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CORRELATION BETWEEN CURRENCY AND STOCK MARKET IN KOREA

35122324-4 SUNWOO PAIK

FINANCIAL STRATEGIES AND CAPITAL MARKETS

C.E. PROF. NOBUHIKO HIBARA

D.E. PROF. SHIGERU NISHIYAMA D.E. PROF. YOSHIKI MANO

My first stock market experience came in 2008. On February of the same year, I transferred all my capital saved from Korea to my US bank account. This amounted to \$90,000, which was everything that I had been saving since I was very young. Then, I invested into a diversified portfolio consisting of stocks from different industries. However, soon after my investment, the Lehman Crisis happened. I quickly lost 20% of my investment capital, and I made a loss cut at that point. On December 2008, I came back to Korea for winter break. I also brought in my capital left after the loss cut, which was around \$72,000 after my loss cut. After exchanging this capital into KRW, I was surprised to see what had happened. Due to the changed currency value, even though I lost 20% from the stock market in US, I actually gained profit during this time.

As a result, I wanted to explore how one can strategically utilize both the stock market and the FX market in order to make profits in Korea. After analyzing various aspects of currency and FX market, this paper is focused on answering how one should carefully utilize currency as an indicator for stock market to capture positive investment outcomes. This thesis will not provide any strict guidelines on investment decisions; however, my focus is to prove that there are some correlations between the currency and the stock market, and every investor should not neglect to follow any one of the two.

Currency going up can be beneficial for some people while it can be bad for the others. In the same sense, currency going down can be good for some while it can be damaging for the others. For example, a company could gain profit from rising currency (value of KRW going down). A manufacturing company that sold products overseas when KRW/USD was 1,000, decided to receive 1,000 USD in three months. After 3 months, the KRW/USD went up to 1,200. Now due to the increase in currency, the company made additional profit of 200,000 won. However at the same time, an importer of rice products from US made a contract of 1,000 USD to be paid in 3 months. When the KRW/USD goes down to 800 instead of 1,000, the company saves 200,000 won from the fluctuation of currency. This is the gain of profit in foreign-exchange. On the other hand, if the above importer of rice experiences rise of KRW/USD to 1,200 won, then the company have to pay additional 200,000 won compared to today. This is the loss made in foreign-exchange. Therefore, when exchange level of currency shifts, some people benefit from the shift while some don't.

Some people believe that currency is decided based on some simple factors. Many FX traders, investors or corporate finance people sometimes like to think in simple and easy ways. They think that if US dollar gets strong, KRW will get weaker, and if USD gets weaker, then KRW will be comparatively stronger. However, this is not the case all the time, and it is important to analyze how it would be for each situation. There are many theories suggesting what causes fluctuations in exchange rates in the market. For example, there are theories involving international parity conditions, balance of payments model, and asset market model. Without even going further into details of these theories, it is said that none of these models developed so far succeed to explain exchange rates and their volatility in long term period. Therefore, there is no absolutely correct way: each situation must be approached differently, so it is important to focus on analyzing Korea firstly.

Korea relies heavily on currency. As 70% of Korean GDP is from import and exports, the Korean economy is influenced significantly by currency. Also, as Korea needs to depend on other nations for energy resources such as oil and gas which makes importance of currency higher. Currency has strong impact on the stock market in Korea. Depending on the causes of the currency shift, the result would be different. If currency goes up due to strong dollar, then it can be a good sign and would result in boost in stock market. However, if currency goes up due to KRW becoming weaker, then it can act as a minus in the stock market. Therefore, it is imperative to know the exact causes of currency shifts, in order to succeed in the stock market, as well as to manage risks.

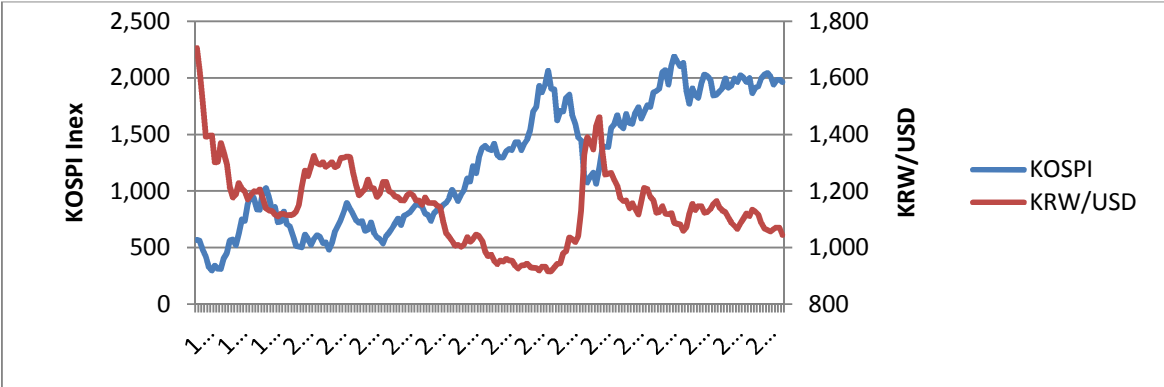
I decided to check the data after the Asian Financial Crisis, because there were many changes after the crisis. The crisis made Korea to allow people to freely trade foreign currencies, as well as eased foreigners to invest capital into the country. As a result, ever since 1998, the KRW/USD had been fluctuating at dangerous levels. The biggest impact of the regulation change after the Asian Financial Crisis was that foreigners could freely bring in foreign capital into Korea, and invest into the stock market, real-estate and etc. If more foreign investors bring in foreign capital, more dollars are brought into the country, and it leads to decrease in KRW/USD. However, if they decide to pull back from Korea, they sell their KRW which would lead to high increase of KRW/USD. For most of the years, the yearly fluctuation of currency had been well over 20%, in either direction, and these fluctuations were caused partly by foreign capitals, because foreigners own about 35% of the Korean market.

Three broad factors that have influence on currency were economics, market psychology and political situation. In order to check the correlation with currency and the stock market, I went to analyze the first part, the economics of Korea. Among many indicators for economy, the most important related with foreign capital is the current account. If positive current account increases or remains stable, foreign investors are more likely to invest into the country. The investors expect benefits from two sources. Firstly, they expect to gain profit from currency; secondly, they are also attracted by the difference in market interest rates.

When compared the current account and KRW/USD, I could see that the two factors are closely correlated. Except years 2003 and 2007, the correlation was strong. They tended to move in same direction, and in same intensity. For example in 2009, the current account went up from 4 to 32 billion KRW, while the foreigner net purchase went up from -32 to 32 trillion KRW. It was seen that these two were correlated, and confirmed that foreigners are more likely to invest in a country when current account improves, or vice versa.

After checking economic situation, market psychology and political stability of Korea, the next step would be to decide whether the currency shift is a good one or a bad one. From there, we should go on to see how currency plays part in the stock market. Most people believe that if the currency level goes up (KRW being valued less), then it is a good sign for the exporting companies. They look for companies to invest, which have good export levels and would gain price advantage due to high currency. However, it was shown that this is not always the case.

When currency level (KRW/USD) was going up, the KOSPI stock market index tended to go down, and this correlation existed in 1997, 2002 and 2008. This shows that high KRW/USD currency level does not always mean better performance in the stock market. However if the KRW/USD currency level falls, it usually showed better performance of the stock market. Looking at year 1998, we could see that the KRW/USD kept falling down, while conversely, the stock market boosted.



The correlation can be explained as follows: when currency level is high (high KRW/USD), then exports increase and imports decrease due to cost differences. As most of Korean companies rely heavily on overseas market, generally corporates' performances go up, and current accounts perform better. These all strengthens the fundamentals of these companies, and foreign investors begin to increase their shares, which leads to rebound of the stock market. In the meantime, the currency starts to go down due to high demand for KRW. The exact opposite would happen when currency level is going down. After performing regression analysis to check correlation between currency and the stock market, I was able to confirm that there exists strong relationship between the two variables.

The purpose of this thesis was to see that there exists a strong correlation between currency and the stock market. After doing much research with the data from Bank of Korea, it seems that there exists correlation between the two. I am not to say that it is perfect inverse correlation; however, there is strong relationship. With the regression analysis, and also just by looking at the graph illustrating KOSPI index and KRW/USD for years 1998~2014, it was seen that there generally is an inverse correlation.

Korea is a geographically small country but with relatively strong economic power. The country has grown very rapidly, which made the country to rely heavily on overseas economy. As a result, everyone and every corporate who resides in Korea are affected by currency. Therefore, it is imperative for people to follow the currency market, know the correlation, and be able to utilize for further gains or minimizing losses.

<Inside Cover>

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Chapter 1. Interest in the Currency Market

Having lived in many different countries since I was very young, I have been exposed to numerous currencies. Born and raised in Korea, I immigrated to Canada when I was 12. I spent 6 years in Canada and went to United States to attend university in Pennsylvania. After graduation, I worked for two years in Singapore and Korea. Finally, I came to Japan to attend Waseda Business School. As the timeline of my life suggests, I was exposed to many different currencies: Korean won, Canadian dollar, US dollar, Singapore dollar and Japanese yen. Not only was I simply exposed, but I spent over two years in each country. This experience made me to pay close attention to currencies and their values.

My first stock market experience came in 2008. On February of the same year, I transferred all my capital saved from Korea to my US bank account. This amounted to \$90,000, which was everything that I had been saving since I was very young. Then, I invested into a diversified portfolio consisting of stocks from different industries. However, soon after my investment, the Lehman Crisis¹ happened: financial services firm Lehman Brothers filed for Chapter 11 bankruptcy protection on September 15, 2008. The filing remains the largest bankruptcy filing in U.S. history, with Lehman holding over \$600 billion in assets. I quickly lost 20% of my investment capital, and I made a loss cut at that point.

On December 2008, I came back to Korea for winter break. I also brought in my capital left after the loss cut, which was around \$72,000 after my loss cut. After exchanging this capital into KRW, I was surprised to see what had happened. Due to the changed currency value, even though I lost 20% from the stock market in US, I actually gained profit during this time. The exchange rate of KRW/USD went up from 1000 to 1450 between February and December 2008.

My Savings	Feb 2008	Dec 2008
KRW/USD	1000	1450
Value in USD	90,000	720,000
Value in KRW	90,000,000	104,400,000

Due to gain in currency, I had gained 14 million KRW during the Lehman Crisis. This experience had led me to think more about currency and the stock market. It came to realize that people do not need to make profit in one stock market, in order to gain positive results, if they can gather much more profit from currency.

As a result, I wanted to explore how one can strategically utilize both the stock market and the FX market in order to make profits in Korea. After analyzing various aspects of currency and FX market, this paper is focused on answering how one should carefully utilize currency as an indicator for stock market to capture positive investment outcomes. This thesis will not provide any solid guide on investment decisions; however, my focus is to prove that there is some correlation between the currency and the stock market, and every investor should not neglect to follow any one of the two.

Chapter 2. Basics of Currency and the Korean Market

Section 1. Currency and Exchange Rate

By definition, currency² is a system of monetary units in common use, especially in a nation. It is pretty easy to see what it is: Korean won, US dollars, European euros, Japanese yen, and etc. What is more important to check from this paper is the exchange rate, which represents value of one currency to another.

Currency is decided in Foreign Exchange Market. The Foreign Exchange Market is a marketplace where different currencies of many countries are traded. The bank which exchanges people's foreign capital is also an example of FOREX, as well as the foreign exchange places at airports. The

FOREX is not physically located at a certain place, but is scattered in each country. The market is open literally 24 hours, as different time zones exist. Among myriads of places, New York, London and Tokyo serve as major foreign exchange market places, where lots of financial institutions participate heavily.

There are three main ways that currency's value is decided: floating, fixed, and pegged. Firstly, Floating currency rate depends on supply and demand of certain type of currency. Basically the main bank or the government does not get involved directly in the currency. Korea as well as most of countries' currencies is based on floating rate. Secondly, fixed rate literally "fixes" the currency at a certain level, or limits going up/down. This is a rate the government or central bank sets and maintains as the official exchange rate. A set price will be determined against a major world currency (usually the U.S. dollar, but also other major currencies such as the euro, the yen or a basket of currencies). In order to maintain the local exchange rate, the central bank buys and sells its own currency on the foreign exchange market in return for the currency to which it is pegged. Finally, dollar pegged rate is also another form of fixed rate. For example, Hong Kong's dollar is pegged to USD.

Currency going up can be beneficial for some people while it can be bad for the others. In the same sense, currency going down can be good for some while it can be damaging for the others. For example, a company could gain profit from rising currency (value of KRW going down). A trading company that sold products overseas when KRW/USD was 1,000, decided to receive 1,000 USD in three months. After 3 months, the KRW/USD went up to 1,200. Now due to the increase in currency, the company made additional profit of 200,000 won. However at the same time, an importer of rice products from US made a contract of 1,000 USD to be paid in 3 months. When the KRW/USD goes down to 800 instead of 1,000, the company saves 200,000 won from the fluctuation of currency. This is the gain of profit in foreign-exchange. On the other hand, if the above importer of rice experiences rise of KRW/USD to 1,200 won, then the company have to pay additional 200,000 won compared to today. This is the loss made in foreign-exchange. Therefore, when exchange level of currency shifts,

some people benefit from the shift while some don't.

Section 2. Reserve Currency – How US Benefits from it

Reserve Currency (or anchor currency) “is a currency that is held in significant quantities by governments and institutions as part of their foreign exchange reserves, and that is commonly used in international transactions.” It is the usual payment method for international trades. As reserve currency has international presence, its value must be stable and strictly regulated. As of today, US Dollar is the major reserve currency, while the Euro also serves as anchor many times. Due to being reserve currency, United States and EU’s economics should be stable and be able to supply the demand for their currency.

