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EXCHANGE RATE EFFECTS AND FOREIGN DIRECT INVESTMENT INFLOW

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Summary

Foreign Direct Investment is probably the most beneficial financial vehicle for resource rich developing countries comparing to portfolio investment due to its qualitative values, such as transfer of new technology, management skills and human resource capabilities.

Therefore, low income, developing countries are always trying to attract more inflow of FDI. As there are numerous studies on the decision making criteria of MNEs, from the perspective of home and host countries; the goal of this paper is to understand the exchange rate effects on FDI.

According to the Law of One Price, local currency depreciation will encourage foreign investors as the price of assets will become cheaper to investors (Froot and Stein (1991)). As for volatility of exchange rates, the study results were mixed due to different treatment method of volatility and firm level objectives. In this thesis paper, I followed the Kiyota and Urata (2004) study extensively, whether the above stated views would be hold for resource rich developing countries and Mongolia.

The new variable that I introduced in the model was Commodities price, in order to see if there's a correlation with FDI and can commodities price trend influence the decision making of foreign investors.

The proposed hypothesis in this paper are:

1. The local currency depreciation encourages the FDI.
2. High volatility of exchange rate discourages the FDI.

3. Increases on commodity price encourages the FDI for resource rich countries.

As for empirical study of resource rich developing countries, 9 countries from the IMF classification were chosen in terms of available number of observations, lower standard deviation in annual GDP growth and same number of countries from one region, covering data from 1998 to 2013. Due to inadequacy of obtaining more number of observations, the regression analysis suggests that coefficient estimations were statistically insignificant. Despite the statistical insignificance, the signs of coefficient estimation were in fact in accordance with the proposed hypothesis.

Empirical study for Mongolia covered the data from 2006 Q1 to 2014 Q4. The number of variables for commodities were expanded, including main export minerals of Mongolia: Coal, Gold, Oil and Iron Ore. The regression result for coefficient estimation was statistically significant for 2 out of 7 coefficients. The coefficient estimation for exchange rate and volatility were statistically significant and strongly correlated with dependent variable. Especially for exchange rate volatility showed a very strong correlation with the FDI, raising a concern over the cause-effect relationship. After omitting the variable, the second regression result was significant for coefficient estimations, exchange rate, and Gold Price respectively, confirming the proposed hypothesis.

In conclusion, the proposed hypothesis were confirmed for resource rich developing countries. However, the coefficient for commodities price index was higher than that of exchange rate and volatility. This indicates that, even if the resource rich developing countries' local currency were weak, but slightly volatile; creating an attractive condition for foreign investors, the last decision will be based on the trend of commodities price.

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CHAPTER 1. INTRODUCTION

Section 1. INTRODUCTION

Foreign Direct Investment (FDI) is the most beneficial financing source for developing countries, as it not only invests in monetary terms, but also the qualitative benefits, such as new technology, company know-hows, human resource capabilities, and management skills, offer greater value to developing economies. Comparing to the short and long term portfolio investment, FDI is more stable and resilient to economic development of the developing countries[1]. This is also true for foreign investors who are seeking growth prospects in the face of macroeconomic shocks and the risks of uncertainty in the home country. Starting from 1990s, there was a sudden surge in the FDI inflow into emerging markets with the political and economic reform in emerging countries and China's open trade. However, due to Global Financial Crisis, the investment inflow declined and lost its momentum. In 2009, the inflow retracted by USD 136.5 billion. Yet, according to the Institute of International Finance, the investment inflow is expected to increase by USD 1.2 trillion as of 2016. If that's the case, how will developing countries attract the Foreign Investors? Especially for resource rich developing countries, who are not only blessed with natural resource wealth, but also tragic weak local currencies; will this expected increase of inflow come to them?

In 2009, Mongolia had signed on the largest investment project for the Oyu-Tolgoi for the exploitation of copper and coal which has deposit of natural resources for more than 50 years. Commencing from this point, Mongolia had attracted many FDI projects in the last years. In 2011, 4 years ago, Mongolia had witnessed its record high FDI inflows and the prospect for future economic growth was naively positive. Businesses activities were expanding, foreign companies were opening their branches in Mongolia, household consumption was increasing and eventually, the economy was overheated due to sudden wealth. Despite the boom economy; the government had given wrong signals to foreign investors and domestic market, creating unstable business environment. Anytime the bubble

[1] Kazunobu, H., Fukunari, K., Hyun-Hoon, L. (2011)

was bound to burst and now, economic recession hit households hard. As of first quarter of 2015, the local currency – Mongolian Tugrik – depreciated by 35% in the last 4 years and GDP growth was -1.3% comparing to previous year's first quarter. As a consequence, all those positive outlooks and naïve hopes for achieving economic wealth, improving infrastructure, and ultimately, improving life standards were gone like a dust. As a result, FDI inflow plummeted by 70% comparing to that of 5 year prior performance. After lessons were learned in hard way, the new government has been focusing to re-attract foreign investors into Mongolia, in order to put back Mongolia in the global radar once again.

According to the Law of One Price, large Multinational Enterprises (MNEs) are willing to invest into cheaper countries, where labor and operation cost is significantly lower than their home countries. During the currency depreciation period, the prices of assets have become cheaper and as a consequence, the Foreign Direct Investment should have been increased, not to decrease. Therefore, I wonder the relationship between local currency depreciation and Foreign Direct investment inflow, or do they have cause – effect relation with each other? What are the important decision factors in the mining sector concentrated country? In order to answer these questions, the aim of this paper is to understand the relationship between FDI and exchange rate in the context of resource rich developing countries and Mongolia case.

The structure of my research paper is as follows. In this Chapter 1, I will give brief outlook on the global FDI situation, the motivation for investment from the Multinational Enterprises and their decision criteria for investment. Then, in the section 3, I will discuss the advantages and disadvantages of receiving FDI from the host country perspective. Section 4 will give brief literature reviews on the relationship with effects of exchange rate and FDI. The section 5 will explain the benchmark model that is used in this research paper.

In Chapter 2, following the Kiyota and Urata (2004) paper, I will do empirical analysis on 9 resource rich developing countries. In Chapter 3, another empirical analysis will be done specifically for Mongolia case, including the brief outlook of the Mongolia's macroeconomic FDI situation. Conclusion will be given at the end in Section 5.

Section 2. GLOBAL FDI INFLOW AND CORPORATE DECISION MAKING CRITERIA

The underlying thought for Global FDI had started off as a way of exploiting the core capabilities that gained in home country by investing into foreign countries in order to increase the scale of economies, to internationalize the company's activities, to get privileged access to market by having the first-mover advantage, to solidify the ownership of proprietary rights, and to get advantage position in threat of more pronounced foreign companies. From this underlying thought, the internationalization theory developed and now it has expanded to the OLI framework. OLI framework was introduced by Dunning (1993) [2] and discusses the MNEs motivation for FDI in terms of advantages of Ownership, Location and Internationalization.

However, investing into developing countries brings many uncertainties to the MNEs, caused by unstable and volatile macroeconomic outlook, in-sufficient infrastructure, corruption, intellectual proprietary rights and personal security. Despite these complications, MNEs are willing to invest into these developing countries. According to the report of Capital Markets Consultant Group, the working group under the IMF[3], the motivation for MNEs to invest are as follows:

- Domestic demand market. In the emerging market countries, there are vast consumer base of hundreds of million people whose consumption choice are changing quickly and requiring new products to meet their needs. MNEs who seek for increases in volume and efficiency in production will foresee the lower profit margins in trade of increases in unit sales. In fact, for countries like China and India, major MNEs enter for growth prospects, by educating its potential customer base and creating new market. As for export seeking MNEs, they look for the natural resource availability in developing countries.
- Long time horizon of FDI is beneficial for stabilizing the macroeconomic shocks and uncertainty. Most of the foreign investors look for long run profitability of FDI and are

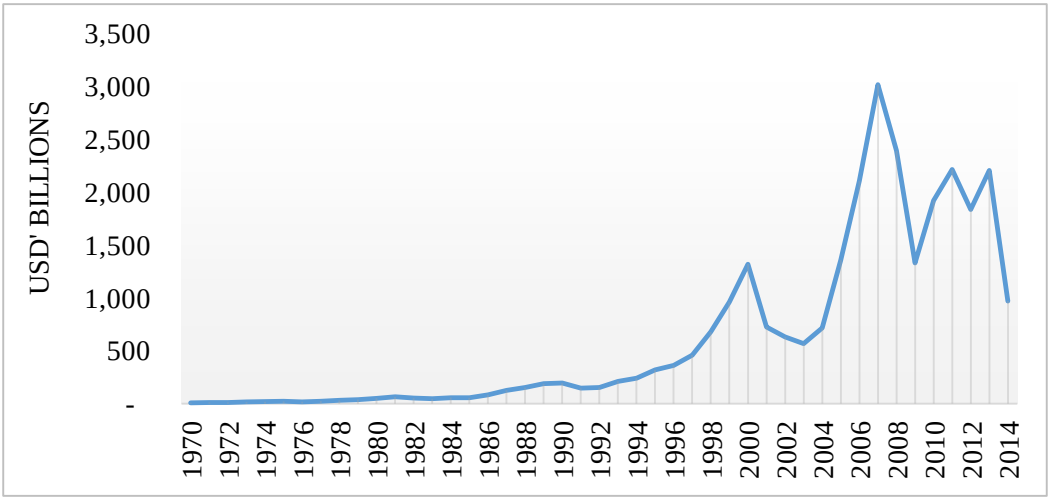
[2] https://en.wikipedia.org/wiki/Eclectic_paradigm
[3] https://www.imf.org/external/np/cmcg/2003/eng/091803.pdf

prepared to accept the expected risk as once the investment is made.

