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DETERMINANTS OF MONGOLIAN ECONOMIC GROWTH

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Abstract: *Mongolia is the second largest landlocked country, which has unique economic condition. This paper aims to examine Mongolian economic growth from 2000 until 2016 and identify its determinants. The growth was studied based on the growth rate of National Domestic Product. Initially, 20 macroeconomic variables are chosen and tested for the economic growth determinators such as; unemployment rate, human capital index, import growth, inflation rate, export growth, and interest rate, etc. The results showed that the growth rate of dollar exchange, inflation rate, and the growth rate of export were the main factors (81.4%). Mongolian GDP per capita and poverty rate were compared with other Asian lower-middle-economies, which are classified in the same classification as Mongolia. An increment of average salary was adjusted by the inflation rate, which showed the purchasing power declined in 2015. Statistics of Central Bank of Mongolia, Central Intelligence Agency, World Bank's statistics, and the statistics from National Statistics Office of Mongolia are used for the research.*

Keywords: *Ndp (National Domestic Product),
Economic Growth, Export Growth Rate, Inflation Rate, Dollar Exchange Growth Rate
(JEL Classification: H0, H30, H6, H70)*

Introduction

Mongolia is a landlocked East Asian country which is bordered by the Russian Federation to the north and the People's Republic of China on the east, west, and south. Mongolia is the 18th largest country in the world by area, and second-largest landlocked country behind Kazakhstan, which has a land area of 1,566,600 square kilometers. Mining is the most important sector to Mongolian economy, which constituted 20.7 percent of the GDP, accounted for 69.2 percent of the country's gross industrial output in 2016, and 70.86 percent of its export revenue. Mongolian economy relies heavily on mineral extraction, particularly, copper, coal, and gold which constitute 32.7%, 19.8%, and 15.4% of 2016's export, respectively. Mongolian economy faced with an economic recession with regards to its dependency on the mining sector, from a double-digit economic growth. Mongolian economic condition is considered to being affected by two factors. First, more than 90 percent of Mongolian exports consistently goes to China; and so, any slowing of Chinese growth affects Mongolian economy. Second, economic policies designed to protect Mongolia's sovereign interests and to respond to the expectations of the Mongolian public which have discouraged FDI (Foreign Direct Investment) (Charles .Brown, 2014).

Tsembelsuren et al., (2012) noted "Mongolia has 20 billion tons of proven coal reserves, and total estimated resource is 150 billion tons, most of them are low-rank brown coal, but remains are undeveloped due to a lack of infrastructure". With extensive reserves of natural resources, Mongolian economy is potential

to increase its production, considerably.

There are plenty of research works on the economic growth. For example, Mazurek (2017) examined the economic growth of 32 European countries from 2005 to 2015. It is concluded that the growth was directly proportional to human and physical capital, and indirectly proportional to the initial level of GDP and the democracy index. Prochniak (2011) analyzed the economic growth determinants in the 10 Central and Eastern European (CEE) countries from 1993 until 2009. The most important economic growth determinants in the CEE countries were determined as investment rate, education level of the labor force, financial sector development, right fiscal stance, economic structure, low-interest rates and low inflation, population structure, and development of information technology. Cuaresma et al., (2009) investigated the determinants of regional economic growth based on a dataset of 255 European Union regions, from 1995 until 2005. Ramanayake and Lee (2015) argued that the export growth is the most robust, in addition to export specialization, while that traditional variables of trade openness and FDI are not robust. Zarra Nezhad et al., (2014) identified robust determinants of economic growth in Organization of Petroleum Exporting Countries (OPEC), which concluded that variety of trade policy measures were a robust and supported hypothesis of export-led growth. Maningi and Borda (2015) re-examined the issue of the determinants of economic growth in the countries of the Organisation of Eastern Caribbean States (OECS) in the

period 1980-2011. External debt, natural increase rate, and private consumption were found to negatively affect economic growth in the short-term, while in the long-term trade openness and foreign direct investment (FDI) positively impacted economic growth. Vedia-Jerez and Chasco (2015) developed an empirical study of long-run determinants of economic growth in South American countries from 1960 to 2008. Results suggested that the economic growth was driven the most strongly by physical and human capital accumulation, as well as by sectorial exports. Simionescu et al., (2017) conducted an empirical analysis on Czech Republic, Slovak Republic, Hungary, Poland, and Romania in the period of 2003-2016, which employed Bayesian generalized ridge regression. The primary results indicated that the FDI promoted economic growth in all countries, except the Slovak Republic. Sezer and Abasiz (2016) determined economic growth indicators in 34 OECD countries, which concluded that logistics and fixed capital investments were positive and statistically significant.