Currency composition of official foreign exchange reserves																
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
US dollar	69.30%	71.00%	70.50%	70.70%	66.50%	65.80%	66.00%	66.40%	65.70%	64.10%	64.10%	62.10%	61.80%	62.30%	61.10%	61.20%
Euro		17.90%	18.80%	19.80%	24.20%	25.30%	24.90%	24.30%	25.20%	26.30%	26.40%	27.60%	26.00%	24.70%	24.30%	24.40%
Mark	13.80%															
Franc	1.60%															
Pound	2.70%	2.90%	2.80%	2.70%	2.90%	2.60%	3.20%	3.60%	4.20%	4.70%	4.00%	4.30%	3.90%	3.80%	4.00%	4.00%
JPY	6.20%	6.40%	6.30%	5.20%	4.50%	4.10%	3.80%	3.70%	3.20%	2.90%	3.10%	2.90%	3.70%	3.60%	4.10%	3.90%
CAD															1.50%	1.70%
AUD															1.50%	1.60%
Swiss franc	0.30%	0.20%	0.30%	0.30%	0.40%	0.20%	0.20%	0.10%	0.20%	0.20%	0.10%	0.10%	0.10%	0.10%	0.30%	0.20%
Other	6.10%	1.60%	1.40%	1.20%	1.40%	1.90%	1.90%	1.90%	1.50%	1.80%	2.20%	3.10%	4.40%	5.40%	3.30%	2.90%

(Source: International Monetary Fund³)

For a very long time, United States dollar has been the world’s reserve currency, and the world’s need for dollars have allowed US to take many advantages. As USD plays the major role in controlling global economy, the US Government has ability to adjust its currency values, to impact global financial industry. As a result, the country is able to cover its losses from trade deficit, through international finance trades. It has allowed the US Government and corporates to borrow at lower costs, granting them “an advantage in excess of \$100 billion per year.” In addition, it is known to cost \$0.5 USD to print a \$100 USD bill. If the country lends this money to other country, for example 4%, then the annual return would be \$4 compared to printing cost of \$0.5. As US Dollar is accepted form of capital globally, it means that the country can also easily gain other countries’ raw

materials or technology without sacrificing too much, in extreme cases.

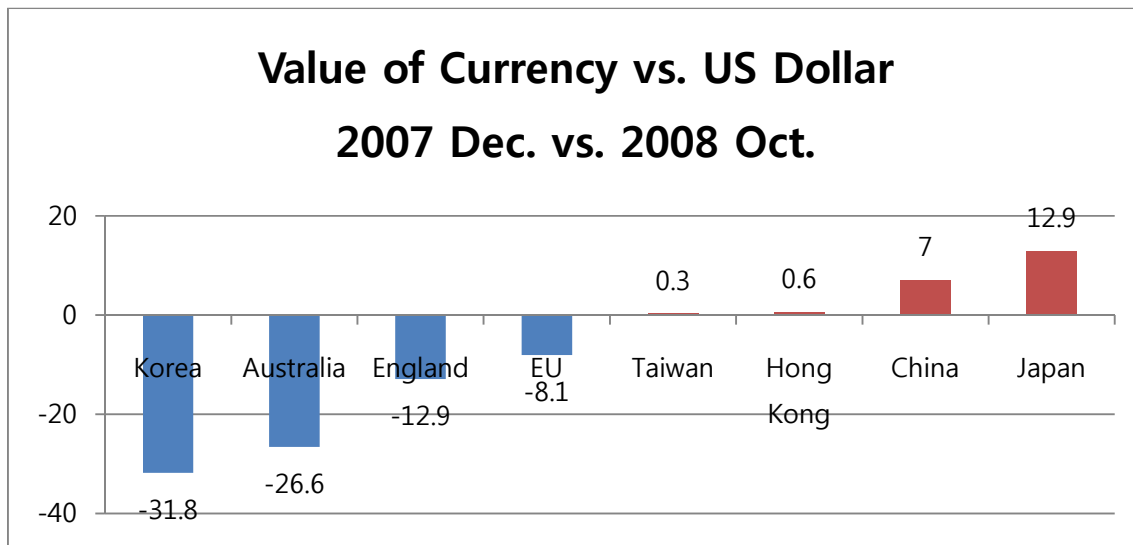
Section 3. Complexity of Valuing Currency

Some people believe that currency is decided based on some simple factors. Many FX traders, investors or corporate finance people sometimes like to think in simple and easy ways. They think that if US Dollar gets strong, KRW will get weaker, and if USD gets weaker, then KRW will be comparatively stronger. However, this is not the case all the time, and it is important to analyze how it would be for each case.

Many times in the news articles or analyst reports, it is said that “US Dollar is getting stronger.” When hearing this news, many people in Korea think that this is compared to their currency, KRW. However, this is not the answer. Actually, what the news articles say is that the USD is getting stronger compared to other leading developed countries, such as EU or JPY. In the same sense, when these media talks about weaker USD, it is meant to say that compared to EU or JPY. This simply does not mean it is getting stronger or weaker compared KRW.

In times when USD is getting stronger, it is usual that KRW gets comparatively weaker just like most people believe; however, it is not always the case. Sometimes KRW gets stronger. In the same sense, sometimes KRW gets weaker even if USD is getting weaker.

For example, looking at the following graph, we can easily see the case when KRW was devalued even though USD was in phase of getting weaker. On December 2007, KRW/USD was 940; however, it was further devalued to 1236.3 on October 2008. In the same time, USD was devalued compared to JPY and China, while maintained comparatively stronger against currencies of Australia, EU, and etc.



(Source: Citibank N.A.)

Therefore, it is not always the case that stronger USD leads to weaker KRW, or vice versa. It is important to consider the main reasons behind stronger USD. Most of them are related to the country's economics, but not all. Some of the factors responsible for stronger USD are known to be as follows: Gaining momentum in recovery of US economy, Trade deficit decrease, current account deficit decrease, increased value of stock market, and etc. On the other hand, the factors known to be responsible for weaker USD are as follows: slow or decline in economic growth, decreased value of stock market, trade deficit worsened, current account deficit increase, bubble burst in stock market or real-estate, and etc.

Non-economic factors also have impact on the currency. For example, looking back at above graph, USD maintained strong even after its Financial Crisis of 2008, which was the worst time between September and October. The fundamentals of US were very weak at the time, which should make the dollar weaker⁴. However, as global financial sector as the whole was unstable, people fled back to buy dollar. This was one of those unordinary cases where dollar maintains its strength, even with weak fundamentals, only because USD is the reserve currency. It is also good to consider the situation in Korea as well. Even if USD is in stage of becoming weaker, if there is worse situation ahead in Korea's side, then KRW/USD could always go up (KRW valued less). In the same sense,

even if USD is becoming stronger, KRW could be valued even stronger. Therefore, it is important to figure out whether USD is comparatively strong or weak due to which of the following possible reasons: 1) economic factors, 2) political conditions, and/or 3) market psychology.

There are many theories suggesting what causes fluctuations in exchange rates in the market. For example, there are theories involving interest parity conditions, balance of payments model, and asset market model⁵⁶. Without even going further into details of these theories, it is said that none of these models developed so far succeed to explain exchange rates and their volatility in long term period. However, it is absolutely true that currency exchange market operates under simple rule of supply and demand. There can be myriads of conditions and factors that cause supply and demand to change for currencies. Supply and demand for currency and its value are not influenced by any single factor or defined short list of conditions. However, it is said that these elements fall into three categories suggested above, which were economic factors, political conditions and market psychology.

A good example of political condition determining exchange rate was the notorious Plaza Accord. The US Dollar had appreciated by about 50% compared against the Japanese Yen, Deutsche Mark, French Franc and British Pound between 1980 and 1985, at the time of President Reagan. This caused severe trade deficit as well as financial deficits. At first, the financial sector was able to gain profit from strong dollars; however, a huge alliance of manufacturers, service providers and farmers responded by running campaigns asking for protection against foreign competition. However, as US Dollar was the reserve currency, and the country had the strongest power and influence globally, the US could get involved directly to the currency market.

On September 22nd 1985, the G5 countries made the Plaza Accord, which was to devalue US Dollar and increase Japanese Yen's value. Devaluing the dollar made US exports cheaper to purchase, which in effect made US goods more demanding. From 1985 to 1987, the exchange rate value of US Dollar compared to Japanese Yen declined by 51%, helping US manufacturers to be more competitive. It is said that this accord was the major contributor for the Japanese asset price bubble⁷,

which resulted in serious recession called Lost-Decade or Lost-Two-Decades.

Section 4. Futures, Forward and Options

Depending on the timing of trade of currencies, it can be either forward exchange or spot exchange. Forward exchange happens in the future. For example, forward deals that have 6 months at KRW/USD 1,200, and when that date approaches, then the participants trade at that pre-decided price. Spot exchange happens right away, at market price of currencies.

There are many types of forward exchanges, which are futures, forwards and options⁸. Futures are done at exchange market places, which the prices are decided upon demand and supply. Forwards are traded at banks which the prices are decided upon market currency level and the difference in interest rates of two countries. Options are derivatives where the buyer has the right but not obligation to exchange one currency into another at pre-determined exchange rate on a specified date.

An example of selling forward exchange can be seen at many small-medium sized companies. A Korean exporting company that sells beverages sold \$1 million worth of products, and decided to receive in 3 months. Although current KRW/USD is at 1,000 won, but the company thinks that the exchange rate would go down in the next three months. As a result, the company decides to hedge against possible loss, by selling forward exchange to sell \$1 million at KRW/USD 1,000 won. This forward exchange is not free, as the company has to pay a certain amount of deposit at start, usually 5% of the trading amount.

Example of buying forward exchange is similar to the above. An importing company that buys wine from overseas decided to pay \$1 million in three months. However, the company thinks that the currency would go up in three months. In the same sense, the company decides to buy forward exchange, to hedge against possible losses. From this exchange, the beverage seller from first example, and the wine importer from this example, got into an agreement to trade at KRW/USD 1000 won in three months. Depending on whether the currency goes up or down, one of the two companies will incur a loss from currency. However, they can manage what would happen in the

future. Although this hedging can work in some situations, it sometimes makes situations worse. Therefore, it is necessary to have currency experts' opinions before making any decisions.

Chapter 3. Currency Impacts Everyone in Korea

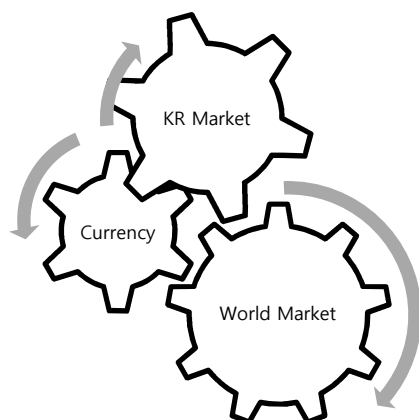
Section 1. Impact of Exchange Rate

When currency goes up or down, people related to this can have different effects on them⁹. Some of them will benefit while some will lose from this currency value change. From end of 2007 to beginning of 2008, many small-medium sized trading companies and ship-building companies experienced severe impact from currency change. Many of these companies “predicted” that the value of KRW would go up (KRW/USD going down), so they decided to do currency hedging. However, the currency unexpectedly went up, making KRW valued less, to drive these companies bankrupt.

On the other hand, some could benefit from the currency shifts. My family decided to immigrate to Canada, and started to prepare starting in 1997. My father sold house in Korea, changed KRW to CAD. However, as the Asian Financial Crisis hit the country, the currency went up (making KRW less valued). At that time, my father had most of capital in CAD, so without doing anything, his capital luckily increased to a fortune.

In 2008, the same phenomena occurred¹⁰. Starting from March, the KRW currency went up sharply (KRW being valued less). This resulted in a vicious cycle, which led to decrease in real income for people, and sharp decline in real-estate prices. Not only that, businesses and banks had short-term overseas loans, which led to huge debts. This was a problem because people and companies just tried to “hedge” against future currency losses, without really analyzing deeply into the effects and causes of currency shifts. In early 2008, most of economic researchers and FX dealers predicted that the KRW/USD would be 940 KRW and GDP growth rate of 4.8~5.0%. However, the actual results were 1500 KRW and 4.0%. Although there were some signs that the currency would increase sharply at the end of 2007, not many people responded to these.

It is important to note that everyone, including ordinary people as well as companies, is exposed to currency shifts, at least in Korea. Therefore, it is mandatory for all to understand how currencies shift, what factors causes these shifts, and how to prepare for future. Also knowing this information could lead to better capital management for everyone.



Korea relies heavily on currency. As 70% of Korean GDP is from import and exports, the Korean economy is influenced significantly on currency. Also, as Korea needs to depend on other nations for energy resources such as oil and gas which makes importance of currency higher. There are not enough raw materials available in the country, so the

country has to import most of them. In fact, if Korean economy lacks foreign currencies, then its economic cycle is likely to halt. For example, 1997 Asian Financial Crisis occurred from the lack of foreign currency such as dollars, and 2008 Financial Crisis impacted Korea as the country lacked US dollars. Although economic growth, income, product price levels, inflations, market interest rate, and etc. are all important, the most important factor would be currency. If exchange rate goes up (value of KRW down), then real income of people would decrease, which can result in collapse of real-estate prices. Also, currency plays as a bridge that connects Korea with the rest of the world. Without knowing how currency functions, businesses cannot survive. Not only businesses, ordinary people are also influenced by currency.

Currency has strong impact on the stock market in Korea. Depending on the causes of the currency shift, the result would be different. If currency goes up due to strong dollar, then it can be a good sign and would result in boost in stock market. However, if currency goes up due to KRW becoming weaker, then it can act as a minus in the stock market. Therefore, it is imperative to know the exact causes of currency shifts, in order to succeed in the stock market, as well as to manage risks. Not

only in Korean stocks, but currency obviously has impact on overseas stocks and mutual funds. Even if a person earns 10% on overseas stock market, for example in US, his overall performance could be negative due to KRW depreciating.

If currency goes up slightly and slowly, then the price of raw material for building houses and apartments would increase as a result, which would in turn give a boost in real-estate prices. Therefore, currency also plays a part in deciding real-estate market. However, if currency goes up rapidly like it did in 1997 and 2008, then it would result negatively.

We saw briefly that currency plays a huge role in Korea, as the country depends on overseas market for economic growth. As the production capability is much higher than the consumption rate, the country relies heavily in partnering countries. Therefore, it is necessary to study what causes currency value shifts, what the impacts are, and how to manage or profit from the shifts.

We can see how not analyzing currency shift can bring many companies to failure from an example. An infamous KIKO crisis¹¹ resulted in loss of 4.5 trillion won (approximately \$4 billion USD) in 2008. Myriads of small-med sized companies joined this service, as it seemed offer many benefits. KIKO stands for Knock-In Knock-Out, which is a kind of currency hedging mechanism offered by major banks. The concept was that if actual currency value results in a pre-determined range, then the buyer of the KIKO can sell the dollar, but If currency goes down, then the deal gets cancelled. However, if the currency goes higher than the range, the deal gets knocked in, and KIKO buyer has to pay twice the difference.