Then how would these MNEs choose which country to invest into? What are the criteria they look at? From the survey of CMCG, companies had reported that they look for open and potential market access, free trade agreements, and availability of skilled labors, infrastructure conditions, and stability of the tax system.

Within the framework of motivation and criteria, the global capital inflows intensified after 1990s, increasing by average growth of 21% until 2008 Global Financial Crisis.

Graph 1: World FDI inflow, from 1970 - 2014



As of 2014, total of USD 28 trillion FDI had been financed into worldwide and of this, USD 6 trillion was injected into Low and Middle income countries.

Section 3. FDI INFLOW ADVANTAGES AND DISADVANTAGES FOR DEVELOPING COUNTRIES

Then what are the advantages for receiving FDI for developing countries? When we look at the global capital inflows (Appendix -1) to the emerging market countries during the last 4 years, the annual changes of capital inflows were relatively stable. According to the Institute of International Finance, the capital inflows are expected to increase by 15%, USD 1.2 trillion[4] in 2016.

The common belief for FDI inflows for developing countries is that the most beneficial financing

[4] https://www.iif.com/about

vehicle is through attracting FDI. Comparing to portfolio investments, FDI is more resilient to macroeconomic development and because of its high initial investment, especially for resource – rich countries, whose investment projects are usually large in size, foreign investors are more committed to their investment than the portfolio investment. As for developing countries, who don't have stable economic production, the foreign investors' resiliency towards macroeconomic shocks provides sustainable source of financing for accumulation of capital, wealth and acceleration towards faster economic development.

However, from above graph, we can see that during 2001 Dot-Com bubble crisis and the 2008 Global Financial Crisis, the worldwide FDI inflow had declined by USD 750 billion and USD 1.7 trillion respectively. As for low and middle income countries, the Dot-Com bubble crisis hadn't affected the inflow, in fact during those period, the FDI inflow to developing countries increased by USD 16 billion. Yet, the FDI inflow level dropped by more than USD 136 billion during the 2008 Global Financial Crisis. Thus, from the above analysis, we can conclude that the FDI resiliency toward macroeconomics shock could be mixed, depending on the size of financial crisis. According to the IMF report[5], there are 3 major benefits to host country for receiving FDI inflow:

1. Transfer of technology: Developing countries are not only looking for capital investments, but also they are looking for sustainable investment that could benefit in their economic production in the long run even after the maturity of investment. Comparing to portfolio investment, FDI provides an opportunity for developing countries to learn from the new technology and to participate in the research and designs. In addition, having a strong competitor in the domestic market will help the competition, requiring domestic companies to decrease their monopolistic prices and to have more efficient cost structure, making the overall market to be productive.
2. Human resource development: Through the Joint Venture or Mergers and Acquisitions, the investor company will create jobs, employing the locals and training them. Through the employment period, employees gain important training in terms of management skills, organization culture, corporate governance, and transparency of financial disclosures. Through

[5] http://www.imf.org/external/pubs/ft/fandd/2001/06/loungani.htm

the differentiated strategy and marketing, it will also help the other domestic companies to employ same level of organizational capabilities in order to compete. In monetary terms, the FDI will increase the wage level in order to attract the best talents, incentivizing the competition of domestic labor market.

3. Tax contribution: Probably the most direct and fastest benefit of FDI is the increases in the country's tax revenues. However, sometimes in order to attract FDI, some developing countries will give tax incentives for foreign companies in exchange of above mentioned values.

Ultimately, through different channels, FDI will support the economic development of developing countries.

But of course, there are related costs to all these benefits. According to the Selma (2013), the possible dis-advantages of having high inflow of FDI are:

1. Effects on employment: In contrast to new job creation; due to entry of strong foreign competitor in the domestic market, existing jobs in domestic companies may be offset the created new jobs.
2. Disruption of Market Competition: Subsidiaries of large Foreign companies may have greater bargaining power in getting information, drawing funds and subsidizing costs in relative to domestic companies, in order to monopolize the and disrupt the market structure.
3. Leverage: Sometimes, FDI can borrow from the domestic market in the further domestic investments, with high leverage. It may seem like the investment is financed by FDI, but the size of investment may be reduced by the domestic borrowing.
4. Effects on Balance of Payments: In order to pay back to its parent company, high earnings outflow may imbalance the balance of payments. Also, foreign companies' subsidiaries tend to import from broad, increasing the debt on the current account and disrupting the balance of payment.

Other than general concerns over the high inflow of FDI and dependency in foreign capital investments, another issue for resource rich developing countries is the Dutch Disease. Dutch Disease is a

phenomenon happened to Netherlands in 1970s. In 1959, due to the sudden wealth accumulation from the large gas deposits.[6] From the experiences of Netherlands,

1. Wealth mismanagement: Due to high inflow of foreign currency from the increases on revenue of mineral exports, if the money is not converted into local currency and is spent in imports, the domestic goods production lose the competitiveness.
2. Weakening real exchange rate of local currency: However, if the money is converted to local currency and is spent on non-traded goods, such as construction and services, then pushes up the domestic goods prices and makes the real exchange currency to appreciate and lowers the purchasing power of local currency. [7,8]

Ultimately, because of sudden wealth from natural resources, the country is losing its competitiveness in domestic market, increasing consumption, along with the increasing un-employment rate and eventually, FDI inflows cease, leaving the country in a curse of natural resources.

In conclusion; for resource rich developing countries, after attracting the high inflow of FDI, the real struggle is the appropriate application of sudden wealth management.

Section 4. LITERATURE REVIEWS

There are several literatures in examining the effect of exchange rate on FDI in terms of its level and volatility. From the basic macroeconomics lesson and Law of One Price, we know that the goods price will be same in any location. The devaluation of host country currency would attract Foreign Investors, as it will reduce the cost of production and prices of asset. However, as for the exchange rate volatility, literature reviews were mixed, due to different treatment methods in volatility calculation and industry characteristics.

The two most cited studies in order to analyze the relationship between exchange rate level and foreign direct investment are Froot and Stein (1991) and Blonigen (1997). Froot and Stein (1991) paper suggests that there is a positive correlation with the foreign direct investment inflow into US

[6] https://en.wikipedia.org/wiki/Dutch_disease
[7] http://www.economist.com/blogs/economist-explains/2014/11/economist-explains-2
[8] http://www.imf.org/external/pubs/ft/fandd/basics/dutch.htm

and depreciation of USD, data covering the period of 1974-1986. In their breakdown analysis of individual industries, mining sector was not specifically taken into account and aggregated with other manufacturing sectors. As for Blonigen (1997), he proved a strong correlation with Japanese acquisition FDI into US and weaker dollar, data covering 1975-1992. Probably, the obvious link of these results is that both studies had been done in similar period in same country. According to the MacDermott (2008), devaluation of the host currency discourages foreign investors. His study looked at much broader context, as the model data included 55 countries' bilateral FDI inflow into OECD countries from 1980 to 1997.

As for the exchange rate volatility, there are no common view on the relationship with the FDI due to different calculation methods and industry characteristics. Chowdhury and Wheeler (2008) paper suggests that high volatility creates uncertainty over the business environment, holding off the MNEs decision for investment. Lin, Chen and Rau (2010) discuss the different reactions of MNEs toward volatility, in terms of MNEs objectives in financing into another country. Market seeking firms may delay their FDI activity over the exchange rate uncertainty, whereas the FDI activity is likely to increase because of motives of export-substituting firm.

The paper I followed for my research was Kiyota and Urata (2004) study, which looked at both effects, the exchange rate level and exchange rate volatility. Their study covered the FDI activity of Japan to developing countries from 1980 to 2000 and following 2 propositions were suggested:

1. Depreciation of the host country currency would attract more FDI as depreciation reduces the cost of production and prices of assets for foreign investors. Therefore, the expected coefficient of β_1 to be greater than 0 in the regression model.
2. High volatility of exchange rate increases the uncertainty regarding the future economic and business prospects of the host country. Thus, the coefficient of β_2 to be less than 0.

In addition to inclusion of both effects of exchange rate, Kiyota and Urata (2004) extensively examined the breakdown analysis for individual industries, manufacturing and non-manufacturing industries. In the manufacturing industry group, the primary metal and metal products were examined and the coefficient signs were in line with the hypothesis.

The limitations in the existing literatures were from the perspective given from the home (developed) countries, their bilateral FDI activities. Therefore, in the next chapters of this study, I will investigate from the perspective of host country, who tries to attract the FDI and feels the greater value not only in the monetary terms, but in the social benefit. My objective is to see whether the both theoretical results will hold for resource rich developing countries.

Section 5. BENCHMARK MODEL

This paper will follow the regression model of Kiyota and Urata (2004) with some modifications on the calculation of volatility and other explanatory variables.

$$\ln\left(\frac{FDI_t^i}{GDP_i^i}\right) = \beta_0 + \beta_1 * \ln\left(\frac{e_t^i P_t}{P_t^i}\right) + \beta_2 * VOL_i^i + \beta_3 * Trend_t^i + \beta_4 * \ln\left(\frac{W_i}{W_t^i}\right) + \beta_5 * \ln\left(\frac{CUMFDI_{t-1}^i}{GDP_{t-1}^i}\right) + \varepsilon_t^i$$

In the above model, the dependent variable on the left side is ratio of FDI of Japan to country i, relative to same year's GDP of country i.

