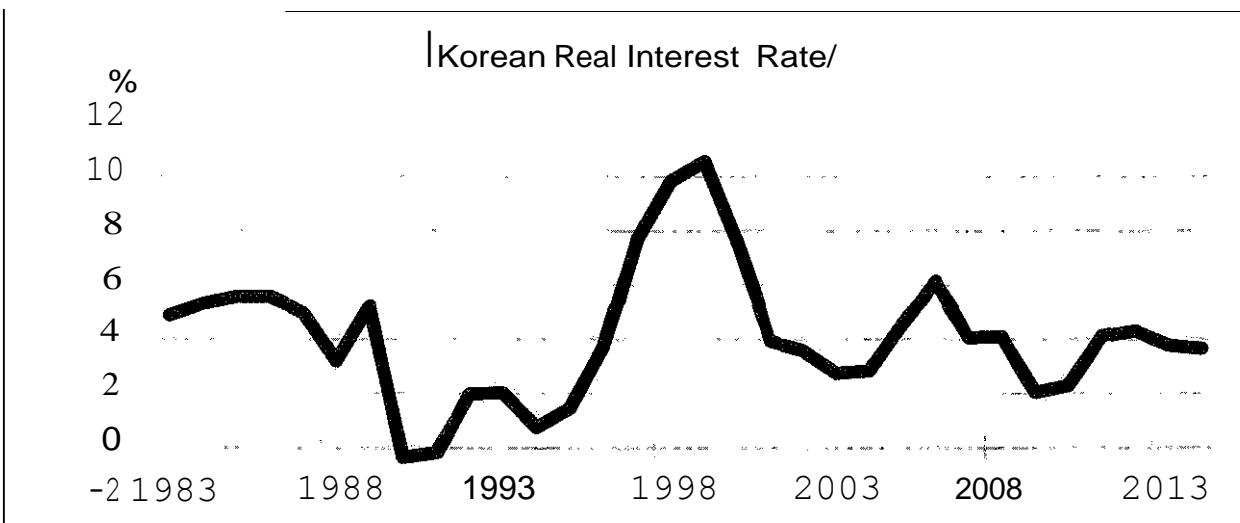
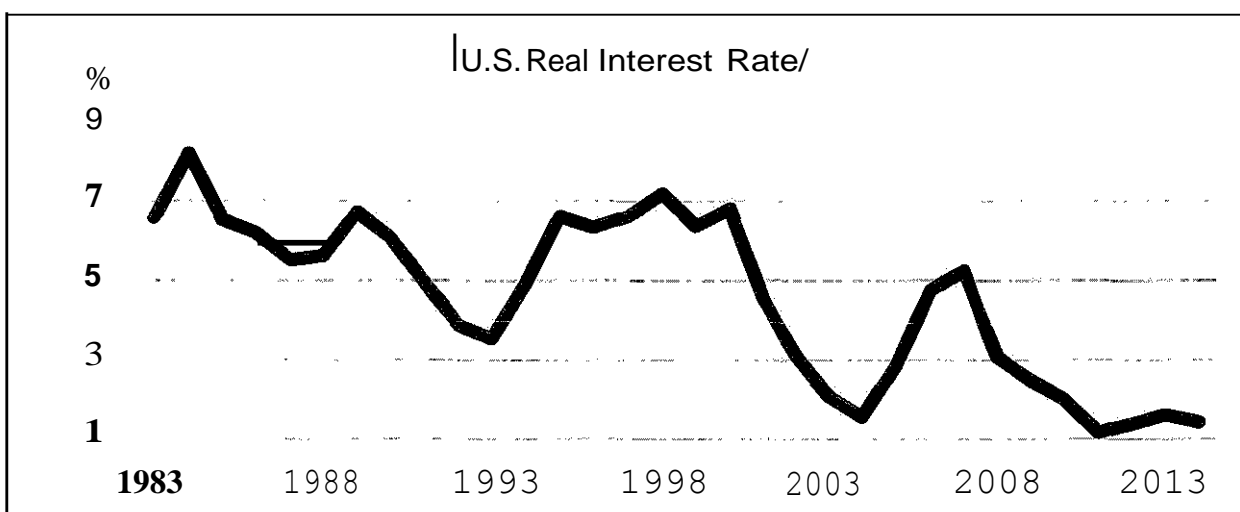
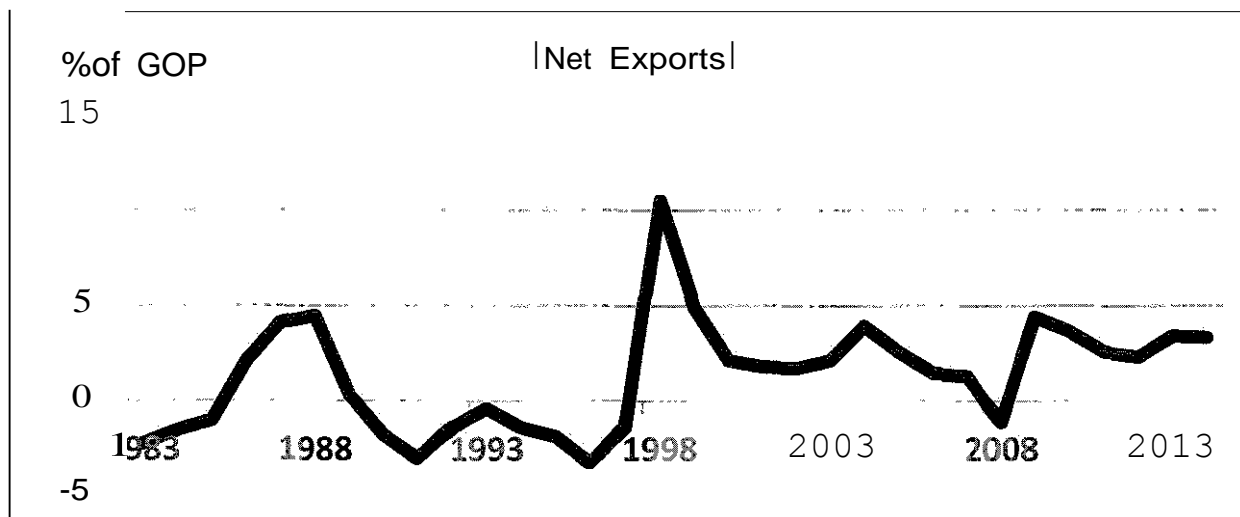
and interest rates as independent variables in order to increase the accuracy of my economic model.