For example, a KIKO deal can be as follows. A KIKO option with range of 950~1050 KRW/USD, allows the buyer to sell dollar at 1,050 KRW, even if it is at 950. If the actual currency value was 950, then the buyer could sell at 1,050, giving 100 KRW profit per dollar. However, if KRW/USD falls below 950, the deal is cancelled. The problem happened when the actual currency was set at higher than 1,050. If it goes above the level, the deal gets knocked in, and the KIKO buyer has to sell twice at the level. For example, if KRW/USD is set at 1,150, then the buyer has to sell twice at 1,050, resulting in $(1150-1050)*2= 200$ in loss.

It is easy to see in another example. In October 2008, the currency was set at 1,500 KRW, and a small-med sized exporter received \$1 million USD. As the liquidity of the company became worse due to poor economic situation, they had to exchange the dollar into KRW. Without KIKO, the company would be able to exchange \$1 million USD into 1500 million KRW. However, due to the KIKO option, the company would now be able to exchange only $(1500 * 1 \text{ million USD}) - [(1500 - 1050) * 1 \text{ million} * 2] = 600 \text{ million KRW}$. Due to KIKO, the company incurred 900 million KRW in loss. Just like this example, hundreds and thousands of small-medium sized companies' experienced huge losses. By properly examining the KIKO and knowing currency better, these companies could avoid such losses.

Section 2. Good and Bad Currency Fluctuations

Most people simply think that when KRW/USD goes up (KRW being valued less), it would be beneficial for exporting companies in Korea. They tend not to go into why the KRW was devalued compared to USD. In the same line, they think that when KRW/USD goes down (KRW being valued higher) it would be beneficial for importing companies. This is true for most of the cases. If US economy is in good situation which resulted in strengthening value of USD, and if this is the main reason for weaker KRW/USD, then it would be perfectly right that exporters would benefit greatly, which is a good currency fluctuation.

However, not all currency fluctuations are good. Bad currency fluctuations occur when it happens too rapidly and dramatically, and results in sharp rise in prices of goods (CPI). Also if export companies take put positions expecting that currency would fall when in fact it goes the opposite way, then it would also be damaging for country's economy.

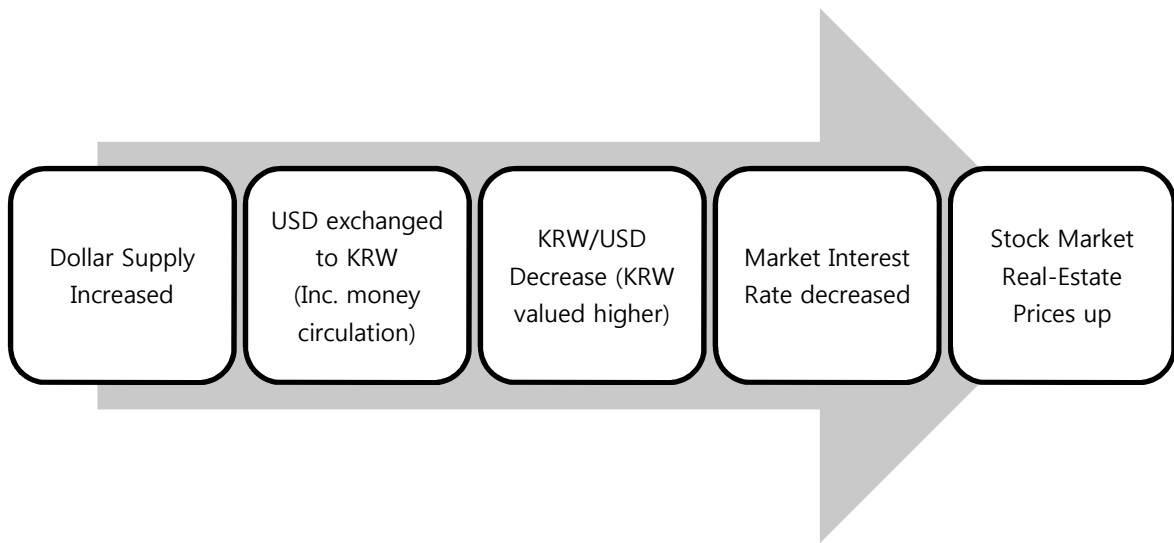
In addition, if the rise in KRW/USD was due to bad economic situation in US, rather than rising from fundamental strengthening of Korean economy, it is likely to be a bad currency fluctuation. For example, KRW/USD started to go up on September 2007, and this was a sign that this currency fluctuation would create much more problems in the future. On September 2007, United States lowered interest rate from 5.25% to 2.0% in order to recover from the housing bubble burst few

years ago. As a result, the dollar's value depreciated, which led prices of raw material and oil to rise sharply. However, as Korea relies heavily on imports and exports, it meant worse for the small country. Korean Won was devalued to even lower level, which resulted in KRW/USD to go up. At this time, even though the currency went up (KRW valued less), exporting companies did not benefit from it; furthermore, they were damaged due to higher raw material prices, and resulted in worse trade deficit.

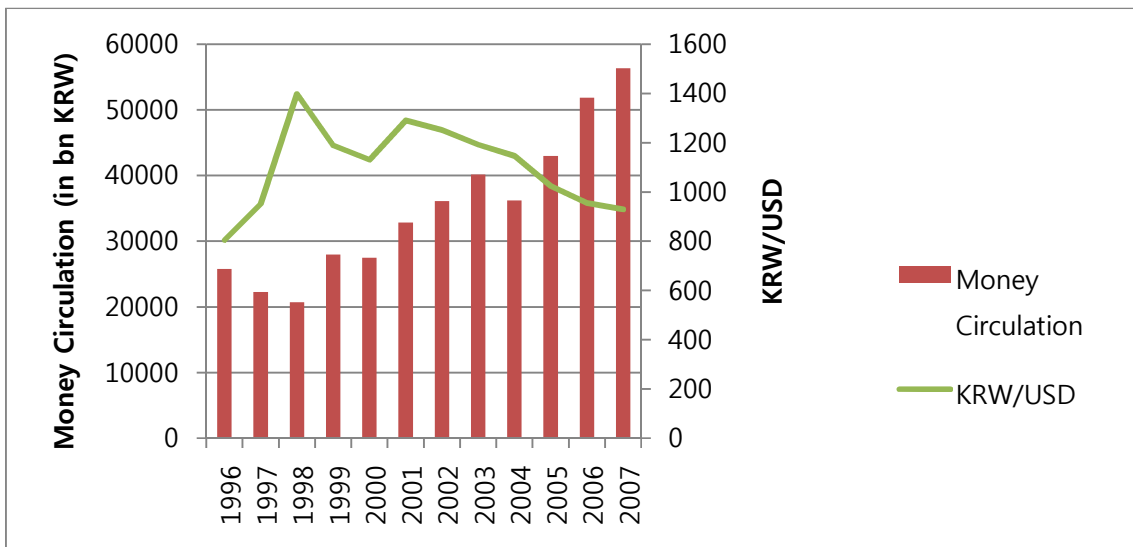
In the summer of 2008, I was working at JPMorgan & Chase as an intern at Equity Sales & Trading division. At the time, the stock market was just started to plummet, and the environment was really awful. However, the weird thing was that no one seemed to mention that the situation was going to be worse. The Korean Government kept saying that the crisis would soon be over, showing optimistic economic indices. Also, the corporates were saying that everything was in control. They probably knew the situation was worse, but were afraid of being degraded in their credit rating. Finally, my peer workers at JPMorgan were all saying only positive ideas. They probably did so because their salary was commission from trading. But now I think back to what happened, it would have been wiser to see that the situation involved bad currency shift.

Section 3. Capital in Circulation and Currency

Money in circulation is the amount of capital that non-financial institutions and people own at a certain period of time. It is in form of cash or cash equivalents such as deposits. If the amount of money in circulation increases, there is high chance that the market interest rate would be low and the prices of stock market and real-estate to increase¹². On the other hand, if the amount of capital in circulation decrease, it is likely to experience increase in market interest rate as well as falling stock market and real-estate prices. Usually, if demand for USD is low then KRW/USD increases, while if demand for USD is high then KRW/USD falls.



Imagine a time of good economic situation like the year of 2006. Due to good performances of Korean companies, the trade balance was profitable which meant more foreign currencies flowing in. As a result, more and more foreigners invested in Korean market, resulting in increased supply of foreign capital in Korea. This led to further decrease of KRW/USD (KRW valued higher). The money in USD, Euro and JPY gets exchanged to KRW and invested in the Korean market. This leads to further lowering of KRW/USD, making it seem like a dangerous threat for Korean exporting companies. As a result, in order to control the currency, the Bank of Korea is likely to lower the market interest rate, and all these processes would result in increased stock market and real-estate prices. Therefore, it is likely that if the money in circulation increases, then the stock market and real-estate prices would go up.



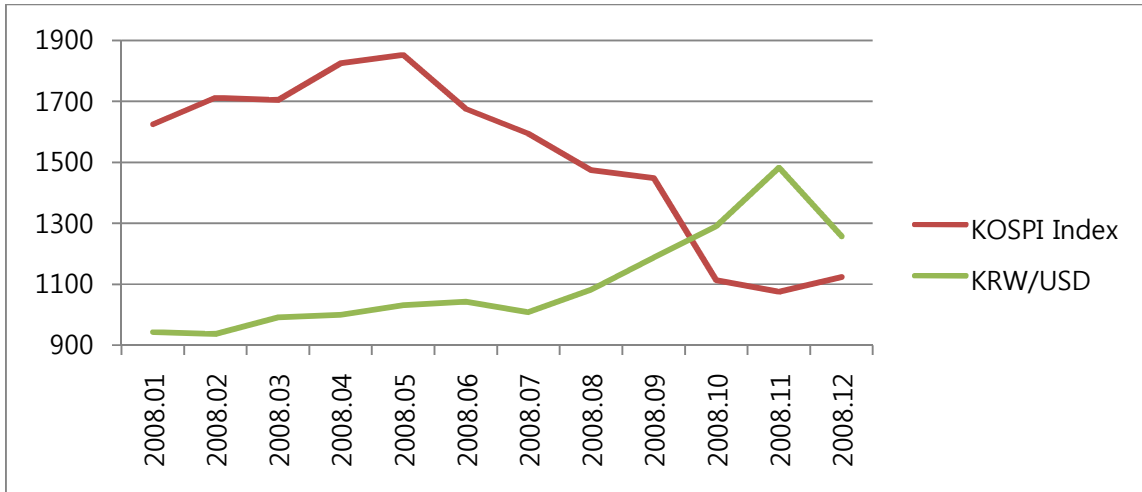
(Source: Bank of Korea, Economic Statistics System)

From above graph, we could see that the money in circulation was somewhat correlated with the currency level. Starting from 1996, the money in circulation kept decreasing until the Asian Financial Crisis in 1998. In the same period, the KRW/USD skyrocketed from 800 to 1400. As the Korean economy got out of the crisis, the money circulation began to gain upward momentum. This was a result of lots of foreign capitals flowing into the Korean market, due to lots of regulations being changed as well as better economic situation. As a result, the KRW/USD sloped downward starting from 2001 to 2007.

On the other hand, the same flow of events happens in opposite way, making it the exact other way, when the money in circulation decreases. In case of trade deficit and foreign capital flowing out, the money in circulation decreases. Foreign capital earned would be less than being spent. The main reason for this to happen would be from many factors. There could be increase in imported goods, out-flow of capital to overseas banks, and etc. It is likely that the market interest rate would increase, in order to turnaround the falling KRW's value (increasing KRW/USD). As a result, the overall economic situation may be worsened, and would make the stock market and real-estate prices to fall.

Looking at below graph, which compares the KOSPI index (stock market) and KRW/USD for 2008, we can see the impact of rising currency. Starting from January 2008, the currency went up by a lot.

Until May 2008, it was moving in the same direction with the KOSPI. However, increase in KRW/USD led to decrease in money in circulation, which led to the sudden crash of stock market starting in June 2008. Investors could see the crash coming if he or she knew the correlation between the currency, money in circulation, and the stock market.

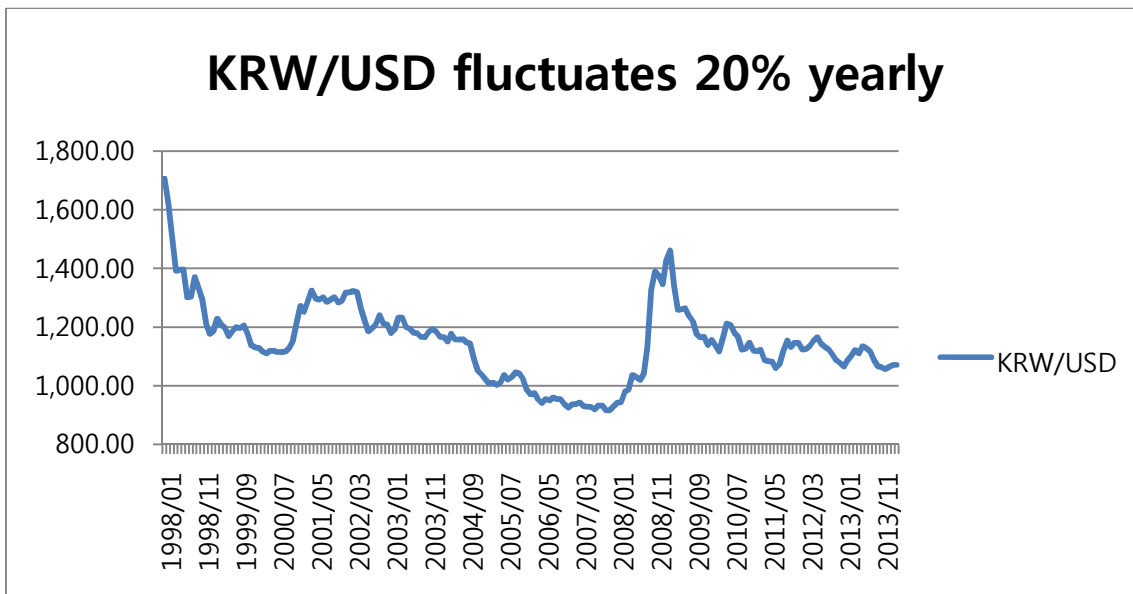


(Source: Bank of Korea, Economic Statistics System)

As above graph illustrates, the movement of stock market and currency level has strong correlation. This trend will be analyzed and explained in later part of this paper.