The explanatory variables on the right side are:

- Real exchange rate of country i
- Volatility of exchange rate
- Time trend
- The wage rate of Japan relative to wage rate of country i
- Cumulative of FDI from Japan to country i from 1989 to year t-1, denominated by previous year's GDP of country i
- Error

As I stated above in the literature review, the mixed reviews on the volatility of exchange rates was because of its different treatment methods. Kiyota and Urata (2004) treated the volatility of exchange rate as described below:

$$VOL_i^i = \left| \text{var}\left(\frac{e_t^i P_t}{P_t^i}\right) - \hat{\text{var}}\left(\frac{e_t^i P_t}{P_t^i}\right) \right|$$

The real exchange volatility is the var ($e_t^i P_t/P_{t-1}^i$) and vaî ($e_t^i P_t/P_{t-1}^i$) is the volatility unexplained by the failures of law of one price. The real exchange rate volatility is calculated as 3 year standard deviation of local currency exchange rate against Japanese yen at year t, multiplied by price of Japan in year t and divided to the price of country i.

$$\text{var}\left(\frac{e_t^i P_t}{P_t^i}\right) = \alpha_0 + \alpha_1 \ln(Dist^i) + \alpha_2 \ln GDP_t^i GDP_t^j + \mu_t^i$$

This Gravity Equation model is to take account of border and distance effect on the exchange rate of volatility within host and home countries.

In my research, however, I included the FDI inflow data of 9 developing countries without any consideration of home countries, of which the FDI was collected from. Moreover, data availability was strictly limited for developing countries case. Therefore, I had to omit the any statistics of home country in the explanatory variables, such as wage rate of Japan, distance kilometers and GDP of Japan.

CHAPTER 2. RESOURCE RICH DEVELOPING COUNTRIES

Section 1. RESEARCH MODEL

With some modifications in the benchmark model of Kiyota and Urata (2004), my research model is illustrated below:

Equation (1) with GDP denominator:

$$\ln\left(\frac{FDI_t^i}{GDP_t^i}\right) = \beta_0 + \beta_1 * \ln\left(\frac{e_t^i P_t}{P_t^i}\right) + \beta_2 * VOL_t^i + \beta_3 * \ln\left(\frac{CUMFDI_{t-1}^i}{GDP_{t-1}^i}\right) + \beta_4 * \ln\left(Commodity\ Price\ Index_t\right) + \beta_5 * Trend_t^i + \varepsilon_t^i$$

The major explanatory variables are identical to the Benchmark model.

- $\ln\left(\frac{e_t^i P_t}{P_t^i}\right)$: Real exchange rate of country i against USD. As US dollar is the major currency, prices of US and prices of country i were taken.
- VOL_t^i: Volatility of exchange rates of country i
- Cumulative of net inflow of FDI country i from 1989 to year t-1, denominated by previous year's GDP pf country i
- $\ln\left(Changes\ of\ Commodity\ Price\ Index_t\right)$: The newly included variable is the global commodity metal price index, under the assumption that FDI activities to the resource rich countries may be affected by the commodity price performance. In line with left side dependent variable, the annual changes of price indexes were used, instead of notional value.
- Time trend

Unlike the volatility treatment that was given in the paper, I treated the volatility of resource rich

$$VOL_t^i = \sqrt{\frac{1}{36}\left[\sum_{j=1}^{1}\left(\ln\left(\frac{Real\ Exch\ Rate_t^i}{Real\ Exch\ Rate_{t-1}^i}\right) - \mu^{i,j}\right)^2\right]}$$

developing countries as a 3 year standard deviation. The natural logarithm was taken on the monthly changes of the real exchange rates and extracted by $\mu^{i,j}$ of 36 month performance in country i.

The reason for denominating GDP for FDI and Cumulative FDI in Kiyota and Urata (2004) paper was to examine the FDI effect of Japan in the host country production. However, as I'm generalizing from the host country perspective, variables are not needed to be denominated by GDP. Therefore, the second model is as follows:

Equation (2) with GDP denominator:

$$\ln\left(RealFDI_t^i\right) = \beta_0 + \beta_1 * \ln\left(\frac{e_t^i P_t}{P_t^i}\right) + \beta_2 * VOL_t^i + \beta_3 * \ln\left(RealCUMFDI_{t-1}^i\right) + \beta_4 * \ln\left(Commodity\ Price\ Index_t\right) + \beta_5 * Trend_t^i + \varepsilon_t^i$$

Some changes need to be adjusted in the Equation (2) variables:

- $\ln\left(RealFDI_t^i\right)$: Real FDI was taken as FDI current denominated by the GDP deflator of country i at year t.
- $\ln\left(RealCUMFDI_{t-1}^i\right)$: Cumulative of net inflow of FDI country i from 1989 to year t-1, denominated by previous year's GDP deflator of country i
- $\ln\left(Commodity\ Price\ Index_t\right)$: Unlike the Equation (1), as the dependent variable is not denominated value now, the price indexes are taken into equation at log value of prices, not as annual price changes.

The Hypothesis proposition on model:

In addition to proposed hypothesis in Kiyota and Urata (2004), the hypothesis for Commodities Price is established:

1. Depreciation of the host country currency would attract more FDI as depreciation reduces the cost of production and prices of assets for foreign investors. Therefore, the expected coefficient of β_1 to be greater than 0 in the regression model.
2. High volatility of exchange rate increases the uncertainty regarding the future economic and business prospects of the host country. Thus, the coefficient of β_2 to be less than 0.
3. Increases on commodity price encourages the FDI for resource rich countries. The coefficient sign for commodities, β_4 to be greater than 0.

Section 2. DATA

There were 29 countries in the Report of IMF Macroeconomic Policy Frameworks[9] for resource-rich developing countries, which are classified as low and lower income country by World Bank. From these countries, in order to have same number of countries from every continent, I picked 4 countries from Africa – Nigeria, Zambia, Mauritania and Liberia; 4 countries from Asia – Indonesia, Vietnam, Papua New Guinea and Mongolia; and 1 country from South America – Bolivia. Countries were chosen in terms of available number of observations, previous history of FDI inflow and lower standard deviation in the economic growth rate.

In order to see the relationship with FDI inflow, let's look at the exchange rate system of these countries.

- Nigeria: Nigeria's currency, Naira, sets by the Central Bank of Nigeria while the amount is auctioned in weekly basis in accordance with the monetary aggregate target. As of 2014, 1USD = 182.73 Naira with volatility of 0.0147.
- Zambia: Kwacha, Zambian local currency, has a floating exchange rate system. As of 2014, 1USD = 6,347.83 kwacha with volatility of 0.0265.
- Mauritania: Ouiguya, Mauritanian local currency, has no explicitly stated nominal anchor, regulated by indicators of monetary policy. 1USD = 289.1 with volatility of 0.0237.
- Liberia: Liberian Dollar follows the USD anchor. 1USD= 92.49 with volatility of 0.0127.
- Indonesia: Indonesian Rupiah, local currency of Indonesia, sets by the floating exchange rate system which follows the inflation targeting framework. 1USD =12,448.46 with volatility of 0.0195.
- Vietnam: Vietnamese Dong sets by the stabilized arrangement with USD rate anchor. 1USD = 21,359.56 with volatility of 0.0036.
- Papua New Guinea: Papua New Guinea Kina sets by floating exchange rate system, which follows the monetary aggregate target with volatility of 0.0244.

[9] http://www.imf.org/external/np/pp/eng/2012/082412.pdf

- Mongolia: Mongolian Tugrik sets by the floating exchange rate system. As the end of 2014, the exchange rate against USD was 1,878.45 with volatility of 0.0179.
- Bolivia: Boliviona, local currency of Bolivia, sets by the stabilized arrangement system that doesn't follow any exchange anchor rate but monitored by various indicators of monetary policy. 1USD = 6.89 with volatility of 0.0020.

The above information was taken from the IMF Annual Report on Exchange Rate Arrangements and Exchange Restrictions 2014. [10]

For developing countries, with high inflation and unstable macroeconomic environment, it is hard difficult to implement floating rate system, due to its sudden high fluctuations and strong depreciation against foreign exchanges. As we can see from above, only 4 of 9 countries follow floating rate system that follows the monetary policy target or economic indicators. In terms of volatility, the lowest volatilities were observed for Vietnam and Bolivia, which have a stabilized arrangement system with USD. It is quite obvious that, within the arrangement, the volatility of exchange rates, wouldn't be drastic comparing to countries who have floating exchange system, such as Papua New Guinea, Mongolia and Zambia. Zambia had the highest volatility of 0.0265. Even for historical average volatilities from year 2005, Zambia had the highest volatility of 0.0361 while Bolivia had the lowest volatility at 0.0048.

The World Bank data base usually starts from 1960 till present year. However, due to data in-sufficiency in some countries, the earliest period for data starts from 1998.

Table 1: Rules for choosing 9 countries in to data pool

Countries	GDP, current		FDI, current		GDP growth	
	USD' million	# of obs.	USD' million	# of obs.	Average	St. deviation
Nigeria	521,803	54	5,609	44	13%	0.280
Zambia	26,821	54	1,811	44	9%	0.182
Mauritania	4,158	54	1,126	44	8%	0.126
Liberia	1,951	54	700	44	6%	0.191
Indonesia	868,346	47	23,344	33	13%	0.177
Vietnam	171,390	29	8,900	44	14%	0.263
Papua New Guinea	15,413	54	18	44	9%	0.126
Mongolia	11,516	33	2,151	24	8%	0.234

[10] https://www.imf.org/external/pubs/nft/2014/areaers/ar2014.pdf

Bolivia	30,601	54	1,750	44	9%	0.127

Nominal FDI, nominal GDP and CPI (base year = 2010) were collected from the World Bank database.[11] Due to difficulty of finding appropriate data, some countries' nominal exchange rates couldn't be collected from the web page of Central Bank. Therefore, I used independent data portal site, called fxtop.com[12]. Nominal exchange rates were taken as average of daily movements in one month, instead of daily exchange rates. One limitation of using average daily exchange rates within one month is on the reflection of volatility. By taking average, the high fluctuation of daily exchange rates that observed within a month cannot be included in the model.

a. Equation (1) with GDP as denominator

Since my objective was to see if the theoretical results of Kiyota and Urata (2004) would hold for resource rich developing countries, I extended the model by including the IMF commodities price indexes of Metal price index and Fuel price index[13]. The major export minerals differed for each countries. For example; Crude petroleum, petroleum gas were the main export minerals for Nigeria, Vietnam and Bolivia while for remaining countries, the largest export mineral were Copper, Coal, Iron Ore and Gold. Thus, I decided to include both Metal price and Fuel price indices.