As for now, there are not many published pieces of research of Mongolian economic growth, except Tsembeluren et al., (2012) compared the ratio of coal market price with coal export price to China. Nixon et al., (1999) attempted to highlight the importance of administrative reform and economic development in Mongolia, 1990-1997.

The purpose of this paper is to reveal the determinants of Mongolian economic growth. The analysis covers the period of 16 years, from 2000 to 2016. Correlation and regression analysis are executed on SPSS statistical program.

The main hypotheses are:

- Export of mining products significantly, positively affects Mongolian economy.
- Foreign Direct Investment (FDI) significantly affects Mongolian economy growth.

The rest of this paper organized as follows: Section two provides the data and variables, and the methodology of this study. Section three consists of empirical results and discussion. Finally, conclusions are drawn in section four.

DATA, VARIABLES AND RESEARCH METHODOLOGY

National Domestic Product (NDP) is one of the key indicators of country's development. However, NDP per capita in level or growth terms have been criticised that they ignore quite some items, particularly the environmental endeavors (Mamingi & Borda, 2015). Despite its flaws, the annual growth rate of NDP is used as the measurement of economic performance.

Research has been carried out on data derived from four sources: World Bank, NSO (National Statistical Office), Mongol Bank's statistics (Central Bank of Mongolia) and Mongolian Statistical Information Service. From these databases, 20 variables are chosen as potential factors of Mongolian economic growth. To get a better understanding of Mongolian economy,

Table 1. Descriptive statistics of variables related with Mongolian economy

| Variables | | Minimum | Maximum | Mean | Std. Deviation |
|----------------------------------|-----|---------|---------|-------|----------------|
| Growth rate of NDP | Y | 0.53 | 48.04 | 20.63 | 12.83 |
| Domestic investment to NDP ratio | x1 | 6.94 | 21.83 | 14.68 | 4.14 |
| Foreign investment to NDP ratio | x2 | 6.92 | 49.32 | 17.52 | 11.82 |
| Government debt to NDP ratio | x3 | 8.19 | 61.23 | 36.98 | 16.69 |
| Export to NDP ratio | x4 | 35.96 | 51.41 | 44.39 | 4.62 |
| Import to NDP ratio | x5 | 32.29 | 69.11 | 50.19 | 9.10 |
| Dollar exchange growth rate | x6 | -6.65 | 19.29 | 4.67 | 6.91 |
| Human development index | x7 | 0.67 | 0.76 | 0.72 | 0.03 |
| Unemployment rate | x8 | 2.80 | 11.60 | 6.03 | 2.94 |
| Inflation rate | x9 | 1.10 | 22.10 | 9.12 | 5.74 |
| Poverty gap | x10 | 18.80 | 33.20 | 27.36 | 4.55 |
| Depth of poverty | x11 | 4.90 | 9.40 | 7.53 | 1.48 |
| Export growth rate | x12 | -25.61 | 65.64 | 17.86 | 26.14 |
| Import growth rate | x13 | -34.11 | 106.19 | 16.19 | 34.58 |
| Domestic investment growth rate | x14 | -31.59 | 86.67 | 25.73 | 36.56 |
| Foreign investment growth rate | x15 | -56.59 | 144.08 | 25.85 | 49.01 |
| Central bank's interest rate | x16 | 6.54 | 15.51 | 11.26 | 2.46 |
| Commercial bank's interest rate | x17 | 16.61 | 37.35 | 25.08 | 7.29 |
| Copper export growth rate | x18 | -39.94 | 171.21 | 22.83 | 51.95 |
| Gold export growth rate | x19 | -88.75 | 155.41 | 15.99 | 67.59 |
| Livestock output growth | x20 | -46.67 | 89.19 | 16.20 | 43.94 |

Source: Central Bank and National Statistical Office's data 2000-2016

descriptive statistics of its variables are given in Table 1.