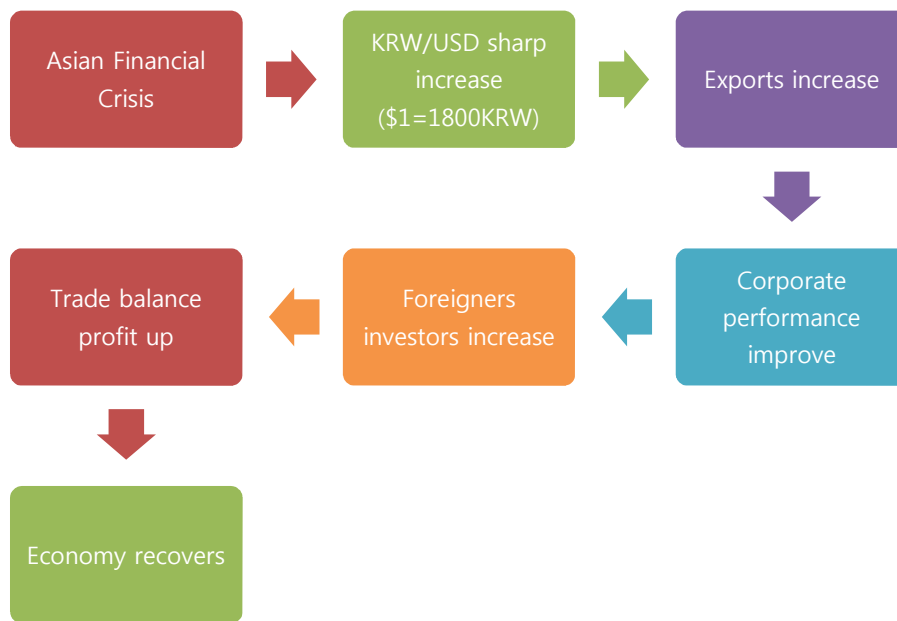
Section 4. Foreign Capital and Sharp Fluctuation of Currency

There were many changes after the Asian Financial Crisis¹³. The crisis made Korea to allow people to freely trade foreign currencies, as well as eased foreigners to invest capital into the country. As a result, ever since 1998, the KRW/USD had been fluctuating at dangerous levels. For most of the years, the yearly fluctuation of currency had been well over 20%, in either direction.



(Source: Bank of Korea, Economic Statistics System)

In 1998 right after the Asian financial crisis, the KRW/USD was as high as 1800. By the end of the year, it had fallen to 1200. This was a decline of 33%, which meant the KRW gaining stronger against the USD by the same percentage. Experts say that this was due to many factors. Because of the high currency level, Korea’s leading industries such as semiconductors, electronic products and automobiles, gained price competitiveness in overseas. As a result, the export level went up sharply, and trade balanced recorded a high profit. In addition, as companies in these industries seemed to have bright future, foreign capitals flowed into the country, expecting short-term profits in both stock market as well as currency. Therefore, the demand for KRW went up sharply, which led to lower KRW/USD. The below process diagram shows the cause and effects that led to the economic recovery of Korea in 1998.



The falling trend of KRW/USD continued until early 2000, until it shifted on September 2000. On September 2000, the currency level was at 1116. However, from the shift in trend, the KRW/USD went up to 1325 on April 2001. This was a sharp boost of nearly 30% in just 6 months.

As the Korean economy began to recover from the early 2002, the KRW/USD shifted again. For the next three years, the KRW gained value compared to the USD. It began at 1318 in April 2002, and went down to 1002 on May 2005, which was a fall of 23%. The trend continued on till the end of 2007, which reached its minimum level on November 2007 at \$1 = 916 KRW.

Years 2008 and 2009 were very dynamic. The two years experienced very sharp fluctuations of currency level consecutively. On January 2008, the KRW/USD was traded at 942. However, combination of foreign investors fleeing from Korea, trade balance losses and the Financial Crisis in US led to sharp devaluation of KRW. The currency level went up to 1462 on March 2009, which was an increase of 55% in a year. However, as the US acted quickly and Korea gained positive future outlooks, the confidence in Korean economy was gained back. The currency level again shifted dramatically, which resulted in fall of 20% to \$1 = 1166 KRW on December 2009. After the Financial Crisis of 2008, the currency had been pretty much stable in the range of \$1 = 1000~1200 KRW.

It is often a good sign when the currency is going up or down at a stable level, just like the fluctuation after 2010. The stable fluctuation does not have much bad impacts on the Korean economy, and sometimes it even benefits the economy. For example, if the currency level goes up stably, the exporting companies gain price competitiveness in the global market¹⁴, which would lead these corporates to capture these benefits. On the other hand, if the currency goes down slowly, it would mean that the demand for KRW is going up due to many factors such as strong economic and political reasons.

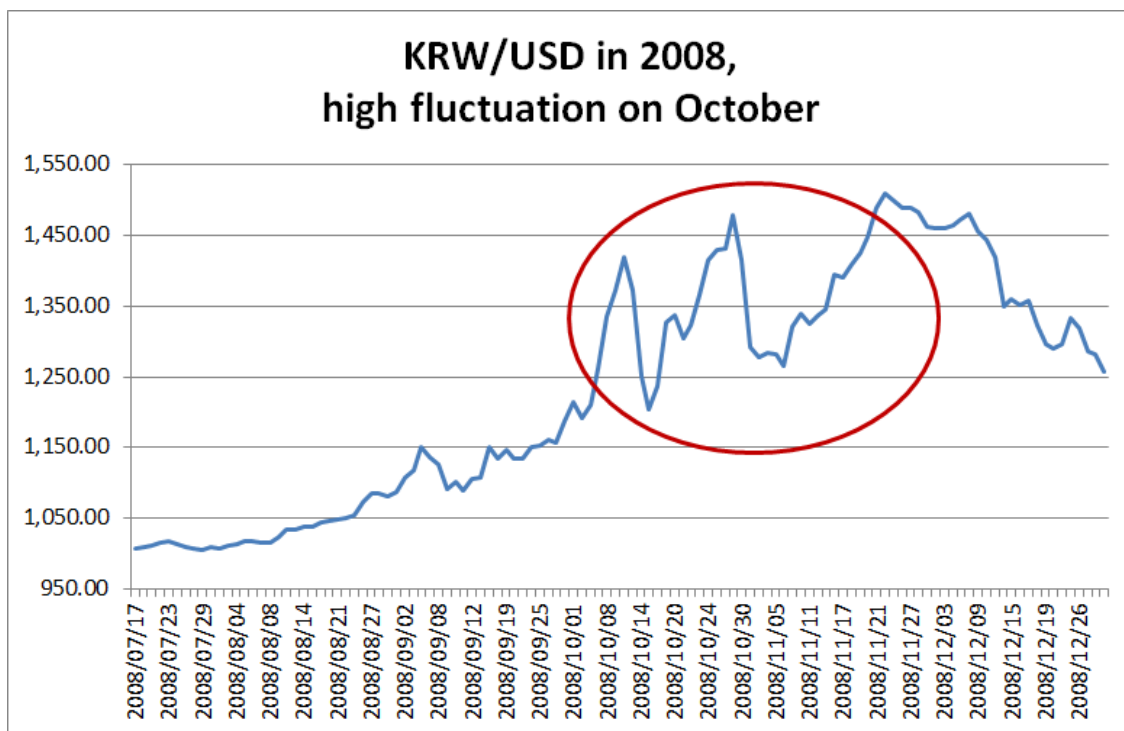
However, the sharp fluctuations mean red light for the country, which is very dangerous. If currency goes up sharply, importing companies and corporates that have short-term foreign debt will have much difficulty. Also, as Korea relies on other countries for raw materials and energy resources, the prices for these would also increase, which would result in higher prices for their final products and services or less profit. It can lead to contraction of Korean economy, which would again lead the foreign investors to flee from the country, and could lead to crash in the stock market. On the other hand, if the currency falls sharply, the exporting companies would lose their edge due to loss of price competitiveness compared to close competitors such as those in Japan.

It is important to notice that the currency can fluctuate at a very high level, as seen from history. Although it is quite stable these days, it is imperative to assume that the sharp shift can happen anytime in future. It will come as a black swan that will have huge impact on the economy.

As mentioned before, after the Asian Financial Crisis, the Korea implemented foreign currency regulation such as those of developed countries like US. Due to the change, the daily limitation of currency shift was abolished, futures and options market for FX was established, and led to deregulation of trading foreign currencies. Most importantly, foreign investors could buy and sell Korean assets and stocks freely, much like Korean citizens. It opened the country and the financial market to the world.

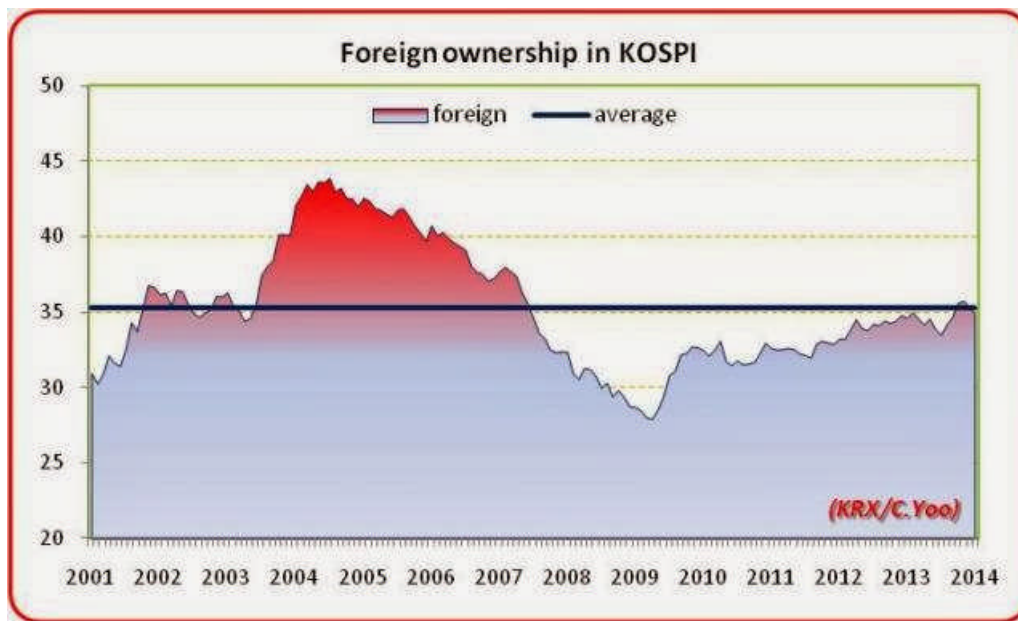
Before the change, it would have taken over a month for the currency to go up from 900 to 1700, because there was a daily limit on the fluctuation. However, after the amendments, there is no limit

on the currency shifts. Therefore, if the FX market gets very unstable like 2008, the currency can fluctuate very sharply. For example, looking at below graph of KRW/USD in 2008, we can see that the currency fluctuated madly. For some of the days, the change was more than 100 KRW per day, which was nearly 8% of the value. Therefore, companies or individuals who do not prepare for these extreme cases are likely to lose huge amounts of capital.



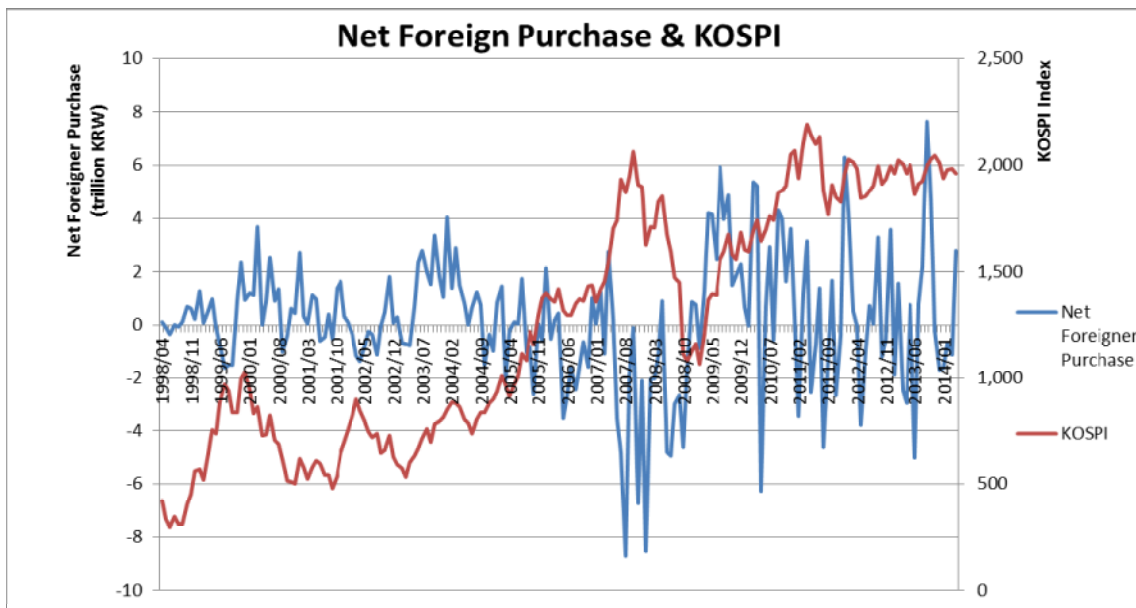
(Source: Bank of Korea, Economic Statistics System)

Another big impact of the regulation change after the Asian Financial Crisis was that foreigners could freely bring in foreign capital into Korea, and invest into the stock market, real-estate and etc. As discussed earlier, if more foreign investors bring in foreign capital, more dollars are brought into the country, and it leads to decrease in KRW/USD. However, if they decide to pull back from the country, they sell their KRW which would lead to high increase of KRW/USD.