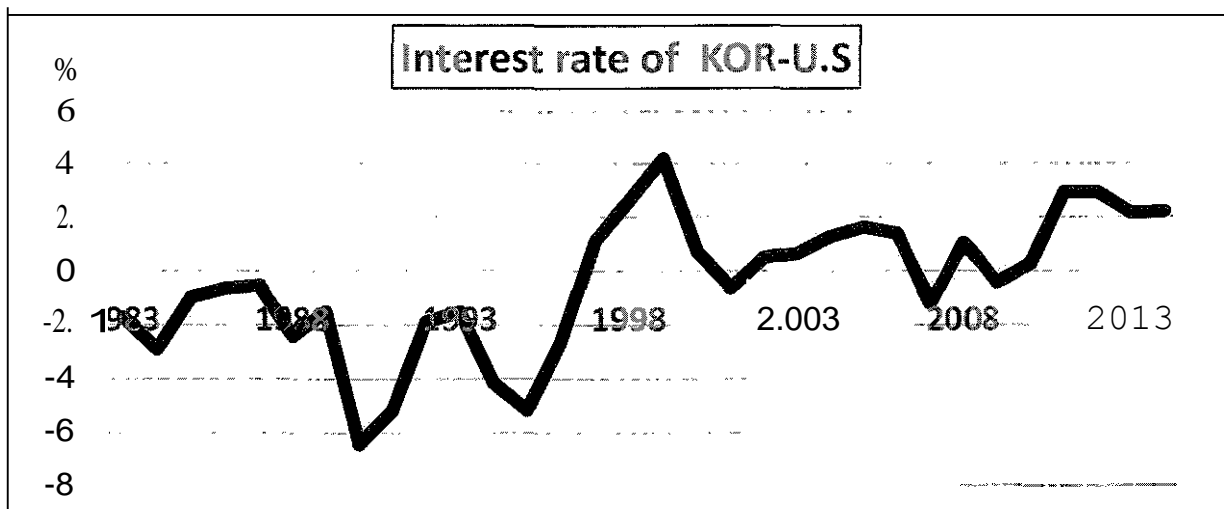
This research will use 32 years of annual data from 1983 to 2014. The variables used are Percent of Outstanding International Private Debt Securities to GDP, Percent of Outstanding International Public Debt Securities to GDP, Percent of Exports Value Goods to GDP, Percent of Imports Value Goods to GDP, Korea/U.S. Exchange Rates, Korean Real Interest Rates, and the United States Real Interest Rates. Every data sets (Exchange Rates, Debt, Imports, Exports, and Interest Rates) are obtained from FRED (Federal Reserve Bank of St. Louis). Outstanding International Private Debt Securities to GDP is the amount of private international debt securities (amounts outstanding), as a share of GDP. It covers long-term bonds, notes, and money market instruments placed on international markets. Outstanding International Public Debt Securities to GDP follows the same principles, but is related to public international debt.