It is clear from Table 1 that the growth of copper export and the gold export were fluctuated wildly, which were the results of the economic recession. For example, the quantity of copper export increased by 0.7% in 2009; however, the amount of money from copper export plummeted from 835.6 million USD to 501.9 million USD (39.9%). Likewise, the export of gold plunged from 599.8 million USD to 308.4 million USD (48.5%). In contrary, dollar exchange growth rate and unemployment rate were the highest, while the growth of NDP was the lowest. Those statistics imply that the Mongolian economy is dependent on the exports especially, export of mining products.

Research Methodology

The methodology applied is correlation and regression analysis. The correlation coefficients between explanatory variables and the NDP growth rate were executed on SPSS statistical program. The correlations between the economic growth and five variables were chosen statistically significant at the 0.05 level (2-tailed), namely:

dollar rate growth, inflation rate, export growth, import growth and the growth of domestic investment. Therefore, four more variables which were statistically significantly correlated at the 0.1 level (2-tailed) were not used, namely: the growth of foreign investment, copper export growth rate, foreign investment to NDP ratio, and import to NDP ratio. Somewhat surprisingly, the livestock output growth was shown to be statistically insignificant to the NDP growth rate, although Mongolia has traditionally been based on agriculture and livestock.

Although the variables are significantly correlated with its explained variable, macroeconomic variables are often judged by their multicollinearity. In this paper, variables were examined for a potential multicollinearity via the Variance Inflation Factor (VIF). A rule of thumb states that for values of VIF larger than 10, the multicollinearity of a model can be considered a serious problem (Mazurek, 2017). In this paper, variables which have VIF less than 3.0 are selected; therefore, import growth and growth of domestic investment were not considered for further analysis. After correlation and multicollinearity testing, growth rate in NDP, dollar rate growth, inflation rate, and export growth rate were chosen.

RESULTS AND DISCUSSION

In Table 2, the growth rate in NDP and the growth rate of export have a robust uphill correlation (positively), see also Figure 1. Moreover, dollar rate growth played an important role in stimulating economic growth in Mongolia. It shows a very strong negative relationship with the rate of economic growth: the correlation coefficient equals -0.65 with the p-value of 0.005, see also Figure 4. The inflation rate exhibits significant correlation with economic growth: a coefficient of 0.60 with the p-value of 0.01 (Figure 5). Correlation and regression analysis allow identifying economic growth determinants.

Table 3. Linear Regression Results

| Indicators | Growth rate in NDP | Dollar rate growth | Growth rate of export |
|-----------------------|--------------------|--------------------|-----------------------|
| Growth rate in NDP | 1.00 | - | - |
| Dollar rate growth | -0.65 | 1.00 | - |
| Growth rate of export | 0.79 | -0.55 | 1.00 |
| Inflation rate | 0.60 | -0.03 | 0.40 |

Source: Author's calculation

Linear regression result is shown in Table 3. The adjusted coefficient of determination $R^2 = 0.814$, which means the dollar rate growth, inflation rate, and growth of export are responsible for 81.4% of the variation in NDP growth rates of Mongolia.

Table 3. Linear Regression Results

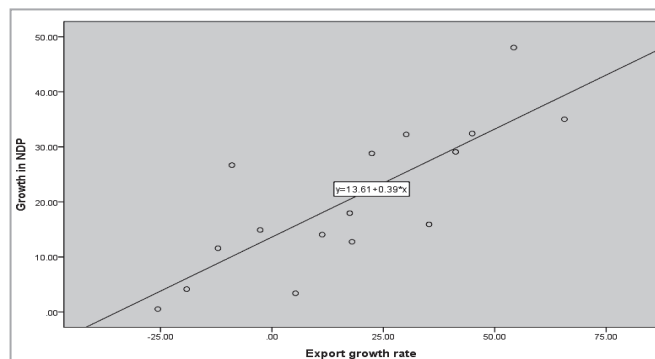
| Model | R | R square | Adjusted R square | Sig. F Change |
|-------|-------|----------|-------------------|---------------|
| 1 | 0.921 | 0.849 | 0.814 | 0.000 |

Source: Author's calculation

Figure 1 shows that export growth rate contributed much to economic growth in Mongolia. Export growth itself can explain 63.9% of Mongolian economic growth. In figure 2 and 3 exports by location and exports by major products are illustrated.