(Source: Korea Exchange Commission)

Above graph shows that on average, 35% of stock market is owned by foreign investors. These investors are sensitive not only to the actual performance of Korean stock market, but they are actually more interested in secondary profits coming from the currency as well. As a result, it is likely that foreigners would invest in Korea when the economy of Korea is in a difficult situation, therefore gaining easy and cheaper access to KRW and the stocks. The Korean stock market as well as the real-estate market is dependent on foreign capital by a large percentage. Therefore, if currency of KRW/USD goes up sharply due to outflow of foreign capital, it can lead to further problems. The stock market would crash and corporate would have hard time with their performances, which would make them much more difficult to come up with capital due to degrading of their credit. This cycle can lead to devastating chain reaction. Therefore, again, it is always important to take close attention to the currency even if individual investors such as me, is investing only in the Korean market.



(Source: Bank of Korea, Economic Statistics System)

We can learn a lot by seeing the above graph comparing net foreigner purchase and the KOSPI index more carefully. Firstly, the KOSPI index tended to go up when the net foreigner purchase was positive. What this means is that when more foreigners bought than sold, the KOSPI index tended to go up. When the net foreigner purchase was positive for long period, the KOSPI index tended to follow into the same trend, however with some time difference.

One interesting thing moment was between year 2007 to 2008. We can see from above graph that starting from January, the net foreign purchase went negative sharply, and by huge amount for a very long time. However, the KOSPI index went up for most of year 2007. This was probably due to domestic investors expanding their position in the stock market, while the foreigners were fleeing from the market. As a result, the market crashed in 2008, and led to huge loss for domestic investors. If they could see that the foreign investors were fleeing from the market, due to some reason whether it be economic, political or psychological reason, and then the domestic investors could have prepared for such huge crash in the market.

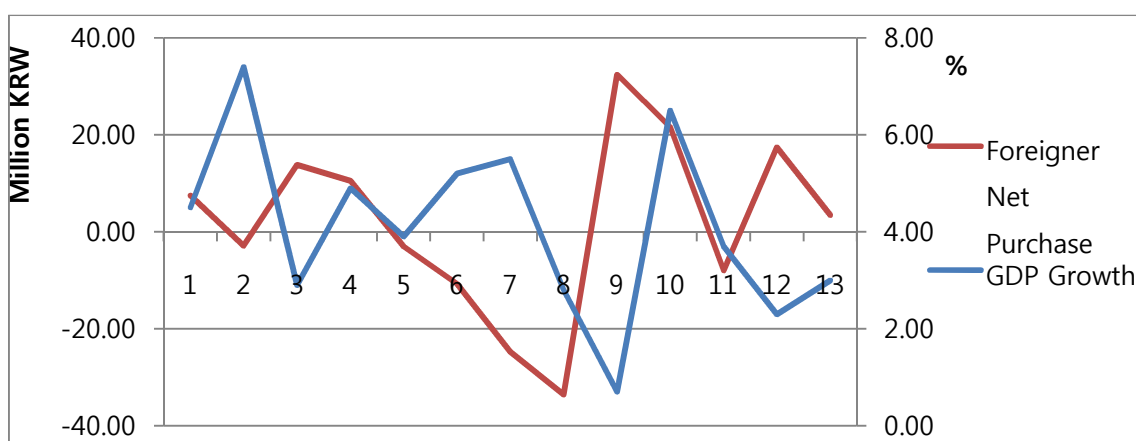
Chapter 4. Currency and the Economy of Korea

Section 1. Economic Growth and Currency

With globalization, flow of capital from one country to another is becoming easier every day, and the way that people view which country's currency to buy is also changing. In the past, it was said that the most important factor was each country's financial policies. However, with globalization and institutes such as WTO and IMF becoming bigger, it became imperative to check on each country's economic condition in order to invest.

International investors consider many things when they decide which country to invest in. For example, they check on economic growth, current account, political stability, short-term foreign loans, foreign reserves, industrial structure, financial policies, investment in information industry, and etc¹⁵. Standard & Poor's, which is a leading credit-rating service agency, is said to have similar criteria when they rate countries.

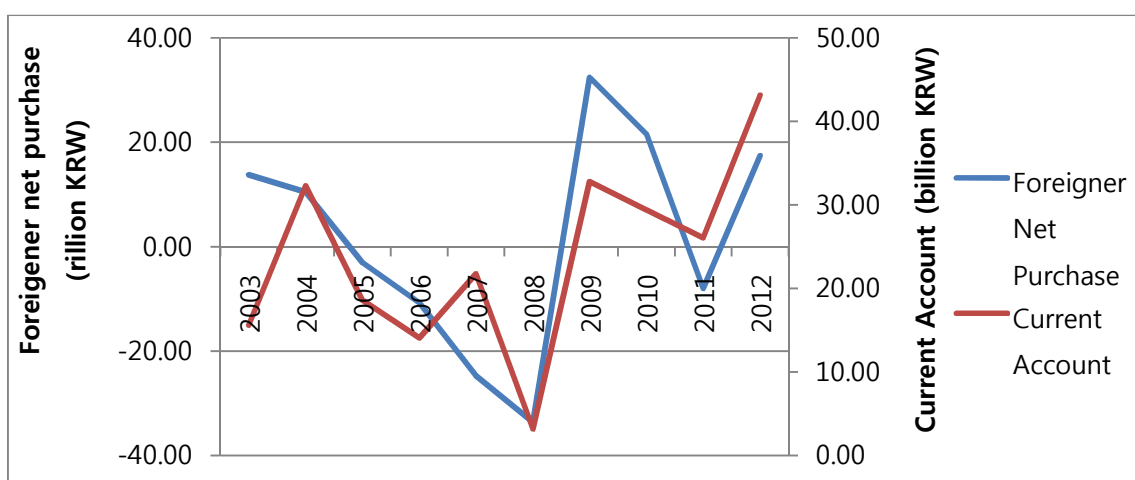
Generally, a good percentage of economic growth means that companies in that country are experiencing solid growth in revenue. Also it means that the country in general is recovering its economic condition, and shows strong fundamentals. Strong fundamentals lead investors to invest in that country, which means more foreign capital flowing in. For example, if Korea shows positive and stable economic growth, it means that the country is proving its strong fundamentals. This leads foreign investors to be more interested in Korea. On the other hand, if economic growth rate slows down, becomes flat or goes down, it means the opposite. The corporates in that country are likely to experience slowing revenue growth and earnings, and weaker fundamentals. Foreign investors are less likely to invest into those countries, and more likely to exit from such markets.



(Source: Bank of Korea, Economic Statistics System)

From above graph, which shows foreign net purchase and GDP growth from year 2001 to 2013, we can come to an interesting conclusion. They seem to have a strong correlation with each other. One possible way to explain the correlation is that they move in same direction with similar multitude; however, it seems that the foreign net purchase moves before the GDP growth. In year 2002, the net purchase of foreigners turned positive, which led the GDP growth to go positive. The same trend goes on for the years following: if foreigner net purchase goes up, then GDP growth goes up for the next year. From this simple assumption, I would guess that the GDP growth is likely to go down for year 2014 compared with 2013.

Going back to economics and currency, if positive current account increases or remains stable, foreign investors are more likely to invest into the country. The investors expect benefits from two sources. Firstly, they expect to gain profit from currency; secondly, they are also attracted by the difference in market interest rates.



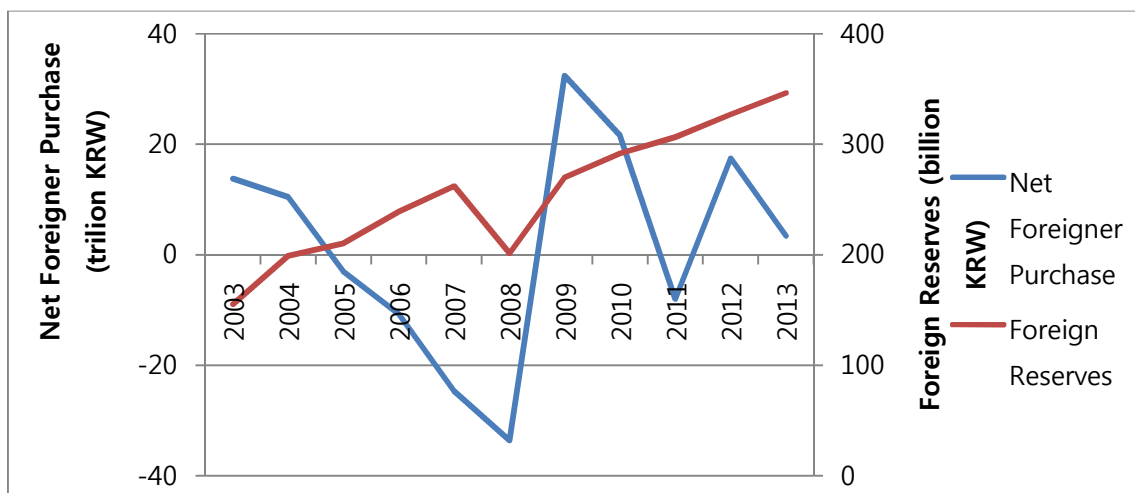
(Source: Bank of Korea, Economic Statistics System)

The above graph illustrates foreigner net purchase compared with current account, for years 2003 to 2012. As we can easily see, the two factors are closely correlated. Except years 2003 and 2007, the correlation was strong. They tended to move in same direction, and in same intensity. For example in 2009, the current account went up from 4 to 32 billion KRW, while the foreigner net purchase went up from -32 to 32 trillion KRW. We can see that these two are correlated, and confirm that foreigners are more likely to invest in a country when current account improves.

In addition, political stability also plays a big role when deciding a country to invest. For example, if a market is controlled or partially closed, by a dictatorship, it is not so attractive. Also if the government experiences too many changes in its leadership, the country is not a very good place to invest. An unstable political situation might lead to uncertain events such as war or sudden changes in interest rates, and etc. Another important factor that is related to political stability is the fiscal policy of a country. Due to globalization and open market becoming the norm for most developed countries, a fiscal policy that supports such free trade and transfer of capital remains important to investors as well. If the fiscal policy somehow lacks support for easy transfer of capital from country to another, this alone can be very unattractive. Moreover, a fiscal policy such as that of Japan shows great confidence for investors, as the policy may lead to revival of Japanese economy.

Foreign reserves also serve as a strong incentive for investors to have confidence in a country. If a country has large foreign reserves, such as China holding the most US Dollar compared to any other

country, it means lower risk and leads to confidence for investors. However, a small country such as Korea has not much meaning to its foreign reserves. If Korea experiences stable economy, it doesn't matter too much if the country holds relatively small amount of foreign reserves. In the same sense, if Korea experiences difficult economic times, it doesn't matter if the country has large amount of foreign reserves, due to the size of the economy.



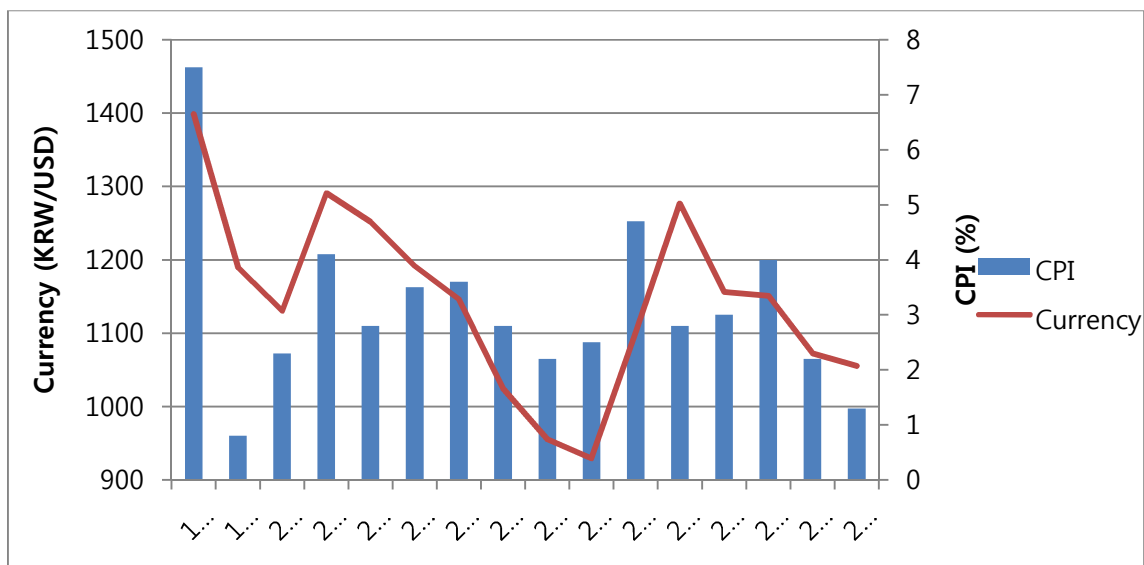
(Source: Bank of Korea, Economic Statistics System)

As we can see from above graph comparing Korea's foreign reserve and net foreigner purchase, there seems to be not much correlation. The foreign reserves kept increasing from year 2003 till today, except in the year 2008. On the other hand, the net foreigner purchase went up and down without much perceived correlation with the amount of foreign reserves. This shows that Korea which is such a small country that relies heavily in other nations is a place to invest regardless of the amount of foreign reserves.

Section 2. Consumer Price Index and Currency

There is very high correlation between CPI and currency¹⁶, which is obvious in an open market, such as Korea. Also as Korea depends on overseas for energy and raw materials, the correlation is stronger. Looking at CPI and currency after the Asian Financial Crisis, we can see the correlation more clearly. For times when the currency went down (strong KRW), the CPI became lower, meaning the prices of consumer prices were stable. Due to strong KRW, the imported goods became

cheaper, which led to stable prices. On the contrary, when currency went up (weaker KRW), the CPI tended to be high due to higher priced imported products.



(Source: Bank of Korea, Economic Statistics System)

As we can see from above graph, in 2000 compared to 1998, currency kept going down to 1130 while CPI was as low as 2.3%. However in 2002 as the currency went up by more than 10%, the CPI again went up as high as 3.5%. In 2006, the currency went down by about 20% compared to 2004, which led to CPI growth to decline for the two years. In 2008, as the currency went up sharply, the imported products' prices went up due to higher raw material prices. As a result, the CPI growth rate was 4.7%, which was the highest growth after the Asian Financial Crisis. We can see that there is clear correlation between CPI growth and the currency levels. Also it is often known that the central bank of Korea often changes its short-term management by examining these correlations.