Changes and relationship between variables









The graphs above are showing their own trends. Fluctuations in exchange rates and international debt are similar, and it is natural to assume there is a relationship between those variables. The two largest peaks in the graphs of exchange rates, international debt, and Korean real interest rate indicate the Asian financial crisis in 1998 and the U.S. financial crisis in 2008. International debt, exports, and imports have gradually increased over the years. Although the graphs have a similar shape, my model will determine the direct relationship between the indicated variables.

The graph of exchange rate for Korean Won per U.S. dollar shows an interesting shape. After the 1998 Asian financial crisis, exchange rates of Korean currency have faced rapid changes. This is because South Korea dropped its government-restricted system of exchange rate to adopt a free float system at the early 1990s. This increased flexibility of capital after adopting a free float system widely opened Korean financial market, which was one of the main reasons that caused an increase in international debt for Korea after the mid-1990s.

Data Summary						
NAME	N	MEAN	ST. DEV	VARIANCE	MINIMUM	MAXIMUM
Exchange	32	980.26	201.04	40417	674.13	1400.4
Public Debt	32	0.46752	0.35055	0.12289	0.0493	1.3405
Private Debt	32	6.9083	4.1401	17.141	0.495	13.424
Export	32	30.987	7.4256	55.14	21.007	46.156
Import	32	29.647	6.2538	39.11	21.699	43.596
Net Export	32	1.3403	2.9447	8.6713	-3.2624	10.511
Interest rate of KOR-U.S.	32	-0.40475	2.59	6.7081	-6.4395	4.1822

i CORRELATION MATRIX OF VARIABLES- 32 OBSERVATIONS

Exchange	1						
Public Debt	0.90534	1					
Private Debt	0.81431	0.69424	1				
Export	0.57684	0.49096	0.73938	1			
Import	0.3623	0.20772	0.60426	0.92142	1		
Net Export	0.68518	0.79691	0.5812	0.56484	0.19981	1	
Interest rate of KOR-U.S.	0.73659	0.72002	0.74536	0.67293	0.48834	0.65983	1
	Exchange	Public debt	Private Debt	Export	Import	Net Export	Interest rate of KOR-U.S.

Exports (EXP) and imports (IMP) are highly correlated by 0.92. Due to this, net exports

(NETEX) are going to be used instead of EXP and IMP so that the model avoids the collinearity.