Figure 1. The relationship between NDP growth and the export growth rate.

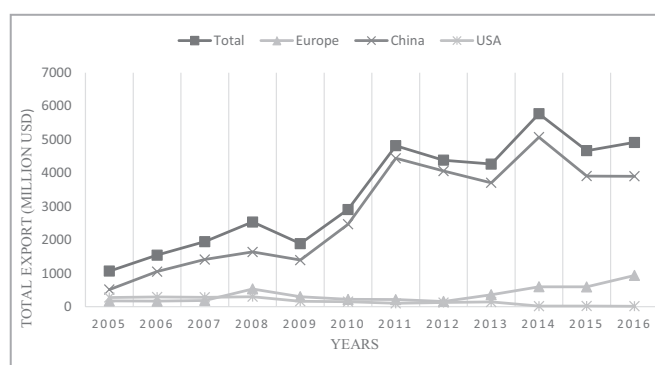
Source: Author's calculation



In Figure 2, total export is described in a squared line, while the x-marked line shows the amount of export to China. From the figure, we can conclude that from 48.2% to 92.5% of the total Mongolian export directly goes to the China, which implies Mongolian economy is highly dependent on China.

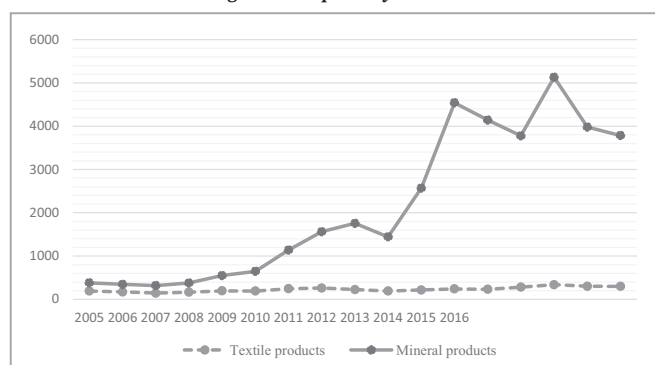
Mongolian main export products are mineral products, cashmere products, and animal products. In Figure 3, mineral products such as; copper, coal, gold, and crude oil are shown in a line, while textile products are on a dotted line. Textile products' export is almost stable compared with mineral products' export amount. Earlier than 2005, the export amount of textile and mineral products were close.