Section 3. Interest Rate, Market and Currency

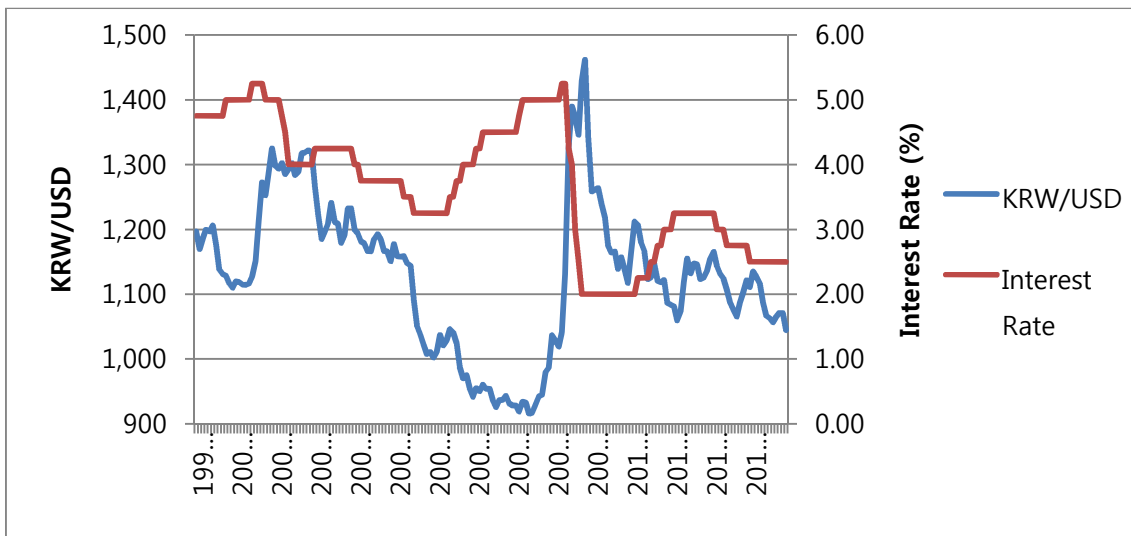
Generally when investing, the money flows from a lower interest rate investment to higher interest rate¹⁷. If there is no risk regarding currencies, then capital would flow to a place that pays highest yield. However, due to currency swaps becoming largely available, it made the international capital to flow from one place to another, easier with less risk. Interest rates have impact on the prices of bonds, which are also related with the currencies and the markets.

“Bond is an instrument of indebtedness of a bond issuer to the holder. It is a debt security, under which the issuer owes the holders a debt and, depending on the terms of the bond, is obliged to pay them interest and/or to repay the principal at later date.” The bond can be issued by the government (national, municipal), and by corporates. For corporates, if they need additional cash, they tend to issue new stocks because lending from the bank or issuing bonds mean additional debt. Bonds can have many differences, such as maturity date and the interest rate. The higher the interest rate, the more appealing it is for investors. It is important to note that the bond prices are influenced by the interest rates, and interest rates have correlation with currencies.

Usually if a government lowers the market interest rate, then the government bond prices go up rapidly. For example, if the market interest rate was at 5% but falls to 3%, then the bond prices would go up. Conversely, if the interest rate rises, the bond prices tend to fall. This makes sense because a bond that pays 3% coupon rate, would be valued less if market interest rate goes up, and another source of investment would pay 4% coupon rate.

Traditionally in Korea, bonds tend to have less liquidity; thus hold till maturity. However, with the implementation of developing better bond market by the government, the liquidity issues became not a problem. Bonds of corporates with good ratings can be sold at easily any time. Therefore, more and more investors from overseas bring in lots of foreign capital in order to gain profits through the bond market, by analyzing trends in market interest rates. This in turn has huge impact on the value of currency.

Fiscal policy has impact on both bond prices and currency value. Usually when a country lowers the interest rate, the country is experiencing difficult time economically. For example, Japan has been lowering its interest rate to zero for many years, due to its lost two decades. If interest rate goes down, lots of capital flows to invest in bonds, while the value of currency would go down. This would lead to increase in currency, for example, higher KRW/USD.



(Source: Bank of Korea, Economic Statistics System)

As we can see from above graph, the currency value and interest rate seem to have some correlation with each other. When currency falls, the market interest rate also tended to fall, and if the currency was in trend of rising, the market interest rate also rose. However this was not the case always. Years 2005 to 2007 showed inverse movements. Theoretically, these situations come from chain reaction that comes from economic condition shifts. When economic situation gets better, more and more foreign capital flows into the market due to strong fundamentals and better expectations. As a result, the prices of stock market, bond market and real-estate market rise due to increased demand. The amount of currency circulated in the market rises, and the market interest rate drops in order to stabilize its level. On the other hand, if economy suffers bad condition, such as slow growth or current deficit, the foreign investors tend to flee from the market due to weaker fundamentals, and exchange KRW to other currencies. Due to these actions, the prices of stock market, bond market and real-estate market fall due to less demand than supply. Also the currency rises because its value becomes less. As a result, in order to control its rising currency, the market interest rate tends to rise.

Chapter 5. Currency and Stock Market

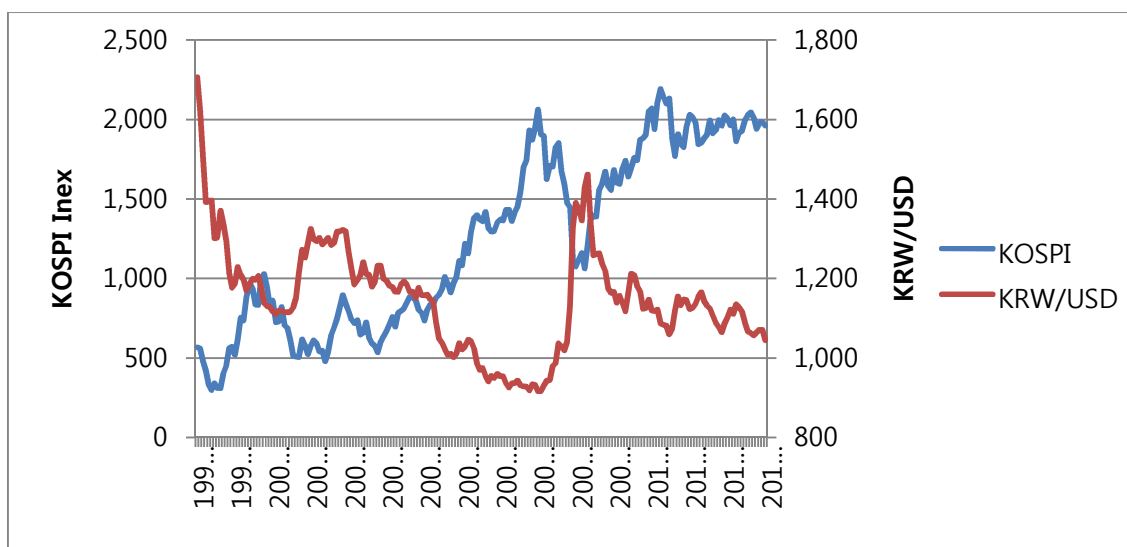
Most of foreign capitals are invested into the stock market in Korea. Ever since the stock market was opened to foreigners, more than 50 trillion KRW had flown into Korean stock market¹⁸. On the other

hand, Korean investors started to aggressively invest overseas starting from 2007, into overseas stock market, in both developed and developing countries.

It is important to note how the foreigners increase their positions in Korea, as well as how the domestic people take position in overseas market. Most of capital flows into the Korean economy through the stock market, due to its good liquidity condition. Therefore, it is imperative to watch closely how the relationship between the stock market and foreign capital flows, and this relationship is linked with currencies.

Section 1. Stock Market Moves Conversely with the Currency Level

Most people believe that if the currency level goes up (KRW being valued less), then it is a good sign for the exporting companies¹⁹. They look for companies to invest, which have good export levels and would gain price advantage due to high currency. However, it was shown that this is not always the case.



(Source: Bank of Korea, Economic Statistics System)

When currency level (KRW/USD) was going up, the KOSPI stock market index plummeted. Looking at the graph above, we can see that this correlation existed in 1997, 2002 and 2008. These all show that it is not the case that high KRW/USD currency level does not mean better performance in the stock market.

However if the KRW/USD currency level falls, it usually showed better performance of the stock market. Looking at year 1998, we could see that the KRW/USD kept falling down, while conversely, the stock market boosted. Looking at the above graph shows illustration of this correlation.

By seeing above two patterns, I was wondering how the currency level would affect the performance of the stock market. After doing much research and analysis for the cause and effect, it made sense that the KRW/USD level would move conversely with the KOSPI index. It is important to study the correlation after year 1998, because that was the time when the market was opened to foreigners without restrictions and implemented developed country's system of stock market.

There has to be many assumptions made in order to explain. However, these assumptions would not be non-sense; they are well-fit with the modern economic knowledge. Among some of the assumptions, three most important are as follows: 1) the Korean economy relies heavily on the world market as its domestic market is too small for rapid growth, 2) Stock market performance is decided purely on demand and supply, and 3) the Korean economy goes through economic cycle, whether it be short-term or long-term.

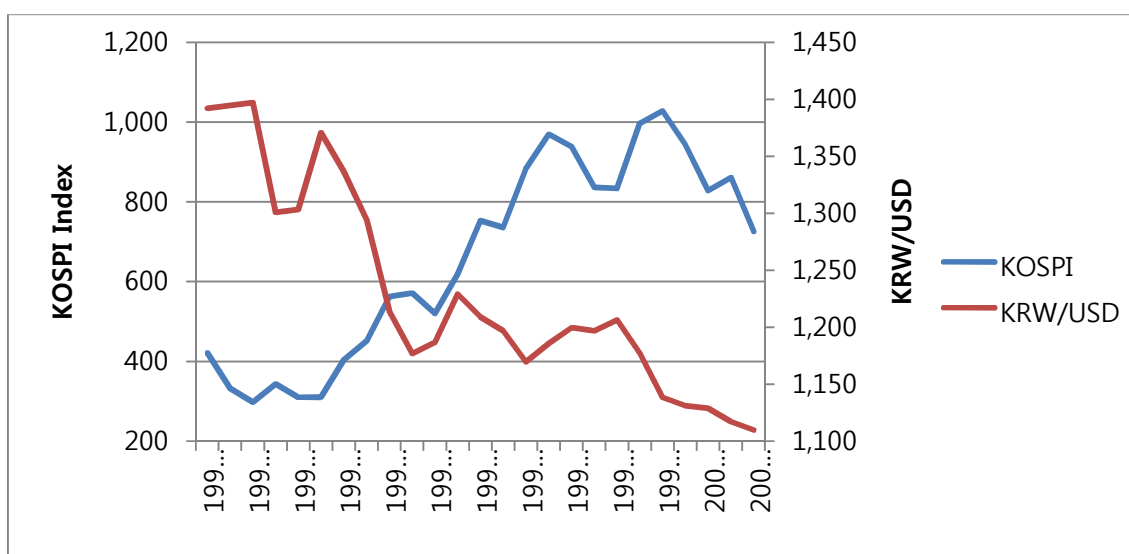
Section 2. Stock Market Bounces When Exchange Rate Falls

When the economy is in bad situation, high level of KRW/USD benefits companies that do lots of exports. For example, high level of currency gives these companies price competitive advantage, which would then boost the companies' performances. This is what is happening at the moment in Japan, where lots of big companies such as Toyota are taking advantage of high JPY/USD to sell more in the overseas market. Focusing back onto Korea again, high currency level will lead to improved performances of most companies, as the Korean market relies heavily on exports for growth. As companies' profits increase over time, it gives confidence for investors to invest into these companies. More and more foreign investors as well as domestic investors look for companies to invest, through the stock market.

Furthermore, high level of KRW/USD at times of bad economic condition would help the economy

to lessen current deficit or increase current profits. This factor would then lead to lowering of currency level (KRW becoming stronger). Combined with better corporate performances and stronger economic indices, it shows the sign that the Korean economy has reached its bottom line and likely to bounce up.

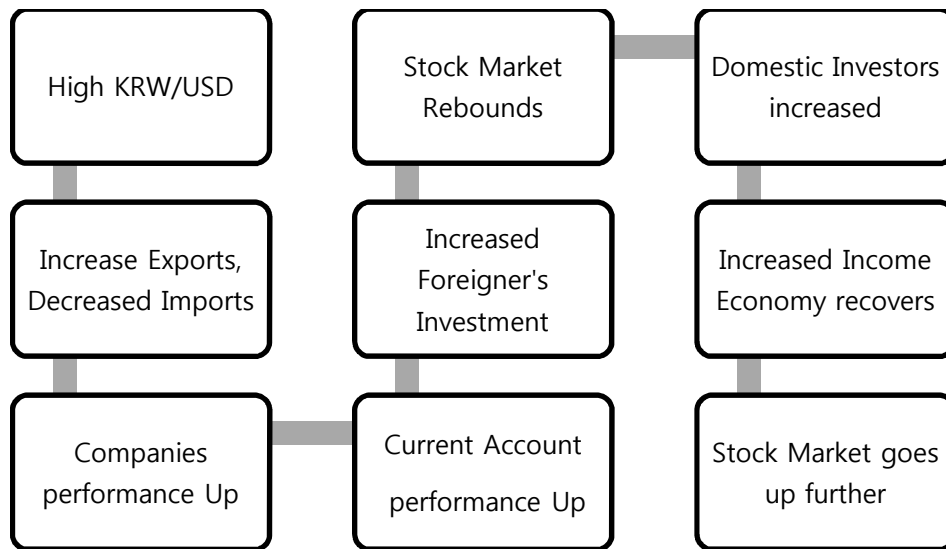
Foreign investors capture this sign of rebound of economy, and take strong position in Korea. They can have two sources of profit from their investment. As KRW/USD is still high, they can expect to gain much from currency when KRW gets stronger in the future. Secondly, they expect to gain profit from the stock market, as the Korean companies have started to show better performances. From this, the effect is that the currency level falls sharply as the stock market goes up slightly. With much more capital flowing in the Korean market, there can be more chain reactions. The market interest rate is likely to rise, as well as the stock market would go up due to foreign capital's investment preference into the stocks.