Table 2: Descriptive statistics for variables of Equation (1)

	N	Mean	St. Dev.	Minimum	Maximum
ln(FDI/GDP)	134	-3.088	1.314	-9.129	-0.094
ln(e*P/Pusd)	143	-6.035	2.995	-10.147	-0.691
VOL	144	0.048	0.091	0.002	0.596
ln(CUMFDI/GDP)	139	-1.648	1.268	-7.174	0.743
Metal Index	144	0.067	0.243	-0.414	0.497
Energy Index	144	0.108	0.329	-0.587	0.739
Trend	144	8.5	4.6	1.0	16.0

Table 3: Correlation matrix

[11] http://data.worldbank.org/indicator/NY.GDP.MKTP.CD
[12] http://fxtop.com/en/historical-exchange
[13] http://www.imf.org/external/np/res/commod/index.aspx

	ln(FDI/GDP)	ln(e*P/Pusd)	VOL	ln(CUMFDI/ GDP)	ln(Metal Index)	ln(Energy Index)	Trend
ln(FDI/GDP)	1.000						
ln(e*P/Pusd)	-0.088	1.000					
VOL	0.125	-0.029	1.000				
ln(CUMFDI/GDP)	**0.580**	0.200	-0.068	1.000			
ln(Metal Index)	-0.050	-0.004	-0.073	0.112	1.000		
ln(Energy Index)	-0.002	-0.008	0.015	0.080	**0.650**	1.000	
Trend	0.159	0.062	-0.411	0.421	0.000	-0.015	1.000

Obviously, the strongest positive correlation for dependent variable was observed with Cumulative FDI at 0.58, due to inclusion of same data. As for Kiyota and Urata (2004), this correlation was 0.747. However, the correlation between dependent variable and main explanatory variables were not strong. The exchange rate level was negatively correlated at -0.088 while volatility of exchange rates was positively correlated at 0.125.

As for commodity price indexes, both were strongly correlated with each other at 0.650, indicating a warning of possible collinearity in the estimation if both Metal and Fuel Price indexes were included. Therefore, considering the weaker correlation with the dependent variable comparing to Metal Index, Fuel price indexes should be omitted from the model.

b. Equation (2) without GDP as a denominator

In the table 4 and 5, the descriptive statistics and correlation matrix of equation 2 is given. The statistics for real FDI, Real_CUMFDI, Metal Index and Energy index increased in the size without GDP denomination and price changes. From the table 4, we can clearly see that correlation matrix has significantly improved for Real exchange rate. As local currency of country i, weakens against the dollar, the real FDI has increased.

Table 4: Descriptive statistics for variables of Equation (2)

	N	Mean	St. Dev.	Minimum	Maximum
ln(Real FDI)	134	20.569	1.925	12.628	23.710
ln(e*P/Pusd)	143	-6.035	2.995	-10.147	-0.691
VOL	144	0.048	0.091	0.002	0.596
ln(Real CUMFDI)	144	22.538	1.857	14.771	25.717
ln(Metal Index)	144	4.683	0.534	3.931	5.454

ln(Energy Index)	144	4.480	0.654	3.095	5.274
Trend	144	8.5	4.6	1.0	16.0

Table 5: Correlation matrix for variables of Equation (2)

	ln(Real FDI)	ln(e*P/Pusd)	VOL	ln(Real CUMFDI)	ln(Metal Index)	ln(Energy Index)	Trend
ln(Real FDI)	1.000						
ln(e*P/Pusd)	**-0.469**	1.000					
VOL	-0.114	-0.029	1.000				
ln(Real CUMFDI)	**0.785**	-0.277	-0.059	1.000			
ln(Metal Index)	0.266	0.061	-0.371	0.406	1.000		
ln(Energy Index)	0.277	0.058	-0.391	0.431	**0.952**	1.000	
Trend	0.286	0.062	-0.411	0.443	0.915	0.943	1.000

As for Real Cumulative FDI and Commodities indexes, correlation matrix result was similar to Equation (1). Energy Index should definitely be omitted from both equations in order to avoid the collinearity in the model estimation.

Section 3. RESULTS

The feasible generalized least square (FGLS) estimation method with heteroscedastic errors was used for analyzing the Panel Data. Table 6 represents the benchmark model test results for both equation (1) and equation (2).

Table 6
Regression result for 2 equations

	Equation 1	Equation 2
Multiple R-squared:	0.6496	0.8593
Adjusted R-squared:	0.5654	0.8263
F (25, 104) :	7.713	26.14
P value :	0.000	0.00

The adjusted R-squared for the model improved much better for equation (2) after omitting the GDP current in the denominator, confirming the high linear relationship between FDI and explanatory variables.

Table 7
Equation 1 Regression results: Dependent variable ln(FDI/GDP)

	Estimate	Std. Error	t Value	P value
ln(e*P/Pusd)	0.113	0.347	0.326	0.745
VOL	-1.431	1.600	-0.895	0.373
ln(CUMFDI/GDP)	0.701	0.140	5.024	0.000***
ln(Metal Index)	2.434	2.858	0.852	0.396
Trend	-0.108	0.040	-2.683	0.008**

, * denote statistical significance at 0.1% and 1% level respectively.

Only 1 out of 4 variables was statistically significant. The reason for statistical insignificance is quite likely to be resulted from data in-sufficiency, as the number of observations in my research was only 144 while more than 1,000 observations were included in Kiyota and Urata (2004).

However, the estimated coefficient signs were all met the expectation of hypothesis. The coefficient estimation for ln (e*P/Pusd) was positive, indicating that even if the local currency depreciated against USD, the FDI inflow was increasing. As for the coefficient for volatility, the negative sign indicates that when there's high volatility on exchange rates of local currency, the foreign investors were hesitant to invest in the country due to business uncertainty. The previous history of attracting the FDI was the only coefficient estimation that was statistically significant. This indicates that previous history of having a foreign investment may comfort potential investors in terms of safety. Especially for resource-rich developing countries, the previous history of FDI has a significant meaning because of huge sunk cost on the capital investment.

Even though it was statistically in-significant, the coefficient estimation for annual changes on Metal index were relatively higher than the other coefficients. This means that, the Metal price index has a stronger effect in attracting the FDI inflow. If there's a future expectation of price increase in metal commodities, the foreign investors would invest into the mining projects of resource rich countries.

Table 8
Equation 2 Regression results: Dependent variable ln(Real FDI)

	Estimate	Std. Error	t Value	P value
ln(e*P/Pusd)	0.246	0.469	0.524	0.602
VOL	-1.479	1.447	-1.022	0.309
ln(Real CUMFDI)	0.663	0.133	4.973	0.000***
ln(Metal Index)	0.714	1.182	0.602	0.547

Trend	-0.163	0.107	-1.526	0.130

*** denote statistical significance at 0.1% level.

As for the result of equation (2), despite the high correlation between Real exchange rate and Real FDI inflow, the coefficient estimation for the variable ln (e*P/Pusd) was statistically insignificant. The only statistically significant variable was again the previous history of foreign direct investment. However, the coefficient estimation signs were all in accordance with what we had expected. The interesting result of this equation (2) is that the coefficient estimation for ln (Metal Index) was at 0.714, reduced from the equation (1) coefficient of 2.434. This indicates that the annual changes of Metal Indexes are better indicator for the foreign investors to invest into the resource rich developing countries.

In conclusion to the model, even if the resource rich developing country's exchange rate is depreciating and volatility of exchanges rates is low, the final decision from the FDI will be based on the commodities' price changes in the global market. However, as I discussed extensively in the MNEs decision making criteria for financing into developing countries will be not only looking at commodities price, the open and potential market access, infrastructure condition, business environment and tax incentives. After having provided these conditions, then resource rich developing countries should be manage the accumulated wealth appropriately in order to avoid the loop of natural resource curse.

CHAPTER 3. MONGOLIA CASE

In this chapter, first I will give brief overview on the current macroeconomic situation of Mongolia and will discuss about its FDI situation and structure. Then, I will explain the relationship between effects of exchange rate on foreign direct investment in context of Mongolia.

Section 1. BRIEF VIEW ON MONGOLIA MACRO ECONOMY

Throughout the hundreds of centuries, our Mongolians have lived nomadic life, moving seasonally in order to seek the better grass and water environment for our main food source, the livestock. Even now, the agriculture contributes to 16.5% of GDP and we have 52 million livestock as of 2014. But in terms of economic development prospect, we are dependent on the Mining Sector growth. With 3 million population in a land of 1.5 million square, Mongolia is a land-locked country with neighbor countries of Russia and China. With its vast land, Mongolia is a host country of natural resource wealth. In 2009, Mongolia has signed on the largest investment project in its history for the establishment of Oyu-Tolgoi mine to exploit the copper and gold with Ivanhoe Mines and Rio –Tinto. From this starting point; Mongolia had been put on the global radar, getting recognized for its remarkable economic growth, investment opportunity, democratic system and favorable business environment. The prospects for the next five years, let alone for the next decade, was tremendously optimistic and embarrassingly naïve. International investors were getting interested in Mongolia, as world known companies and banks entered into Mongolian market. For example, during this period, world leading auditing firms, such as KPMG, Delloitte and PwC opened their branches, encouraging Mongolian companies for transparency and consistency of their financial statements in accordance with International Financial Reporting Standards. This had led Mongolian companies to have a foothold in international context, receiving credit rating and raising capital in the international stock exchange markets. Businesses activities were expanding, household purchasing power was improving and young professionals, like myself, were excited for contributing in the most favorable period of Mongolian contemporary history.