Figure 2. Exports by location



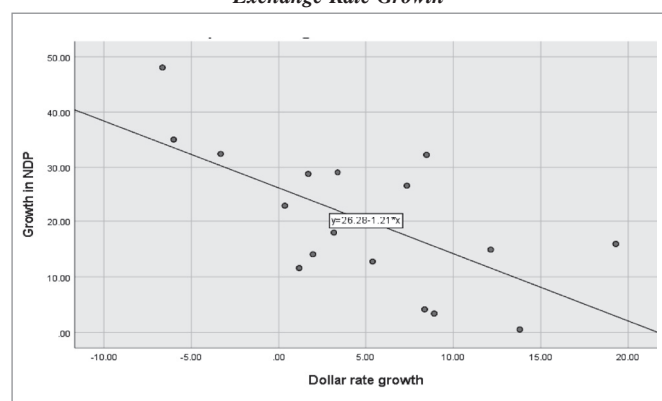
Source: author's calculation

Figure 2. Exports by location



Source: author's calculation

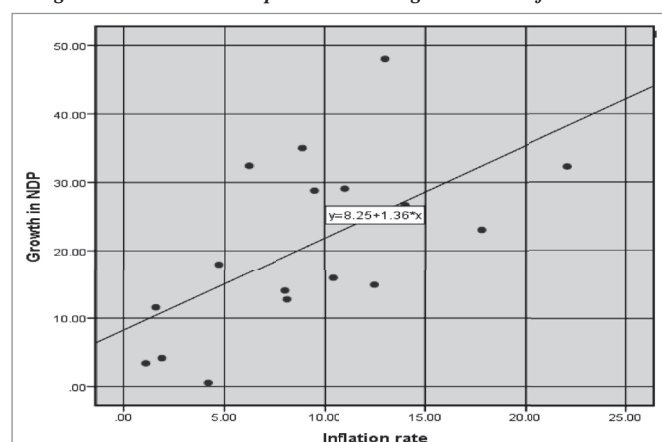
Figure 4. The relationship between NDP growth and the Dollar Exchange Rate Growth



Source: author's calculation

Figure 4 provides a robust and negative graphical relationship between the NDP growth rate and dollar rate growth, which supports Vedia-Jerez and Chasco's results. As we can see from the figure, dollar exchange rate growth is responsible for 42.2% of the economic growth. However, there is a mutual relationship between dollar exchange rate growth and export growth rate. Export growth rate as we see in Figure 1, results in NDP growth. Exports are usually made in USD; therefore, export growth is connected with an increase in dollar reserve. When dollar reserve increases, dollar rate decreases.

Figure 5. The relationship between NDP growth and inflation rate



Source: author's calculation

A definite positive relationship between inflation rate and the rate of economic growth is plotted in Figure 5. Empirical analysis indicates that inflation rate is an essential factor of economic growth. Simionescu et al., (2017) noted that the relationship between inflation and GDP growth, especially in the short and middle term, tends to be specific for the country. For example, they mentioned Poland has a positive correlation between economic growth and inflation rate, like Mongolia.

For the 2018 fiscal year, low-income economies are defined as those with a GNI per capita (dollar value of a country's final income in a year divided by population), calculated using the World Bank Atlas method, of \$1,005 or less in 2016; lower-middle-income economies are those with

a GNI per capita between \$1,006 and \$3,955; upper middle-income economies are those with a GNI per capita between \$3,956 and \$12,235; high-income economies are those with a GNI per capita of \$12,236 or more (Desk, n.d.). Mongolia is classified as a lower-middle-income economy. According to World Bank classification, Mongolia is ranked 107th out of 178 countries. The percentage of people below the poverty line is one of the proper variables for economic growth, although that measure is not often produced. In Table 4, lower-middle-income Asian countries' GDP per capita and poverty rates in 2016 are shown. According to the Table 4, Mongolia is 4th of the ranking GDP per capita. However, it is in the 9th of the ranking its poverty rate, which means GDP per capita cannot determine the living standard of the country. For example, those countries' economic conditions are much different than Mongolian economy. Mostly those countries' economies are based on agriculture, industry, or service, while Mongolian economy is hugely dependent on mining sector and export.

Table 4. Asian lower-middle-income economies and poverty rates

| Nº | Country name | GDP per capita (\$) | Rank | Poverty rate (%) | Rank |
|----|--------------|---------------------|------|------------------|------|
| 1 | Armenia | 3,606.0 | 5 | 32.0 | 12 |
| 2 | Bangladesh | 1,359.0 | 11 | 31.5 | 11 |
| 3 | Bhutan | 2,804.0 | 7 | 13.3 | 5 |
| 4 | Cambodia | 1,270.0 | 12 | 17.7 | 7 |
| 5 | Georgia | 3,854.0 | 2 | 9.2 | 2 |
| 6 | Indonesia | 3,570.0 | 6 | 10.9 | 3 |
| 7 | Jordan | 4,088.0 | 1 | 14.2 | 6 |
| 8 | Moldova | 1,900.0 | 9 | 20.8 | 8 |
| 9 | Mongolia | 3,687.0 | 4 | 21.6 | 9 |
| 10 | Pakistan | 1,468.0 | 10 | 29.5 | 10 |
| 11 | Sri Lanka | 3,835.0 | 3 | 6.7 | 1 |
| 12 | Vietnam | 2,178.0 | 8 | 11.3 | 4 |

Source: Statistics of World Bank on poverty 2016, Central Intelligence Agency

As for 2016's statistics, the poverty rates were quite high, i.e., 27.1% in the capital city Ulaanbaatar, and 34.9% in the countryside. Therefore, the growth of an average salary was tested as if the increase is real for purchasing power.