First differenced data

NAME	N	MEAN	ST. DEV	VARIANCE	MINIMUM	MAXIMUM
Exchange	31	8.911	119.44	14267	-210.56	447.21
Public Debt	31	0.013016	0.2443	0.059681	-0.3009	1.1645
Private Debt	31	0.39804	1.3522	1.8285	-3.6008	4.1425

Methodology

The model used in this research is the Ordinary Least Square model. This model allows us to find the impact of International Debt Securities on the value of Korean currency. Data sets of exchange rates of Korean currency (South Korean Won per One U.S. Dollar) will be used as a dependent variable, while the other variables (Outstanding International Private Debt Securities, Outstanding International Public Debt Securities, Net exports, and differential between Korean and American interest exchange rates) will be used as the independent variables. This model is a time series regression analysis of yearly data between 1983-2014. Every test is going to use the level of significance ($\alpha = 0.1$).

$$Y(\text{Exchange rate}) = \beta_0 + \beta_1 \text{Pub} + \beta_2 \text{Pri} + \beta_3 \text{NetEx} + \beta_4 \text{Int} + \epsilon$$

Y: Exchange rate of Korean currency per US dollar

Pnb: Amount of public international debt securities (amounts outstanding), as a share of GDP.

Pri: Amount of private international debt securities (amounts outstanding), as a share of GDP.

NetEx: Value Goods of (Exports-Imports), as a share of GDP.

Int: Real interest rate of (Korean-U.S.)

HETEROSKEDASTICITY TESTS			
	CHI-SQUARE TEST STATISTIC	D.F.	P-VALUE
E**2 ON YHAT:	0.008	1	0.92834

Before start to interpret OLS regression, heteroskedasticity test showed 0.92834 p-value, which means there is no heteroskedasticity. In other words, variance of error terms does not depend on variables. So, there is no the heteroskedasticity problem on the results below.

Results

ANALYSIS OF VARIANCE - FROM ZERO				
	SS	DF	MS	F
REGRESSION	323720	5	64745	15.771
ERROR	106740	26	4105.3	P-VALUE
TOTAL	430460	31	13886	0.000

VARIABLE NAME	ESTIMATED COEFFICIENT	STANDARD ERROR	T-RATIO DF	P-VALUE
PUB	45.765	14.45	3.166	0.004
NETE	-4.169		-0.4871	
INT	-0.84987	4.754	-0.1788	0.86
CONSTANT	-12.083	12.45	-0.9703	0.341

R-SQUARE = 0.7506 R-SQUARE ADJUSTED= 0.7122

URBIN-WATSON = 1.5834

(dL=1.177, du=1.732)

Brief data result

P-value of PUB is 0.03, and p-value of PRI is 0.004. These two variables are significant under the level of significance ($\alpha = 0.1$). The remaining variables, NETEX and KMIU, had a p-value bigger than 0.1, which shows its insignificance by the level of significance ($\alpha = 0.1$). The F- test demonstrated that this model is significant due to a p-value of nearly 0. By Durbin-Watson test, p-value is 1.5834, which means there is no autocorrelation according to the Durbin-Watson table ($dL=1.177$, $du=1.732$). As R-square is 0.7506, this model explains about 75% of the variability of the response data around its mean.

Conclusion

The result of the regression demonstrated that public and private international debt are the only significant variables. An increase in international debt for Korea has a negative influence on the value of Korean currency. The coefficient of Pub is 244.33 and Pri is 45.765, meaning the exchange rate of Korean currency per U.S. dollar moves the same direction as amounts of international debt. In other words, as the Korean Won depreciates, more Won must be spent to purchase U.S. dollars. That is, Korean currency depreciates when amounts of international debt increase. Why was international debt significant?