However, the dream bubble was burst in the next 4 years. Like any other resource rich developing country, the Dutch Disease curse[14] was placed in Mongolia. The Dutch Disease is a phenomenon for resource rich countries, where the country is becoming overly dependent on the exports of mining sector, while the other sectors growth is cannibalized. With the establishment of Erdenet Mining Corporation in 1978, the foothold of mining sector development was formed. Since then, mining sector contribution to GDP production has been stable comparing to the slow growth of non-mining sectors.

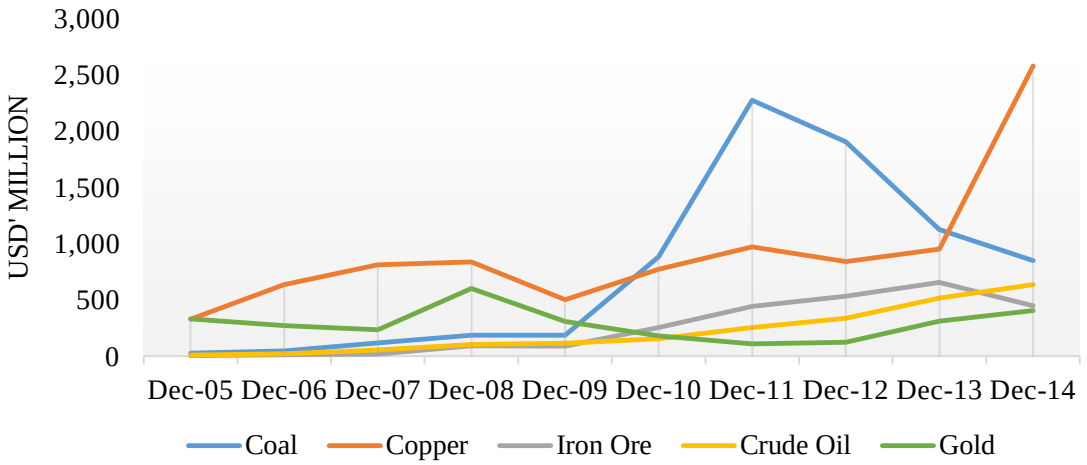
As the end of 2014, the GDP growth was 7.8%, [15]down by 5 percentage points from the last three years' average of 13.8%. In terms of economic sectors; mining, agriculture, service and transportation sectors were the main contributors to total economic growth as these sectors made up 4.9%, 1.7%, 1.6% and 1.2% of economic growth respectively. However, the wholesale and retail and construction sector were sluggish in 2014, due to decreasing power of household purchase. In overall, the non-mining economic sector growth is expected to be decreased even more as the 2012 expansionary policy of Central Bank is wearing off in 2015. Going forward, the economic dependency on mining sector will be more intensified.

The widening external trade deficit, which had stemmed from the price decreases in mineral products, had led the local currency to depreciate against major foreign currencies in 2012 and 2013.

Due to weak local currency, the purchasing power had declined and total imports fell by 16% comparing to previous year's same period. As a result, the external trade imbalance is being recovered as of 2014. As for mineral products composure in the total exports; the Copper export increased in 2014 by 171%, taking the first place from the Coal, which declined by 24%. This sudden increase in the Copper export was supported from the Oyu-Tolgoi sales, who started its commercial production with 1 year delay.

[14] https://en.wikipedia.org/wiki/Dutch_disease
[15]/wwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/03/24/000477144_20150324144540/Rendered/PDF/949970WP00PUBL0Update0December02014.pdf

Graph 2: Major Mineral Export, by products



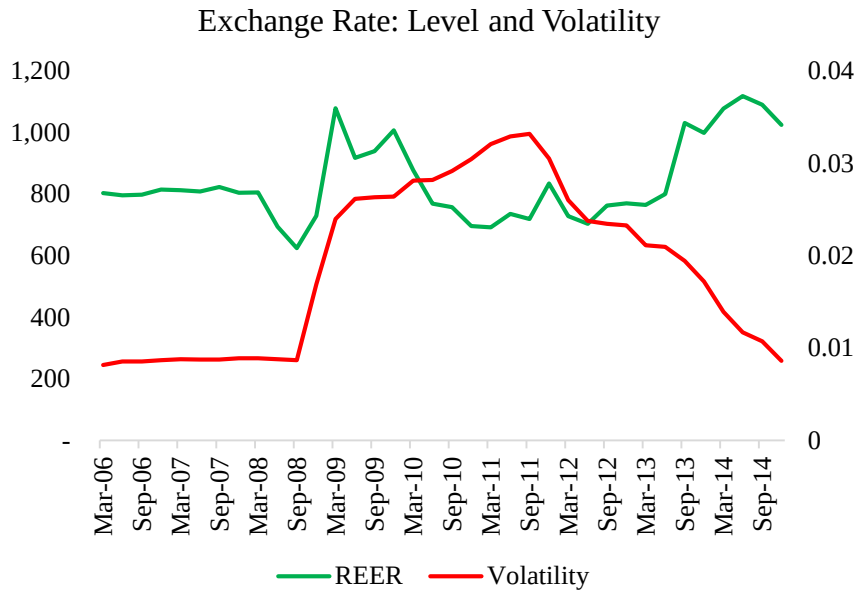
However, in terms of export to foreign countries; 84.1% of the exports go to China, leaving economy of Mongolia is entirely dependent on China's economy. As for imports; the two neighbor countries, Russia and China, are major importing countries with 30% and 34% of total imports respectively.

During this period, the national headline inflation rate had increased, reaching 14% in 2012. The demand driven inflation rate decreased in the last 2 years, thanks to the Central Bank's price stabilizing policies. However, as the end of 2014, the inflation was still accounted at 11% despite the efforts.

As the end of 2013, the total loan size was equal to 20% of the GDP. In this period, due to the Central Bank's expansionary policy, the reserve requirements for Banks were lower and monitoring for banks' activities was weak. Because of qualitative and quantitative factors in macro economy and Central Bank policy, the total loan quality deteriorated in 2014. Loans in arrears volume increased by 1.66 times, while non-performing loans size increased by 48%. As of 2014, the loan to deposit ratio is 130%. This indicates that the banking sector is facing a threat of liquidity run due to impending low confidence from public.

As for Mongolian local currency, Tugrik depreciated against USD by 35.3% (from 2011).

Graph 3: Exchange rate movement from 2006Q1 to 2014Q4



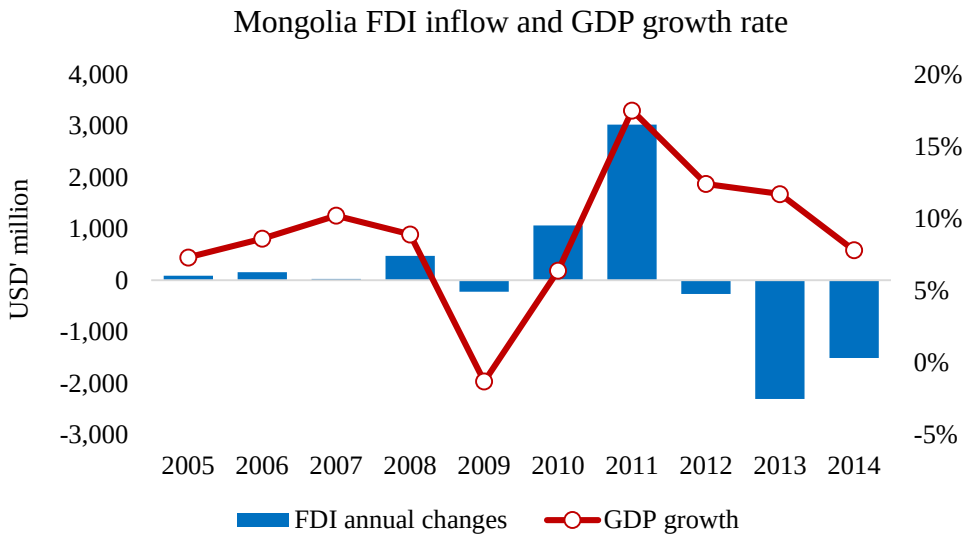
The foreign net reserves was accounted at USD 1.3 billion as the end of 2014, plummeted from the previous year by whopping 41.5%.

In 2012, the Development Bank of Mongolia had raised Chinggis Bond for USD 1.5 billion to inject into the financing of road infrastructures. But because of investing into non-income earning project, the loan payment has become the concern, unless the government of Mongolia will find new financing sources. The lack of foreign currency reserves, which is going to be needed in the next year for upcoming bond payment, is pressurizing the economy and expected to affect the foreign currency volatility negatively.

Section 2. FOREIGN DIRECT INVESTMENT INFLOW

Mongolia's FDI history started after the Democratic revolution of 1990 and its shift to Market Economy. As Mongolia became a member of various International Institutions, the financial irreversible aids and infrastructure projects started to pour in. As of 2000, a decade after the market reform, the gross FDI inflow had increased up to USD 181.4 million, growing 16 times than that of 1991.