The average monthly salary is adjusted for inflation rate

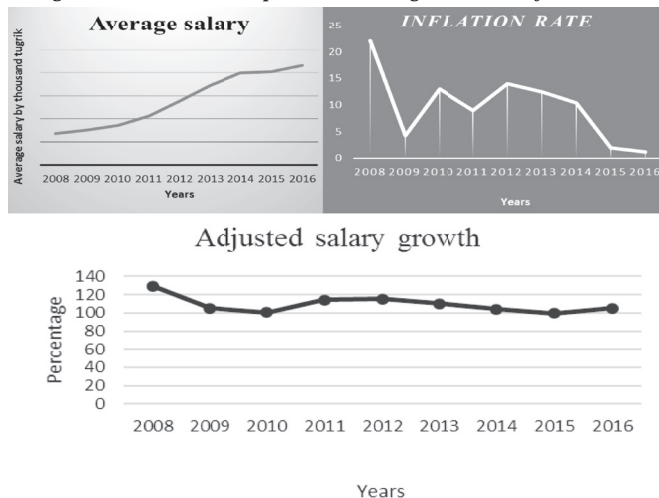
Table 5. Actual increase in the average salary after-inflation rate adjustment

| Statistical indicator | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Average salary ₮ | 274.2 | 300.4 | 341.5 | 424.2 | 557.6 | 692.3 | 796.6 | 808.0 | 861.9 |
| Inflation rate % | 22.1 | 4.2 | 13.0 | 8.9 | 14.0 | 12.5 | 10.4 | 1.9 | 1.1 |
| Adjusted growth % | 129.8 | 105.1 | 100.6 | 114.1 | 115.3 | 110.4 | 104.2 | 99.5 | 105.0 |

Source: Author's calculation based on the statistics from National Statistics Office of Mongolia

in Table 5. It shows that an increase in salary does not always mean an increase in purchasing power. For instance, the salary increase in 2015 was lower than that of the inflation rate, which implies there was a decrease in purchasing power, see the Figure 6.

Figure 6. The relationship between NDP growth and inflation rate



Source: author's calculation

Inflation-adjusted salary growth improves the data comparability, but it cannot represent the actual purchasing power nevertheless. In 1st line graph of Figure 6, we can see that the amount of average salary was continuously increasing. However, after inflation adjustment, the salary did not increase significantly from 2000 until 2016.

CONCLUSION

1. This article presents an empirical analysis of Mongolian economic growth determinants from 2000–2016. The analysis is composed of the following steps: descriptive statistics of the variables, correlation analysis, and regression analysis.
2. Correlation results suggest that the most important economic growth determinants are inflation rate, export growth rate, import growth rate, domestic investment growth rate, and dollar rate growth. However, due to the multicollinearity domestic investment growth rate and import growth rate were excluded from the regression analysis.
3. In the regression analysis, the selected variables explained 81.4% of the variation of Mongolian economic growth. Export growth rate correlated positively with NDP growth which supported Ramanayake's result, Dollar exchange rate correlated negatively, and inflation rate had significant correlation with NDP growth which supported Simionescu's research in Poland's case.
4. Regression analysis and correlation analysis rejected the hypothesis that FDI significantly affects Mongolian economy growth. Also, it conflicts the results of Ramanayake and Lee (2015) which concluded the FDI variable is significant in developing countries but insignificant in developed countries. However, research

result supported the hypothesis that mining products' export has a significant and positive effect on Mongolian economy.

5. Mongolian economy is compared with other Asian lower-middle-income economies. Mongolia is ranked in the 9th by its poverty rate, while it is ranked in the 4th by its GDP per capita, which showed Mongolian economic conditions was much different than Mongolian economy. Mostly those countries' economies are based on agriculture, industry, or service, while Mongolian economy is hugely dependent on mining sector and export.
6. Inflation-adjusted salary showed that the increase in the salary is not always a real growth in purchasing power. There were decreases in some year in purchasing power regardless of salary rise.

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