Analysis of the “Dutch Disease” effect and Strengthening Public Financial Management of Mongolia

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Abstract

The purpose of this paper is to analyze whether Mongolian economy has been suffering from "Dutch Disease" or not by employing a vector auto-regression (VAR) model with a quarterly data from 2000 to 2017 of National Statistical Office, Mongolia (NSO). Evaluation result shows that there is a great possibility that Mongolian economy has been suffering from the "Dutch Disease" through the resource movement effect such that the boom in the mining sector has crowded out manufacturing activities; and that the boom in the mining sector has not contributed to, or even deteriorated the capital accumulation effect that alleviates the "Dutch Disease". Therefore, the Government of Mongolia should strengthen its public financial management in order to escape from the resource "curse". Moreover, current Natural Resource Funds, named "Future Heritage Fund" of Mongolia, could be one of the successful solutions for the "Dutch Disease", while "Fiscal Stabilization Fund" is in need of reform and independency from political pressures. The policy recommendation is reached that resource revenues should be utilized for the projects on education, human resource development, and economic infrastructure to accumulate capital and promote economic diversification and future development of Mongolia.

Keywords: Dutch Disease, Public Financial Management, Mongolian Economy, Public Investment.

JEL classification numbers: F43, L60, O53.

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1. Introduction

Mongolia is a landlocked and middle-income developing country with vast agricultural and mineral resources, and her national income highly depends on the mining sector and mineral resources exports. Therefore, an income from mining flows are playing main role in Mongolian economy and its growth. The Government of Mongolia pays more attention to exporting mineral products, instead of taking a good policy for an industrialization. Mongolia has world-class mining deposits such as "Tavan Tolgoi" coking-coal site and "Oyu Tolgoi" copper and gold mining, which are strong enough to push Mongolian economy to the upper income class. However, a recession during 2012-2016 driven by a fall in commodity prices and a decline of foreign direct investment (FDI) on mining sector shows that Mongolian economy is extremely vulnerable and in an urgent need of analysis for economic effects of mineral recourse dependence behind Mongolian economy. An assumption used in this study is that there would be the "Dutch Disease" effects on Mongolian economy, and policymakers should reconsider a comprehensive public financial management to avoid the "Dutch Disease" in the context of "resource curse" and to transform it into "resource blessing".

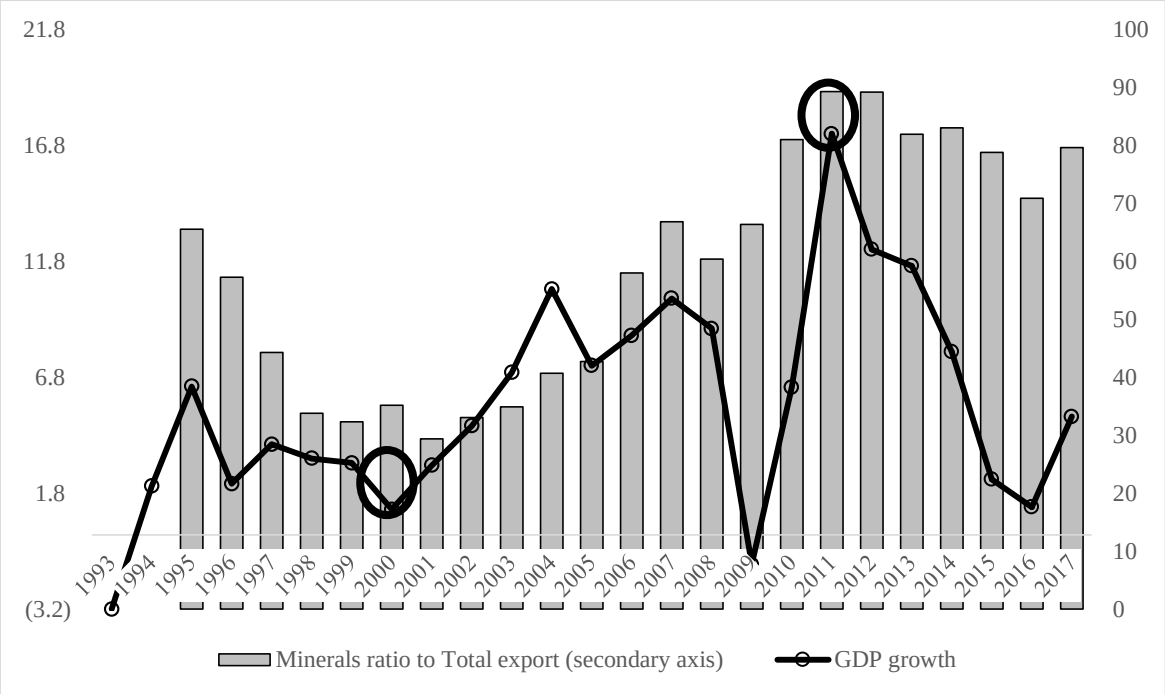
IMF (2013) defined that "resource curse" is a complex phenomenon through which abundant revenues from natural resources translate into economic stagnation, waste, corruption, and conflict. If a country is "cursed" by its resources, the country tends to have less economic growth and development than other countries with fewer natural resources. One typical cons of being resource-rich is the "Dutch Disease", which is an economic fact that the revenues from natural resources could damage a country's manufacturing sectors by real exchange appreciation and by an increase of labor demand and wages of booming sector. It would leave manufacturing sector less competitive in the international market. The extreme result from the "Dutch Disease" is crowding-out of manufacturing activities and declining output of tradable goods through resource movement effect and spending effect through real appreciation of domestic currency contributes (Corden and Neary, 1982). In order to escape from the "Dutch disease", the Government of Mongolia had better strengthen its public financial policy and management, including the establishment of Natural Resources Funds (NRFs) to support manufacturing and higher value-added activities.