Graph 4: Mongolia GDP growth rate and FDI inflow



During this period, 72.5% of FDI inflow had directed into the Mining Sector, while 17.8% went to retail and services[16]. Along with the mining sector development and its' positive outlook for going forward, there's a window of opportunity to invest into non-mining sectors.

However, in the last 4 years, the FDI had declined drastically from USD 4.7 billion in 2011 to USD 644 million. The tragic decline of FDI attributes to following reasons:

- *High dependency in mining sector development*: The attractiveness for foreign investors fallen down because of declining global coal price. In addition, conflicts of interest between Mongolia's government and MNEs on the key investment projects has been under a fire from foreign investors.[17]
- *Unfavorable investment environment*: In 2012, Mongolian government has imposed strict investment law, restricting the activities of foreign investors and giving power to the central government.

Along with decline in FDI, the number of companies invested by foreigners declined by 3 times in the last 3 years. In 2011, the number of foreign invested companies was 933. As the end of 2014, this figure fell to 335.

[16] http://investmongolia.gov.mn/?page_id=881
[17] http://nationalinterest.org/commentary/can-mongolia-keep-going-9811?page=2

In the threat of upcoming bond payment and financial market stress, the Government is now encouraging the foreign direct investments, by removing the strict clauses from the investment law and supporting the private sectors for favorable business environment.

Section 3. DATA

As high inflow of FDI recorded only 4 years ago in Mongolia, it was essential to examine the model on recent data considering its last 2 years performance, depreciation of local currency and observed fluctuation in the exchange rates. Therefore, in order to increase the number of observations, data are collected in quarterly basis, covering from 2006 Q1 to 2014 Q4. Quarterly data, such as net inflow of FDI, exchange rates and real exchange rate index, collected from website of Central Bank of Mongolia. As for GDP current, GDP deflator and CPI were collected from the database of National Statistics Office[18].

Volatility of exchange rate was treated in accordance with the previous Chapter 2, taking account of standard deviation of 3 years in monthly basis. In this case, instead of using average monthly exchange rate, the exchange rates at the end of month were used. Therefore, the explanatory power of volatility has improved comparing to that of Chapter 2. The monthly volatility of local currency against USD was actually high during the period of high FDI inflow. This view contradicts the theoretical result of Kiyota and Urata (2004), which says that high volatility increases the uncertainty over business environment and therefore, affects the FDI inflow negatively. (Graph 2)

The benchmark model is extended for Mongolia context, in terms of Commodity price index. In the equation (1) and (2), Metal and Fuel Price indexes were used. In order to test the previous section argument, of which the FDI inflow affected from declining Coal Prices, I wanted to include major export commodities in the both equations. Commodities are: Crude oil, Coal, Gold and Iron Ore. The data was obtained from the data portal site, Indexmundi[19]. I didn't include the Copper price data, as its economic importance was only seen in 2014 due to exploitation of Oyu-Tolgoi. Therefore, I thought

[18] http://1212.mn/en
[19] http://indexmundi.com/

that the inclusion of Copper Price would not give any significant result in relationship with the FDI inflow.

Table 9 presents the descriptive statistics for both equation (1) and equation (2) respectively. The number of observations in both equations were 36, from 1st quarter of 2006 to 4th quarter of 2014. Because of the GDP denomination, we can clearly see the difference in the data mean for dependent variable ln (FDI/GDP) and ln (RealFDI). Also, the statistics for commodities differ due to different treatment in equations.

Table 9: Descriptive statistics

		N	Mean	Std. Dev.	Minimum	Maximum
Equation 1	ln(FDI/GDP)	36	-1.965	0.923	-4.704	-0.613
	ln(e*P/Pusd)	36	-7.243	0.157	-7.516	-7.035
	VOL	36	0.019	0.009	0.008	0.033
	ln(CUMFDI/GDP)	36	0.403	1.090	-2.308	1.904
	Oil_price_changes	36	0.111	0.344	-0.539	0.929
	Coal_price_changes	36	0.130	0.477	-0.553	1.593
	Gold_price_changes	36	0.136	0.190	-0.275	0.479
	Iron_price_changes	36	0.200	0.402	-0.493	1.182
	Trend	36	18.500	10.536	1.000	36.000
Equation 2	ln(RealFDI)	36	19.373	1.007	16.477	20.882
	ln(e*P/Pusd)	36	-7.243	0.157	-7.516	-7.035
	VOL	36	0.019	0.009	0.008	0.033
	ln(RealCUMFDI)	36	21.871	1.359	18.333	23.356
	ln(Oil_price)	36	4.429	0.271	3.726	4.879
	ln(Coal_price)	36	4.489	0.313	3.921	5.143
	ln(Gold_price)	36	6.990	0.351	6.323	7.479
	ln(Iron_price)	36	4.432	0.571	3.510	5.177
	Trend	36	18.500	10.536	1.000	36.000

Appendix 2.a and 2.b present the correlation matrix for both equations. Other than the obvious correlation of cumulative FDI, the real exchange rate and the volatility have a strong and positive correlation with the dependent variable FDI in both equation models.

From the appendix 2.a and 2.b, we see there are high correlations among commodities prices. The correlation for Gold and Iron ore price was at high at 0.92, while correlation for Oil and Coal was 0.76. In the chapter 2, the Fuel Index was omitted from the model, due to its high correlation with the Metal Index and in avoidance of collinearity. However, in Mongolia case, I've included all mineral prices,

even if there were high correlations considering the usage of simple linear regression, unlike the complicated Panel Data analysis with fixed and time effects.

Section 4. ESTIMATION RESULT

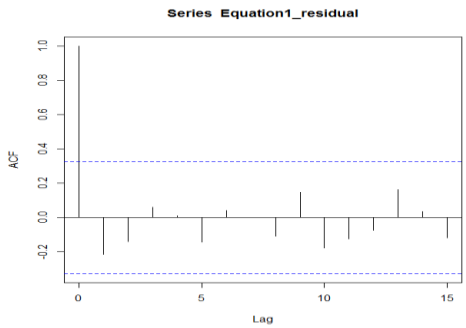
a. Under equation (1)

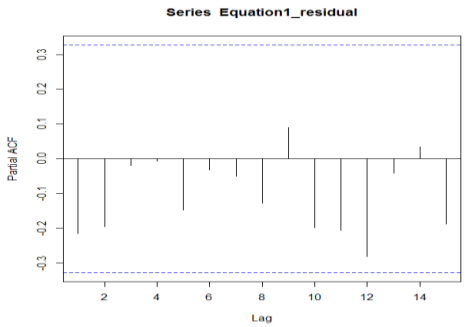
Unlike the Chapter 1, where model estimation method was Feasible Generalized Least Squares for Panel Data Analysis, simple linear regression method was used for estimating the coefficient.

Table 10
Regression results: Dependent variable ln(FDI/GDP)

	Estimate	Std. Error	t Value	P value
ln(e*P/Pusd)	4.817	1.843	2.614	0.014
VOL	60.982	25.198	2.420	0.023
ln(CUMFDI/GDP)	-0.720	0.367	-1.961	0.060
Oil_price_changes	0.607	0.553	1.098	0.282
Coal_price_changes	0.142	0.142	0.232	0.818
Gold_price_changes	-0.258	-0.258	-0.237	0.814
Iron_price_changes	-0.344	-0.344	-0.826	0.416
Trend	0.007	0.042	0.171	0.866

After running the regression diagnostics for regression model, the Null hypothesis for heteroscedasticity was rejected and confirmed that data was robust. However, the null hypothesis





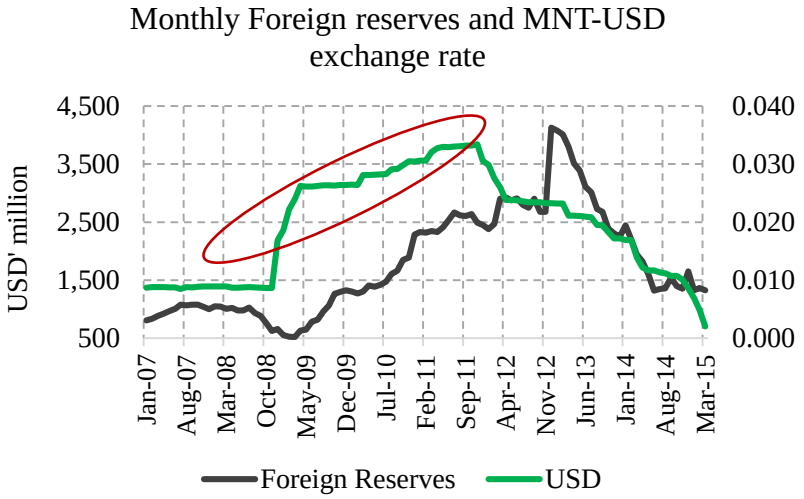
couldn't be rejected for the autocorrelation within variables (D-W statistics = 2.31). Yet, when we look at the autocorrelation and partial autocorrelation check for the regression residuals, no lags were observed.

Therefore, the t statistics are reliable for estimating coefficients.

Contrast to the Equation (1) result in the Chapter 2 – Section 3, coefficient estimation for real

exchange rate and volatility were statistically significant. However, interesting thing to observe was that while coefficient sign for real exchange rate was positive, as we have expected; the coefficient sign for volatility was positive, and surprisingly high at 60.9, indicating that high volatility of local currency attracts the foreign investors. But it's most likely from the cause-effect relationship that high inflow FDI triggered the strong activities in the small domestic market of Mongolia, and as a consequence, the exchange rate fluctuated vastly.