(Source: Bank of Korea, Economic Statistics System)

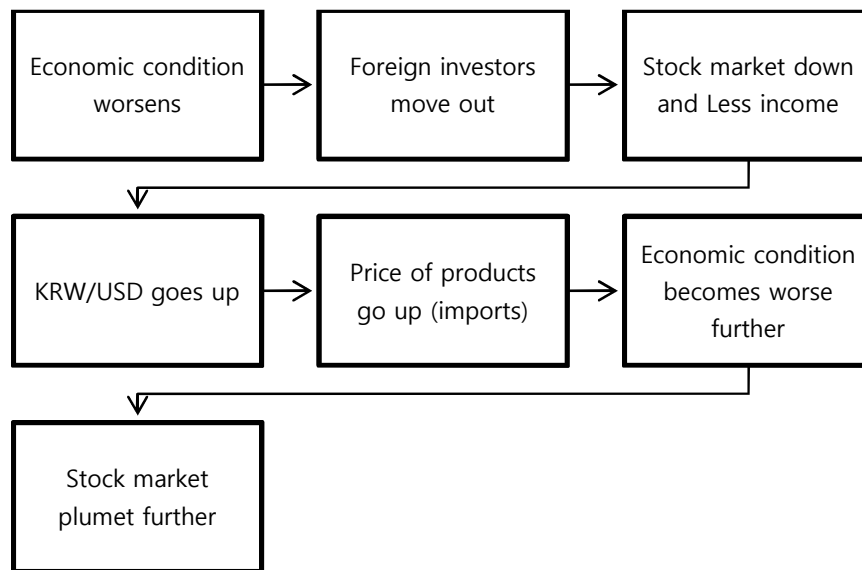
As seen from above graph, at the time of currency going down (KRW being valued more), the stock market showed to go up rapidly. While the KRW/USD fell from 1640 to 1100, which is down of 32%, the KOSPI index rose from 300 to 1030, which is gain of 240%. This relationship can be explained more easily if we look at the chain reactions that happen when the currency level tends to

go down. Below flow chart shows what happened:

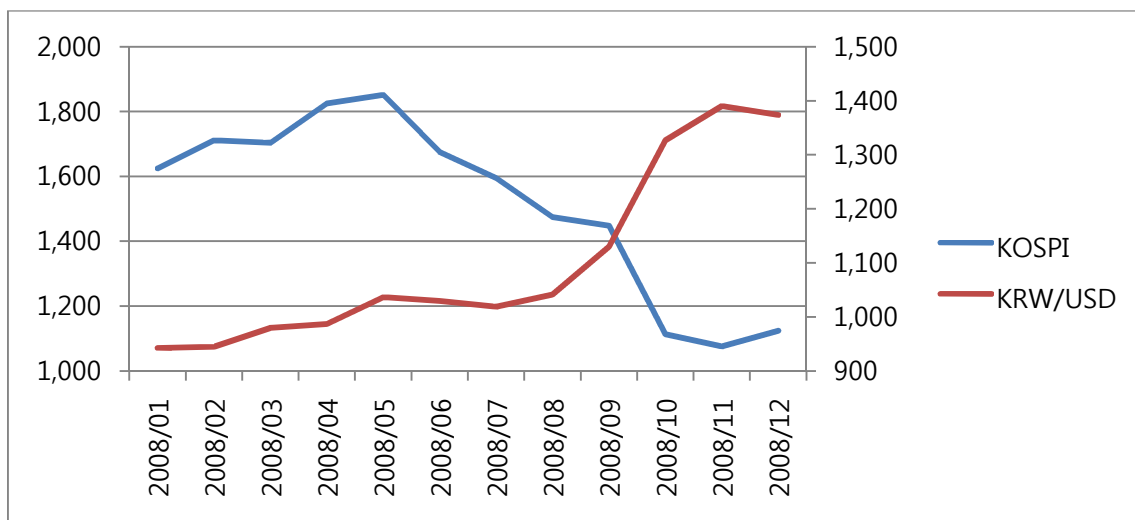


Section 3. Stock Market Falls When Currency Goes Up

On the contrary to the above phenomena that happened when currency went down, the opposite happens to the stock market when currency falls down. When the economic condition reaches its peak, it goes down due to economic cycle. As the economic condition becomes worse, the corporates' performances tend to become poor. Due to weaker fundamentals, the stock prices tend to fall down as well. At the same time, the foreign investors worry about losing capital through currency, they try to sell off their holdings in KRW, and buy foreign currency such as USD. As there is less capital flowing in the Korean market, the economic situation becomes worse. The chain reaction can be illustrated as follows:

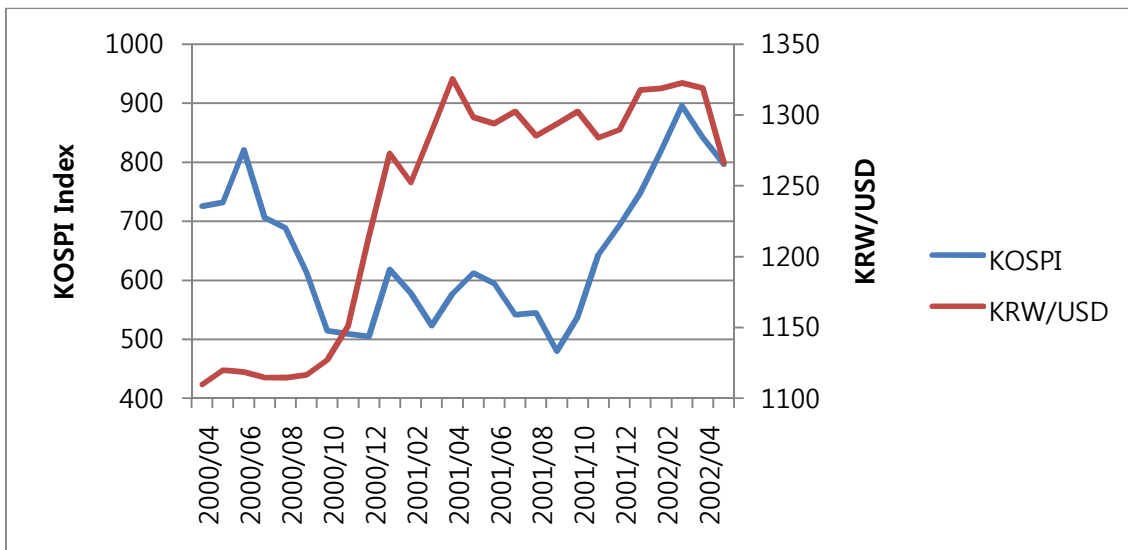


If we take a look at what happened in 2008, it is easy to see the correlation. Looking at the graph below, which illustrates KRW/USD and KOSPI Index in year 2008, it shows the converse relationship between the two. As the currency level goes up, the KOSPI index fell heavily.



(Source: Bank of Korea, Economic Statistics System)

We have seen the two extreme cases, where currency falls or goes up. However, there are also times that neither happens. Taking a look at what happened in 2000 to 2002 would give better understanding when the currency stays relatively high for a long period of time.



(Source: Bank of Korea, Economic Statistics System)

As we can see from the graph above, the KOSPI index surged highly when the KRW/USD stayed high for a long period of time. This was probably due to the fact that Korean firms gained competitive advantage due to price, and the fundamentals proved to be stronger. However, it took some time for the index to go up. This could have resulted due to the time it takes for companies to gain the actual benefits of its competitive advantage in price.

As we saw from many graphs above, the general correlation was that the stock market falls when currency level went up, and it rose when currency went down. Therefore, it is logical to utilize the level of currency in order to maximize one's chance of improving chance of success in the stock market. When it is expected or assumed that the currency would stop falling or go up, it would be wise to decrease position in the stock market or stop buying securities. Again, as seen from below graph, there is high chance that the stock market would plummet when the currency level goes up (KRW being valued less).

Section 4. Currency and Real-Estate

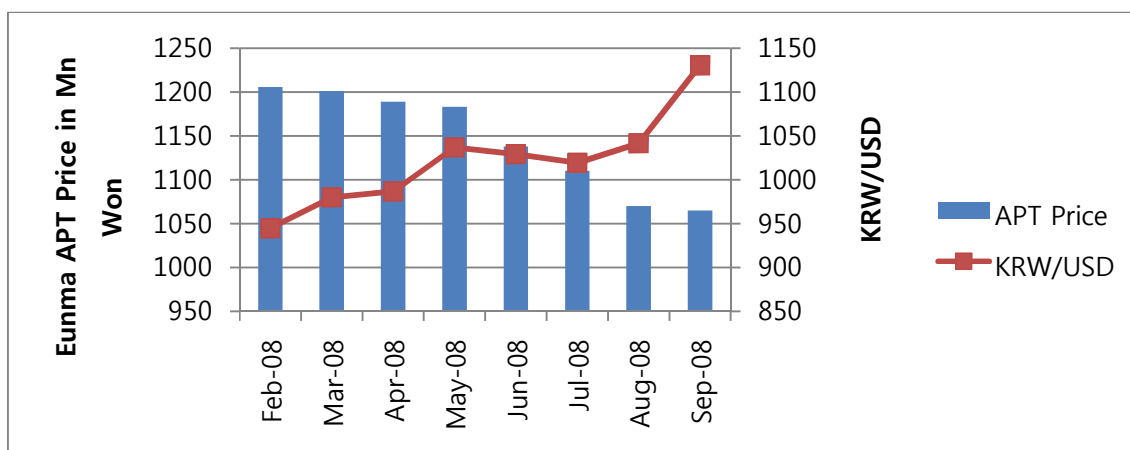
Real-estate price tends to go along with the macroeconomic situation of the country. Specifically, if Korean economy is doing well, then the real-estate prices would generally be going up high. On the other hand, if the country is experiencing bad economic times, then the real-estate price tends to go

down as well as other assets. With this, it is usual that the Korean economic situation is bad when the currency level is high (high KRW/USD, lower value for KRW). At the same time, the real-estate prices would be at low point due to the economic situation. Therefore, if the currency level is high, it is likely that the real-estate price would be low, due to the economic situation.

It is important to dig further into the relationship of real-estate and currency. It is definitely true that currency fluctuation has strong impact in real-estate prices. As mentioned earlier in this report, generally when the currency level goes down, it would mean that supply of dollar is increasing, meaning more of foreign capital is flowing in. The foreign capital in Korea is exchanged into KRW, and invested. As the amount of capital in circulation goes up, the stock market enjoys boost due to brighter expectation about Korea's economic outlook. This boosts the economy further, results in higher demand for real-estate, and prices of real-estate rises.

On the other hand, the exact opposite happens when the currency level is in stage of going up. It is usually the case that economic situation doesn't look so bright when KRW is becoming less and less valued, because it means that supply exceeds demand for the currency. The stock market slides and lots of capital get out of country as more KRW is exchanged to USD and gets transferred to overseas. Therefore, there is less capital in the circulation, and the real-estate market gets damaged as well.

An example can be seen if we take a look at what happened to apartment prices in Gangnam area of Korea in 2008. Eunma-Apartment, which is often times used as bench mark for real-estate prices of Seoul, experienced heavy fall in 2008. In the same time, the currency level went up sharply. Below graph shows trading prices of 85m³ apartments from February 2008 to September 2008, and KRW/USD for the same time period.



(Source: Bank of Korea, Economic Statistics System)

Looking at above graph, we can see that the price of Eunma-Apartment fell from slightly above 1,200 million to 960 million KRW in the time period, which was a decrease of 20%. In the same time, the KRW/USD went up from 1040 to 1140, which was increase of 10%. Looking at this period, there was a strong correlation which suggested that currency and real-estate markets are influenced by each other.

Section 5. Regression Analysis on KOSPI and Exchange Rate

Up to now, it was found that there clearly seems to be a correlation between the stock market and the currency exchange rate. Roughly taking a look at the graphs that I outlined for the values of KOSPI and KRW/USD starting from 1998 till today, it was shown that there seems to be a negative correlation. From this relative correlation, I made a hypothesis that the level of exchange rate causes many chain reactions that leads to fluctuation in the stock market.

In order to further analyze the correlation, my approach was to perform a linear regression analysis. I did the analysis for the same period of time from previous graphs, which was from January 1998 to April 2014. As previously explained, the chain reaction was as follows. When the KRW/USD shifts its trend to upward moving, the KRW becomes relatively weaker than other currencies. It helps exporters to capture better performance but damages imports. However, as most Korean companies rely heavily on exports for growth, the general market begins to perform better, as export companies show better sales and profit. Next, due to better performance, the current account performance goes

up. With Korean companies showing improved fundamentals, foreign investors begin to take larger position in the Korean market, which drives the stock market to go up. Next, due to better performance and economic condition of the country, the domestic investors also take larger position in the stock market, which further drives the stock prices to go up.

As stated above, this chain reaction flow begins from shift of KRW/USD and ends in the fluctuation of the stock market. Therefore, the currency exchange rate will be the independent variable, while the KOSPI index will be the dependent variable for the analysis. By performing the regression analysis, I would be able to see their relationship more clearly.

The regression analysis is used to produce an equation that would be used to predict the value of a dependent variable, in our case the stock market index KOSPI, using an independent variable, which is the currency exchange rate, KRW/USD. Performing the regression analysis gave the following result:

Regression Statistics		ANOVA					
			df	SS	MS	F	Significance F
Multiple R	0.5340539	Regression	1	17338377.8	17338377.8	77.4097404	7.57893E-16
R Square	0.285213568	Residual	194	43452481.26	223981.8622		
Adjusted R Square	0.281529102	Total	195	60790859.06			
Standard Error	473.2672207						
Observations	196						
		Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	3801.879247	293.1216248	12.97031309	4.13899E-28	3223.764983	4379.99351	3223.764983
KRW/USD	-2.233903916	0.253902329	-8.798280536	7.57893E-16	-2.734667235	-1.733140597	-2.734667235

From above, we can derive a linear equation which would show the trend line that is formed by looking at 196 samples of KOSPI and KRW/USD:

$$\text{KOSPI} = [\text{KRW/USD}] * (-2.2339) + 3801.8792$$

This equation is important to note that it contains the coefficient for KRW/USD and suggests that there is an inverse correlation between the two variables. The coefficient for currency exchange is -2.2339, which means that KOSPI is predicted to decrease by 2.2339 when the KRW/USD goes up by 1, and vice versa. In other words, if KRW/USD falls by 100, then KOSPI index is predicted to go up by 223.39. However, the equation also suggests that the y-axis is at 3801.8792. This does not

have much meaning, because it would be the value of KOSPI when KRW/USD is equal to 0.