Figure 1 shows that Mongolian GDP growth has highly fluctuated over the last 2 decades, and it has been seriously affected by the changes of commodity prices of

international market since the 2000s. The Parliament of Mongolia approved a "Minerals Law" in 1997 and has putted it in force since 1998 in order to boost its mining sector's production and to attract FDI on the mining.

In fact, Mongolia was one of the member countries of the Soviet Union from 1924 to 1989. In 1990, Mongolia became Democratic country and shifted to the market-based regime after Soviet Union's collapsed. However, Mongolia faced economic difficulties and had negative economic growth until 1993. After that, the economy was recovered year by year and kept and raised its growth gradually until the global financial crises in 2008.

Figure 1. Percentage of Resource export to total export and GDP growth of Mongolia between 1993–2017



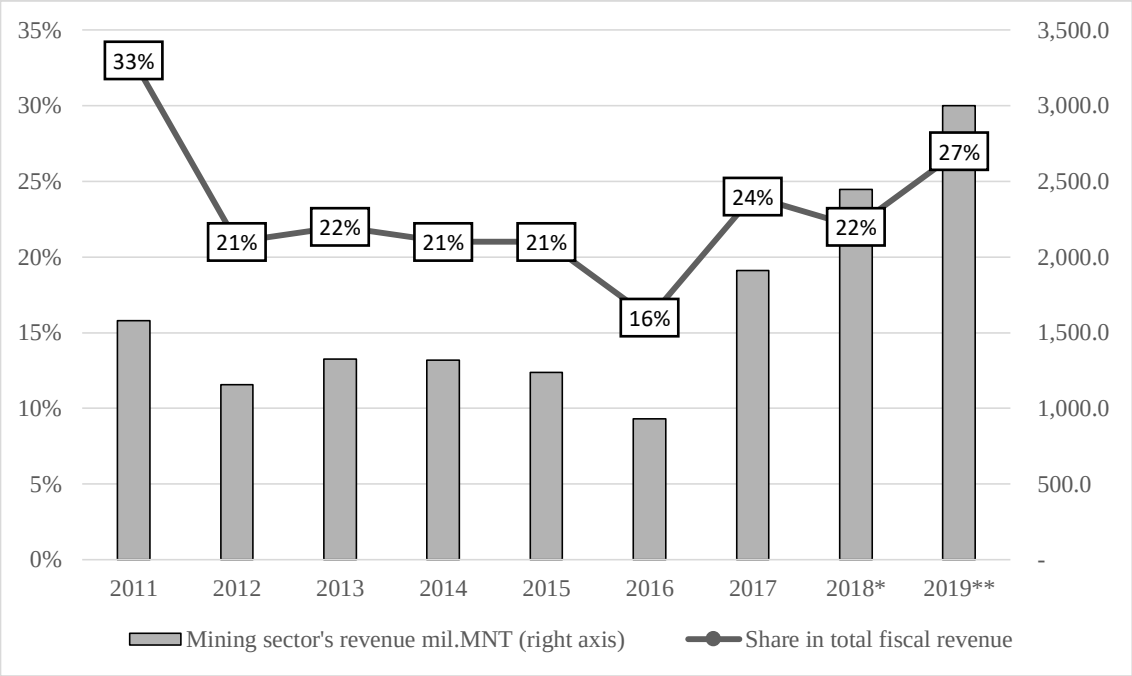
Source: National Statistical Office, Mongolia