Graph 5: Monthly foreign reserves and exchange rate volatility against USD*



*Note: The higher fluctuation of the volatility (as circled by red lines) was due to Global financial crisis, not from the FDI inflow.

Due to high cause-effect relationship between volatility and FDI, another regression analysis was done after omitting the volatility from the equation (1).

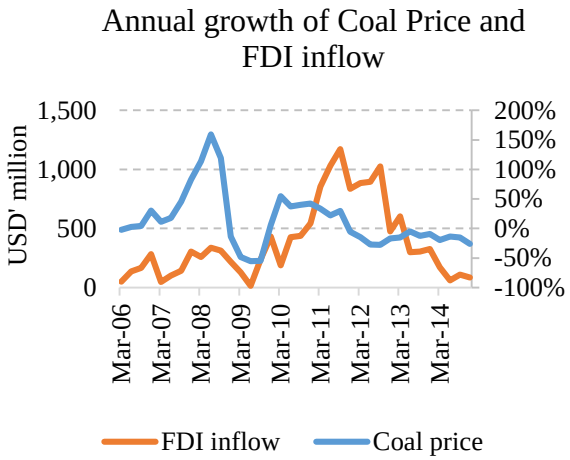
Table 11
Regression results: Dependent variable ln(FDI/GDP)

	Estimate	Std. Error	t Value	P value
ln(e*P/Pusd)	7.413	1.623	4.568	0.000
ln(CUMFDI/GDP)	-0.343	0.360	-0.953	0.348
Oil_price_changes	1.001	0.571	1.763	0.089
Coal_price_changes	-0.957	0.448	-2.135	0.042
Gold_price_changes	1.097	1.012	1.085	0.287
Iron_price_changes	0.248	0.366	0.677	0.504
Trend	-0.033	0.041	-0.795	0.433

The second result suggests that real exchange rate has a strong positive and statistically significant

effect on increases of FDI. The coefficient estimation for the remaining variables, such as previous history of FDI and annual changes of commodities price were statistically insignificant except for the Coal Price. Another interesting result was the negative sign of coefficient estimation for ln (CUMFDI/GDP). For developing countries, where economy is unstable and business environment is unfavorable, the level of safety is one of the most essential criteria for foreign investors. Therefore, we expect the coefficient sign to be positive all time. Due to small size observations, the coefficient estimation may be biased.

Graph 6: Coal Price movement and FDI Inflow



As for the commodities, except the annual changes of Coal price, the coefficient estimation for remaining commodities prices were in accordance with the proposed hypothesis, but insignificant. Annual changes of coal price has a negative but significant effect on FDI. This means that, for every 1 percent annual decline in Coal prices, the FDI will increase by 0.96 percentage points. However, this result contradicts with the common thought of declining global Coal Price has affected the inflow of FDI negatively, which I had listed for possible reasons for FDI plummet earlier in the section 2 of this chapter. Despite the continuous decline of coal price, foreign investors were willing to invest into Mongolia for other mineral products, diversifying the dependency on coal.

b. Under equation (2)

Table 14 presents the estimation results for coefficient estimation through regression analysis.

Table 12
Regression results: Dependent variable ln(Real FDI)

	Estimate	Std. Error	t Value	P value
ln(e*P/Pusd)	2.715	2.606	1.042	0.307
VOL	-57.034	47.792	-1.193	0.243

ln(Real CUMFDI)	-0.138	0.400	-0.346	0.732
ln(Oil_price)	-0.031	0.791	-0.039	0.969
ln(Coal_price)	-0.504	0.988	-0.510	0.614
ln(Gold_price)	4.186	1.584	0.014	0.014
ln(Iron_price)	0.955	0.961	0.993	0.330
Trend	-0.122	0.066	-1.846	0.076

Unlike our result of equation (1), the statistical significance for coefficient estimation was true for only one explanatory variable, the ln (Gold_Price). After omitting the volatility again, table 15 represents the second regression results. Only 1 out of 6 explanatory variables were significant, confirming that the coefficient of estimation for gold price has strong positive effect on FDI inflow.

Table 13
Regression results: Dependent variable ln(RealFDI)

	Estimate	Std. Error	t Value	P value
ln(e*P/Pusd)	3.758	2.473	1.520	0.140
ln(RealCUMFDI)	-0.208	0.399	-0.521	0.607
ln(Oil_price)	0.284	0.751	0.378	0.708
ln(Coal_price)	-0.234	0.969	-0.241	0.811
ln(Gold_price)	2.994	1.239	2.416	0.023
ln(Iron_price)	0.023	0.565	0.041	0.968
Trend	-0.079	0.056	-1.419	0.167

Despite its statistical insignificance, the coefficient sign for main explanatory variables, real exchange rate and volatility were in line with propositions. In addition, the coefficient sign for Oil, Gold and Iron were had met our expectation. As for coal price, the coefficient sign was negative, in contrast for our argument.

Section 5. CONCLUSION

Foreign Direct Investment is a beneficial source of finance for resource rich developing countries comparing to portfolio investment; as along with the FDI, developing countries gain the qualitative value of new technology, job creation, management skills, human resource capabilities and tax revenues.

Low income, developing countries are always trying to attract more inflow of FDI. As of 2016,

capital inflow is expected to be increased by USD1.2 trillion. How will developing countries get a share from upcoming investment inflow? And what are the criteria for foreign investors to invest into resource rich developing countries? What are the disadvantages of having high inflow of FDI in resource rich developing countries? As there are numerous studies on the decision making criteria of MNEs, in terms of firm-level and country-level characteristics; the goal of this paper was to see the exchange rate effects on FDI inflow. As a citizen of resource rich developing country and unstable macroeconomic environment, I'm always interested in the exchange rate movements due to its direct involvement in my daily life. The principle exchange currency in Mongolia is between USD and Mongolian local currency, Tugrik, and local currency depreciated against USD by 35% in the last 4 years. The average volatility in this 4 years was 1.84%. During this period, FDI had plummeted by 70% from that of 4 years value. Therefore, I wanted to understand the effect of exchange rate on inflow of FDI.

Many studies have examined the relationship, in terms of exchange rate, or only exchange rate volatility, or both exchange rate level and volatility. According to the Law of One Price, which any good will be sold at same price at any location, the asset price of host country (receiving end of FDI), whose local currency is depreciating, will become cheaper to investors of home country (Froot and Stein (1991)). As for volatility, the study results were mixed due to different treatment method of volatility and firm level objectives, such as export-substituting and market-seeking. In this thesis paper, I followed the Kiyota and Urata (2004) study extensively, whether the above stated views would be hold for resource rich developing countries and Mongolia.

In the Kiyota and Urata (2004) study, the industries were classified as manufacturing and non-manufacturing and under the manufacturing classification, mining sector was not specifically taken into account. Therefore, following the benchmark model that was used in study, empirical analysis was done for both resource rich developing countries and Mongolia case. The new variable that I introduced in the model was Commodities price, in order to see if there's a correlation with FDI and can commodities price trend influence the decision making of foreign investors.

The proposed hypothesis in this paper are:

4. The local currency depreciation encourages the FDI. ($\beta_1 > 0$)
5. High volatility of exchange rate may be considered as uncertainty, raising the concern for business risk and discourages the FDI. ($\beta_2 < 0$)
6. Increases on commodity price encourages the FDI for resource rich countries. ($\beta_4 > 0$)

As for empirical study of resource rich developing countries, I have chosen 9 countries from the IMF classification in terms of available number of observations, lower standard deviation in GDP annual growth and same number of countries from one region. The chosen countries are: Nigeria, Mauritania, Liberia, Zambia, Indonesia, Vietnam, Mongolia, Papua New Guinea and Bolivia. Number of observations in the Panel Data Analysis is 144, covering data from 1998 to 2013. Unfortunately, due to inadequacy of obtaining more number of observations, the regression analysis suggests that coefficient estimations were statistically insignificant, except for explanatory variable, which is determined as the previous history of FDI in country *i*. Foreign investors, who are financing high sunk cost in the developing countries, are concerned of their safety as developing countries tends to have unfavorable business environment. Therefore, the previous history of inward FDI in country i affects the foreign direct investment positively. Despite the statistical insignificance, the signs of coefficient estimation were in fact in accordance with the proposed hypothesis. The local currency depreciation has slight positive effect on FDI as the asset of prices gets cheaper and the high volatility negatively affects attracting FDI. As for commodities price, Metal Index had a stronger positive effect on FDI comparing to exchange rate and volatility, indicating that for resource rich countries, rather than local currency depreciation and volatility, the global commodities index is strong indicator for attracting the FDI.

Empirical study for Mongolia covered the data from 2006 Q1 to 2014 Q4, including total of 36 observations. Instead of using commodities price indexes that were used in empirical study of resource rich developing countries, I included the four main export minerals of Mongolia: Coal, Gold, Oil and Iron Ore. The regression result for coefficient estimation was statistically significant for 2 out of 7 coefficients. The coefficient estimation for main explanatory variables, exchange rate and volatility, were statistically significant and strongly correlated with dependent variable. Especially for exchange

rate volatility showed a very strong correlation with the FDI, raising a concern over the cause-effect relationship. However, the exchange rate volatility had a very strong effect on FDI, raising a concern over the cause-effect relationship. Therefore, after omitting the volatility from the equation (1) and equation (2), statistically significant result achieved for exchange rate and Coal price, and Gold price respectively. The depreciation of Mongolian currency, Tugrik, has a strong positive effect on FDI as the cost of capital investment got cheaper for investors. As for commodities price changes, Coal Price had a negative effect on FDI, contradicting with the common thought of declining global Coal Price has affected the inflow of FDI negatively. However, the effect was smaller than that of real exchange rate. As for Gold price, the coefficient estimation has a strong positive and statistically significant effect as same as Exchange rate on the inflow of FDI.