Original sin is one of the biggest reasons that international debt is significant (Eichengreen, 2003). If Korean currency happened to depreciate due to some random economic situation, the ability of Korea to repay the international debt denominated in foreign currency will be unstable because Korea has to spend more Korean Won to repay the debt. This unstable debt repayment capability limits the effectiveness of monetary policy. This is because if the

Korean government uses an expansionary policy, it will cause more financial pressure on Korea's debt repayment capability due to depreciation of Korean currency (Eichengreen, 2003). Since it is important for the Korean government to make sure the value of Korean currency does not suddenly and extremely depreciate, the Korean central bank ends up intervening in the foreign exchange markets more often to focus on accumulating more foreign currency. So, international debt denominated in foreign currency limits the ability of the central bank. This entire process heightens the uncertainty of the Korean economy and lowers credit ratings of Korea, ultimately decreasing the value of Korean currency.

Net exports were insignificant. There are two reasons: bidirectional causality and the relatively small value of net exports. First, net exports and exchange rates are affecting each other in the real economy. If exports are greater than imports, demands for the Korean Won would increase due to increased demands for Korean products, causing appreciation of Korean currency. Vice versa, if imports are bigger, demands for foreign currency would increase due to increased demands for foreign products, resulting in depreciation of Korean currency.

On the other hand, if Korean Won appreciates, the amount of the U.S. dollar that Korean people can spend with the same amounts of Korean Won would increase, causing an increase in demands for foreign products. Conversely, if Korean currency depreciates, prices of foreign commodities increase more than before. This causes a decrease in imports due to increased prices of imports, and exported products get affected positively because of decrease in foreign currency prices of exported commodities. For this complicated bidirectional causality, it is hard to capture one-directional effect of net exports on exchange rate with OLS model, which is not

able to capture the bidirectional causality between dependent and independent variables. That is why net exports turned out to be insignificant.

Second, the values of Korean net exports were nearly zero. Korea is one of those countries that has poor amounts of natural resources and high population density. The only way for Korea to survive in the worldwide competition is to have high technology by taking advantage of human capital so that Korea can make profits from scratch without consuming domestic natural resources. In order to make high technology products, Korean companies have to import materials to start a manufacturing process. After that, the companies export finished products to the world markets. Since the Korean domestic market is relatively small compared to the world markets, the domestic Korean market does not have a meaningful impact on the volume of exports and imports. So, the amounts of inflow and outflow of money by imports and exports are almost identical.

As the data summary shows, the values of imports and exports have similar numbers, making net exports cancel each other out. As the graph of net exports indicates, the curve is around the zero line, except for the special periods of 1998 Asian financial crisis. If inflow and outflow of capital do not have a significant difference, it is less likely going to affect the value of currency. Therefore, net exports were not significant to affect the value of Korean Won.

Korean real interest rates were also found to be insignificant. Two of the biggest reasons are low political stability and uncertainty of the Korean economy. Korea has politically complicated circumstances due to its geographical location. Korea is technically in an official state of war, under an Armistice. In other words, the divided Koreas, South and North Korea, remain technically at war since an armistice stopped fighting between them in 1953.

Furthermore, North Korea has been constantly threatening South Korea with using a nuclear bomb. Surrounding powerful neighbors, such as China, Japan, and the United States, have also been trying to intervene in the unpredictable situation of the Korean peninsula in order to get political advantages. It is natural that economic stability tends to be strongly affected by the surrounding political situation.

In addition, the times when Korea had fairly high interest rates, according to the graph of Korean interest rates, was 1998 and 2008. During these periods, Korea faced the Asian and international financial crises. The Korean government used a high interest rate policy to attract financing from abroad and ultimately to overcome the financial crises. However, the Korean Won was not considered a stable currency to attract foreign investors due to the poor financial situation.

For this reason, low political stability and uncertainty of the Korean economy made Korean currency relatively unreliable, and investors found it hard to predict the Korean economy. The unreliable and unpredictable Korean economy created a discouraging situation for investors to invest in Korean markets, even with relatively high interest rates compared to other countries.