Going back, the goal of this analysis was to see that there exists some correlation between KRW/USD and KOSPI. Therefore, in addition to the prediction components of the equation, it is necessary to see some measure to show how strongly the independent variable, KRW/USD, is associated with the dependent variable, KOSPI.

Looking at the P-value, which is near zero, we can again confirm that the correlation exists between the two variables. The P-value shows percentage chance of getting in a collection of random data in which the independent variable had no effect. In other words, it gives the percentage chance that KRW/USD had no correlation to the KOSPI. In line with my analysis so far, the P-value is near zero, which further suggests that the correlation exists between the two variables.

Now looking at the R-Square of the analysis, we see that it is 0.2852 and adjusted R-Square is 0.2815. Also looking at the Multiple R, we see the correlation is 0.53. Whichever we see, this value is not as much as important for my analysis here. I am not trying to predict KOSPI index when KRW/USD reaches some point in the future. My goal of this analysis was to prove that there exists correlation between the two variables. The R-Square is 0.2852, which shows the fraction of the variation that the dependent variable (KOSPI) is accounted for the independent variable (KRW/USD). The magnitude of R-Square does not matter too much, since the goal of analysis was to show that there exists correlation.

Chapter 6. Utilizing Research Results

The purpose of this thesis was to see that there exists a strong correlation between currency and the stock market. After doing much research with the data from Bank of Korea, we've seen that there exists correlation between the two. I am not to say that it is perfect inverse correlation; however, there is strong relationship with the two. With the regression analysis, and by just looking at the graph illustrating KOSPI index and KRW/USD for years 1998~2014, we saw that there generally is an inverse correlation.

However, it was not always the case. For many of the periods, the correlation was very weak or not inverse at all. This was because there are many reasons behind a shift in currency. As a result, I could not come up with any strict answer on whether a shift in currency would result in increase or decrease of stock price. In order to figure out the exact impact of currency shift, I would have to figure out whether the fluctuation came from good or bad influences.

As mentioned before in this paper, there are good and bad shifts of currency. A good shift comes from many positive factors such as increase in GDP growth of both US and Korea, and stabilizing political situations. For example, if KRW/USD goes down, it could've resulted under good conditions. If Korean economy is expected to expand and US economy is also expected to grow when the currency shifts, it is a good sign. However, if currency shifts result from negative news such as it was at the time of 2008 Financial Crisis, the impact in the stock market from the currency is devastating.

As we have seen that currency has strong impact in the Korean economy, we can utilize this fact in order to predict whether the stock market would go up or down. In order to predict with accuracy, it is mandatory to check three broad areas: economy, market psychology and political situation. If the KRW/USD is falling due to positive economic results, boosting market psychology and beneficial political situation for Korea, then it is a good sign which is likely to result in boost of stock market. On the other hand, if KRW/USD falls when economic situation is bad or unclear, market psychology is weak and political situation is unstable and not beneficial, then the impact on the stock market is negative.

Korea is such a small country but with relatively strong economic power. The country has grown very rapidly, which made the country to rely heavily on overseas economy. As a result, everyone and every corporate who resides in Korea are affected by currency and its shifts in direct or indirect ways. Therefore, general people should follow the currency market, know the correlation, and be able to utilize for further gains or minimizing losses.

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APPENDIX:
Economic / Stock Market Data

	GDP Growth	Net Foreigner Purchase	Current Account	Foreign Reserves
Unit	%	1 million KRW	1 mn USD	1 mn USD
1998		5,723,387.00		
1999		1,516,210.00		
2000		11,390,212.00		
2001	4.50	7,447,074.00		
2002	7.40	-2,898,600.00		
2003	2.90	13,768,891.00	15,584.00	155,352.00
2004	4.90	10,483,873.00	32,312.00	199,066.00
2005	3.90	-3,022,874.00	18,607.00	210,391.00
2006	5.20	-10,753,460.00	14,083.00	238,956.00
2007	5.50	-24,712,568.00	21,770.00	262,224.00
2008	2.80	-33,603,404.00	3,198.00	201,223.00
2009	0.70	32,386,412.00	32,790.00	269,995.00
2010	6.50	21,573,107.00	29,394.00	291,571.00
2011	3.70	-7,995,487.00	26,068.00	306,402.00
2012	2.30	17,462,138.00	43,139.00	326,968.00
2013	3.00	3,411,143.00		346,460.00

Year	CPI	KRW/USD	Year	CPI	KRW/USD
1986	2.8	881.47	2000	2.3	1130.36
1987	3	822.46	2001	4.1	1290.79
1988	7.1	731.42	2002	2.8	1251.62
1989	5.7	671.48	2003	3.5	1191.68
1990	8.6	707.97	2004	3.6	1146.19
1991	9.3	733.6	2005	2.8	1024.24
1992	6.2	780.84	2006	2.2	955.34
1993	4.8	802.73	2007	2.5	929.38
1994	6.3	803.62	2008	4.7	1100.13
1995	4.5	771.04	2009	2.8	1277.25
1996	4.9	804.78	2010	3	1156.26
1997	4.4	951.11	2011	4	1150.9
1998	7.5	1398.88	2012	2.2	1072.5
1999	0.8	1189.14	2013	1.3	1055.3

	KOSPI	KRW/USD	Interest Rate								
Unit		KRW	%								
1999/05	736.02	1,197.00	4.75	2004/05	803.80	1,177.37	3.75	2009/05	1,395.89	1,258.71	2.00
1999/06	883.00	1,169.63	4.75	2004/06	785.80	1,158.65	3.75	2009/06	1,390.07	1,261.35	2.00
1999/07	969.70	1,186.04	4.75	2004/07	735.30	1,157.66	3.75	2009/07	1,557.29	1,263.97	2.00
1999/08	937.90	1,199.79	4.75	2004/08	803.60	1,159.00	3.50	2009/08	1,591.85	1,238.40	2.00
1999/09	836.20	1,196.97	4.75	2004/09	835.10	1,147.97	3.50	2009/09	1,673.14	1,219.15	2.00
1999/10	833.50	1,206.38	4.75	2004/10	834.80	1,144.04	3.50	2009/10	1,580.69	1,175.25	2.00
1999/11	996.70	1,177.22	4.75	2004/11	878.10	1,091.19	3.25	2009/11	1,555.60	1,164.23	2.00
1999/12	1,028.10	1,138.39	4.75	2004/12	895.90	1,050.91	3.25	2009/12	1,682.77	1,166.45	2.00
2000/01	943.90	1,131.07	4.75	2005/01	932.70	1,038.23	3.25	2010/01	1,602.43	1,138.82	2.00
2000/02	828.40	1,128.80	5.00	2005/02	1,011.40	1,022.43	3.25	2010/02	1,594.58	1,157.08	2.00
2000/03	860.90	1,117.19	5.00	2005/03	965.70	1,007.49	3.25	2010/03	1,692.85	1,137.64	2.00
2000/04	725.40	1,109.76	5.00	2005/04	911.30	1,010.94	3.25	2010/04	1,741.56	1,117.11	2.00
2000/05	731.90	1,120.01	5.00	2005/05	970.20	1,002.21	3.25	2010/05	1,641.25	1,163.11	2.00
2000/06	821.20	1,118.73	5.00	2005/06	1,008.20	1,010.87	3.25	2010/06	1,698.29	1,212.33	2.00
2000/07	705.97	1,114.86	5.00	2005/07	1,111.30	1,037.44	3.25	2010/07	1,759.33	1,207.30	2.25
2000/08	688.62	1,114.57	5.00	2005/08	1,083.30	1,021.17	3.25	2010/08	1,742.75	1,179.92	2.25
2000/09	613.20	1,116.50	5.00	2005/09	1,221.00	1,029.33	3.25	2010/09	1,872.81	1,167.01	2.25
2000/10	514.48	1,127.31	5.25	2005/10	1,158.10	1,046.25	3.50	2010/10	1,882.95	1,123.45	2.25
2000/11	509.23	1,151.15	5.25	2005/11	1,297.40	1,041.43	3.50	2010/11	1,904.63	1,126.20	2.50
2000/12	504.62	1,214.40	5.25	2005/12	1,379.40	1,024.15	3.75	2010/12	2,051.00	1,147.55	2.50
2001/01	617.91	1,272.82	5.25	2006/01	1,399.80	987.03	3.75	2011/01	2,069.73	1,120.07	2.75
2001/02	578.10	1,252.44	5.00	2006/02	1,371.60	970.22	4.00	2011/02	1,939.30	1,118.14	2.75
2001/03	523.22	1,288.43	5.00	2006/03	1,359.60	975.09	4.00	2011/03	2,106.70	1,122.45	3.00
2001/04	577.36	1,325.55	5.00	2006/04	1,419.73	954.44	4.00	2011/04	2,192.36	1,086.84	3.00
2001/05	612.16	1,298.46	5.00	2006/05	1,317.70	941.40	4.00	2011/05	2,142.47	1,083.54	3.00
2001/06	595.10	1,293.83	5.00	2006/06	1,295.15	955.16	4.25	2011/06	2,100.69	1,081.27	3.25
2001/07	541.60	1,302.60	4.75	2006/07	1,297.80	950.15	4.25	2011/07	2,133.21	1,059.50	3.25
2001/08	545.10	1,285.39	4.50	2006/08	1,352.74	960.72	4.50	2011/08	1,880.11	1,073.17	3.25
2001/09	479.70	1,293.70	4.00	2006/09	1,371.40	953.68	4.50	2011/09	1,769.65	1,118.61	3.25
2001/10	537.80	1,302.60	4.00	2006/10	1,364.60	954.23	4.50	2011/10	1,909.03	1,155.45	3.25
2001/11	643.90	1,284.00	4.00	2006/11	1,432.21	936.22	4.50	2011/11	1,847.51	1,132.31	3.25
2001/12	693.70	1,289.66	4.00	2006/12	1,434.46	925.75	4.50	2011/12	1,825.74	1,147.45	3.25
2002/01	748.10	1,317.60	4.00	2007/01	1,360.23	936.36	4.50	2012/01	1,955.79	1,145.85	3.25
2002/02	820.00	1,318.72	4.00	2007/02	1,417.34	937.02	4.50	2012/02	2,030.25	1,123.35	3.25
2002/03	895.60	1,322.51	4.00	2007/03	1,452.55	943.26	4.50	2012/03	2,014.04	1,125.90	3.25
2002/04	842.30	1,318.93	4.00	2007/04	1,542.24	931.50	4.50	2012/04	1,981.99	1,135.55	3.25
2002/05	796.40	1,266.06	4.25	2007/05	1,700.91	927.91	4.50	2012/05	1,843.47	1,154.27	3.25
2002/06	742.70	1,223.47	4.25	2007/06	1,743.60	928.32	4.50	2012/06	1,854.01	1,165.51	3.25
2002/07	718.00	1,185.12	4.25	2007/07	1,933.27	918.85	4.75	2012/07	1,881.99	1,143.36	3.00
2002/08	736.40	1,196.37	4.25	2007/08	1,873.24	933.80	5.00	2012/08	1,905.12	1,131.69	3.00
2002/09	646.40	1,208.50	4.25	2007/09	1,946.48	932.41	5.00	2012/09	1,996.21	1,124.78	3.00
2002/10	658.90	1,241.13	4.25	2007/10	2,064.85	915.86	5.00	2012/10	1,912.06	1,106.93	2.75
2002/11	724.80	1,211.91	4.25	2007/11	1,906.00	916.98	5.00	2012/11	1,932.90	1,087.52	2.75
2002/12	627.60	1,208.91	4.25	2007/12	1,897.13	930.24	5.00	2012/12	1,997.05	1,076.97	2.75
2003/01	591.90	1,179.27	4.25	2008/01	1,624.68	942.39	5.00	2013/01	1,961.94	1,065.35	2.75
2003/02	575.40	1,191.19	4.25	2008/02	1,711.62	944.69	5.00	2013/02	2,026.49	1,086.68	2.75
2003/03	535.70	1,232.40	4.25	2008/03	1,703.99	979.86	5.00	2013/03	2,004.89	1,102.20	2.75
2003/04	599.40	1,232.82	4.25	2008/04	1,825.47	986.66	5.00	2013/04	1,963.95	1,121.83	2.75
2003/05	633.40	1,199.78	4.00	2008/05	1,852.02	1,036.73	5.00	2013/05	2,001.05	1,110.67	2.50
2003/06	669.90	1,194.02	4.00	2008/06	1,674.92	1,029.27	5.00	2013/06	1,863.32	1,135.21	2.50
2003/07	713.50	1,181.59	3.75	2008/07	1,594.67	1,019.12	5.00	2013/07	1,914.03	1,127.23	2.50
2003/08	759.50	1,178.42	3.75	2008/08	1,474.24	1,041.54	5.25	2013/08	1,926.36	1,116.98	2.50
2003/09	697.50	1,166.17	3.75	2008/09	1,448.06	1,130.40	5.25	2013/09	1,996.96	1,087.35	2.50
2003/10	782.40	1,166.27	3.75	2008/10	1,113.06	1,326.92	4.25	2013/10	2,030.09	1,066.80	2.50
2003/11	796.20	1,184.87	3.75	2008/11	1,076.07	1,390.09	4.00	2013/11	2,044.87	1,062.82	2.50
2003/12	810.70	1,192.95	3.75	2008/12	1,124.47	1,373.84	3.00	2013/12	2,011.34	1,056.67	2.50
2004/01	848.50	1,184.32	3.75	2009/01	1,162.11	1,346.10	2.50	2014/01	1,941.15	1,064.75	2.50
2004/02	883.40	1,166.69	3.75	2009/02	1,063.03	1,429.46	2.00	2014/02	1,979.99	1,071.30	2.50
2004/03	880.50	1,166.34	3.75	2009/03	1,206.26	1,461.98	2.00	2014/03	1,985.61	1,070.89	2.50
2004/04	862.80	1,150.85	3.75	2009/04	1,369.40	1,341.90	2.00	2014/04	1,961.79	1,044.55	2.50