However, in Mongolia case, the null hypothesis for second proposition, which the high volatility would discourage FDI inflow, couldn't be rejected. Despite the statistical significance for coefficient estimation, the coefficient effect on FDI was too large, as if FDI inflow had increased due to high volatility of exchange rate. But this argument could be possible, considering the foreign investors' risk tolerance for 1.8% volatility and high policy rate from Central Bank of Mongolia. Another possible argument is along with the monthly foreign reserves activity, when there was a high fluctuation in the volumes, the volatility of exchange rates may be resulted from these active period, triggered by the FDI inflow. During this period, economic activities of businesses were high, requiring the companies to trade actively in the foreign currency exchange.

In conclusion, the proposed hypothesis were confirmed for Mongolia context, except for the exchange rate volatility. However, the coefficient for commodities price index was higher than that of exchange rate and volatility. This indicates that, even if the Mongolia's local currency was weak, and volatile; creating an attractive condition for foreign investors, the last decision will be based on the trend of commodities price. Even if the last decision was made from the investors, the appropriate wealth management is required from the resource rich developing countries in order to avoid the natural resource curse.

REFERENCES

[1] Baltagi, B.H., "Panel Data Methods", Handbook of Applied Economics Statistics. Available at: ftp://ftp.zew.de/pub/zew-docs/sws/baltagi.pdf

[2] Blonigen A. (1997). "Firm Specific Assets and Link between Exchange rates and Foreign direct investment". The American Economic Review, June 1997, Vol. 87, No.3: 447 - 465.

[3] Chowdhury, R., Wheeler, M. (2008). "Does Real Exchange Rate Volatility Affect Foreign Direct Investment? Evidence from Four Developed Countries". The International Trade Journal, Vol.22, No.2, April-June 2008

[4] Central Bank of Mongolia. http://www.mongolbank.mn/

[5] Exchange rates. http://fxtop.com/en/historical-exchange-rates.php

[6] Froot, K.A., Stein J.C., (1991). "Exchange rates and Foreign Direct Investment: An Imperfect Capital Markets Approach", The Quarterly Journal of Economics 106 (4): 1191-1217.

[7] International Monetary Fund, (Aug 2012), "Macroeconomic Policy Frameworks for Resource-Rich Developing countries". Available at: http://www.imf.org/external/np/pp/eng/2012/082412.pdf

[8] International Monetary Fund, (May 2014), "Exchange Rate Volatility and Trade Flows – Some new Evidence". P.26 – 36, Available at: https://www.imf.org/external/np/res/exrate/2004/eng/051904.pdf

[9] IMF commodity prices. http://www.imf.org/external/np/res/commod/index.aspx

[10] John, F., Weisberg, S. (2010), "Time-Series Regression and Generalized Least Squares in R", An Appendix to An R Companion to Applied Regression, Second Edition. Available at: http://socserv.socsci.mcmaster.ca/jfox/Books/Companion/appendix/Appendix-Timeseries-Regression.pdf

[11] Kazunobu H., Fukunari K., Hyun-Hoon L. (2011), "How Does Country Risk Matter for Foreign Direct Investment", Institute of Developing Economies Discussion Paper, No.281.

[12] Kiyota, K., Urata, S. (2004), "Exchange Rate, Exchange Rate Volatility and Foreign Direct Investment", World Economy, 27: 1501–1536.

[13] Lin, C., Chen, K., Rau, H. (2010). "Exchange rate volatility, and the timing of Foreign Direct Investment: Market seeking versus Export Substituting" Review of Development Economics, Vol.14, No.3: 466-486.

[14] MacDermott, R. (2008). "Linking exchange rates to Foreign Direct Investment". The International Trade Journal, Vol. 22, No.1.

[15] National Statistics office of Mongolia. http://1212.mn/

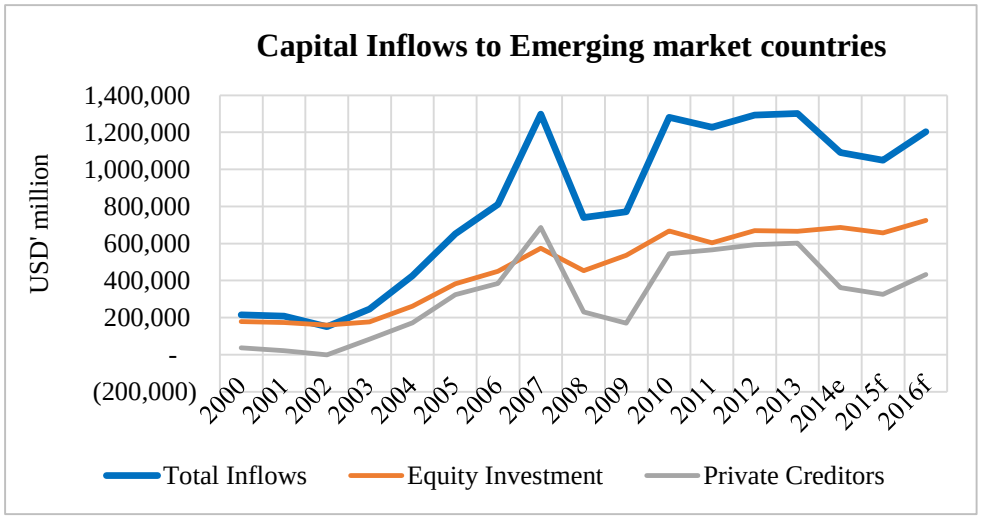
[16] Selma, K.K., (2013), "The effects of foreign direct investments to for Host Country's economy", European Journal of Interdisciplinary Studies, Vol. 5, Issue 1, p. 26- 38

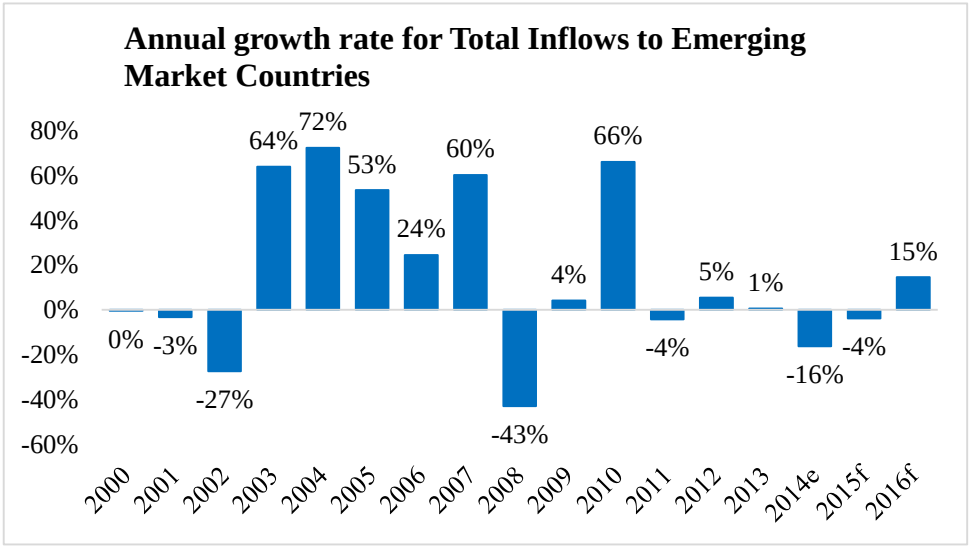
[17] Word Bank database. http://data.worldbank.org/

[18] World Bank quarterly report of Mongolia, (Dec 2014)

APPENDIX

1. Graphs for Global capital inflows to emerging markets.





Appendix 2.a: Correlation matrix for Equation 1 variables for Mongolia case

	ln(FDI/GDP)	ln(e*P/Pusd)	VOL	ln(CUMFDI/GDP)	Oil_price_changes	Coal_price_changes	Gold_price_changes	Iron_price_changes	Trend
ln(FDI/GDP)	1.000								
ln(e*P/Pusd)	0.528	1.000							
VOL	0.575	0.507	1.000						
ln(CUMFDI/GDP)	0.214	0.839	0.488	1.000					
Oil_price_changes	0.368	0.018	-0.009	-0.216	1.000				
Coal_price_changes	0.215	-0.044	-0.259	-0.356	0.765	1.000			
Gold_price_changes	0.233	-0.390	0.047	-0.624	0.588	0.562	1.000		
Iron_price_changes	0.134	-0.212	0.174	-0.340	0.387	0.547	0.491	1.000	
Trend	0.193	0.827	0.369	0.950	-0.229	-0.396	-0.667	-0.454	1.000

Appendix 2.b: Correlation matrix for Equation 2 variables for Mongolia case

	ln(Real FDI)	ln(e*P/Pusd)	VOL	ln(Real CUMFDI)	ln(Oil_price)	ln(Coal_price)	ln(Gold_price)	ln(Iron_price)	Trend
ln(RealFDI)	1.000								
ln(e*P/Pusd)	0.613	1.000							
VOL	0.557	0.507	1.000						
ln(RealCUMFDI)	0.394	0.872	0.491	1.000					
ln(Oil_price)	0.518	0.706	0.219	0.544	1.000				
ln(Coal_price)	0.646	0.676	0.473	0.433	0.676	1.000			
ln(Gold_price)	0.637	0.907	0.714	0.899	0.635	0.580	1.000		
ln(Iron_price)	0.619	0.843	0.831	0.811	0.542	0.621	0.923	1.000	
Trend	0.294	0.827	0.369	0.953	0.527	0.264	0.843	0.742	1.000