Korea has not yet reached the stage of having a developed and stable economy. In order to improve Korea's economy, the structure of Korean economy should not rely on capital from abroad. Korea has to develop its own economy based on its main industries, such as a technology-intensive industry or human capital rather than the high dependence on international debt. For these reasons, it is dangerous for the Korean economy to have more international debt because it causes depreciation of Korean currency, ultimately causing a harder situation for

Korea to get out of the inextricable debt trap. Therefore, the Korean government must find an innovative way to guide the Korean economy to develop by its own power.

Works Cited

Abu, *Dalu*. "The Real Effective Exchange Rate Impact on ASEAN-5 Economic Growth."

OMICS Publishing Group. 2014.

Ahmed Shaghil, Christopher J, Gust, Steven B, Kamin, and Huntley Jonathan. "Are Depreciations as Contractionary as Devaluations? A Comparison of Selected Emerging and Industrial Economies." International Finance Division. Number 737. September 2002.

Bleakley and Cowan. "Corporate Dollar Debt and Depreciations: Much Ado About Nothing?" The Review of Economics and Statistics, Vol .90, No.4, pp.612-626. 2008.

Bonomo Marco, Martins Betina and Pinto Rodrigo." Debt Composition and Exchange Rate Balance Sheet Effects in Brazil: A Firm Level Analysis. "Emerging markets Review, Vol .4, Issue 4, pp. 368-396. 2003.

Carranza Luis, Juan M, Cayo, and Galdon-Sanchez. "Exchange Rate Volatility and Economic Performance in Peru: A Firm Level Analysis." Emerging Markets Review, vol. 4, pp. 472-496. 2003

Choi, Chang geu. "Analysis about the effect of volatility of exchange rate on investment." The bank of Korea, Economic analysis, Vol 5, Issue 3, pp, 110-130. 1999.

Edwards, Sebastian. " Are Devaluations Contractionary?" Review of Economics and Statistics, Vol.68, No.3, pp.501-508. 1986.

Gwak, Tae un. "The effect of real effective exchange rate: comparison economy between Korea and Japan." The Korea Economy Research, Vol13, Issue 3, pp. 309-330. 2009.

Gwank, Nho sean. "Analysis about factors of Korea's economy: comparison between domestic and foreign impact." The Korea Economy Research, 18th, pp. 211-236. 2007.

Ha, Hyeon seung. "Korea's economic changes: Structural Analysis by using VAR model." The Application Economic conference in Korea, Application Economic, Vol 8, Issue I, pp 5-27. 2006.

Kamin steven and Rogers John. "Output and the Real Exchange Rate in Developing Countries: An application to Mexico." Journal of Development Economics Vol. 61, No 1, pp 85-109. 2000.

Kamin Steven B. and Klau Marc. "Some Multi-Country Evidence on the Effects of Real Exchange Rates on Output." BIS working papers, May, No.48. 1998

Kim, Kwan shik "The effect of foreign economic impact on domestic economy." The Research Center of Foreign Economic Policy. 2005.

Kim Yoonchul and Choi Yoochul. "The impact of exchange rates of Won/U.S. dollar on investments in Korean manufacturing industries." The Korean central Bank, Economic analysis Vol. 6. No 3. pp 56-88.

Kim, Heeshik. "The effect of changes of exchange rates: investment, growth, and supply." The Korean central Bank, Economic analysis Vol. 9. No 2. pp 31-65.

Kim, Minsik. "The Empirical analysis about Real Effective Exchange Rate." Korea University. July 2011.

Klau Marc and Fung San Sau. "The new BIS effective exchange rate indices." Bis Quarterly Review, pp.51-65. March 2006.

Martinez Lorenza and Werner Alejandro. "The exchange rate regime and the currency composition of corporate debt: the Mexican experience." *Journal of Development Economics* Vol. 69, No 2, pp. 315-334.2002.

Pratap Sangeeta and Lobato Ignacio and Somuano Alejandro. "Debt composition and balance sheet effects of exchange rate volatility in Mexico: A firm level analysis." *Emerging Markets Review*. Vol. 4, Issue 4, pp. 450-471. 2003

Rodrik, Dani. "The Real Exchange Rate and Economic Growth." Harvard University. Fall2008.