Then Mongolian economic growth reached its peak in 2011. However, a fall in international market prices of mineral resources caused sharp drop in the economy from 2012 to 2016. In the beginning of 2017, the Government of Mongolia announced that Mongolia was going to take an "Extended Facility Fund" Program of International Monetary Fund to recover its economy until 2019. According to the statistics from the National Statistical Office, Mongolia (NSO), the economy is still under recovery in 2019, while the growth rates were 5.3 percent in 2017 and 6.9 percent in 2018, respectively. Despite the improving growth trend, structural challenges such as the limited export diversification remain and could amplify the vulnerability of the economy to commodity

price or other external shocks, given its high reliance on the mining sector according to the economic outlook of WB (2018).

Figure 2 shows that the share of the mining sector revenue in total fiscal revenue is expected to increase in this year (27 percent), and it means that Mongolian economy is relying more on the mining revenue.

Figure 2. Revenue of Mining sector in Total Fiscal Revenue (million MNT)



*Source: Ministry of Finance, Mongolia, as November, 2018, *-preliminary performance, **-expected*

According to the IMF (2007), an indicative threshold for resource revenue dependency is in the range of 20-25 percent of total fiscal revenue, and the fiscal year of 2019 is expected to be beyond the threshold due to the "Oyu Tolgoi" mining's underground production. Since 2011, the average of mining sector's revenue in total fiscal revenue of Mongolia has been around 23 percent, which has been in the range of the IMF threshold.

As mentioned before, Mongolia has large-scaled mineral reserves and the major mineral resources reserves are shown in Table 1.

Table 1. Major Mineral Resources Reserve of Mongolia as 2014.

#	Minerals	Measurements	Reserves
1.	Coking coal	million metric ton	175,500.0
2.	Copper	thousand metric ton	57,000.0
3.	Gold	metric ton	2,493.0
4.	Zinc	thousand metric ton	1,740.0
5.	Iron	million metric ton	1,166.0
6.	Oil	million barrels	2,438.0
7.	Uranium	thousand metric ton	170.0

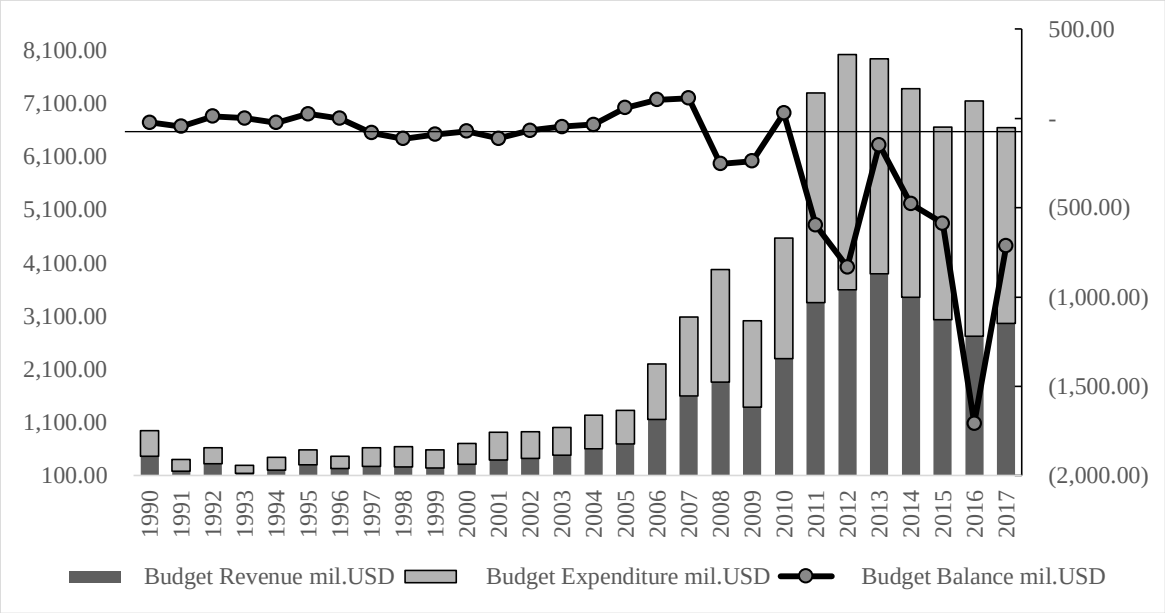
Source: Ministry of Mining, Mongolia

A top of the mineral reserve of Mongolia is a coking coal, but main national revenue source is from the second biggest reserve, copper sites of "Erdenet" and "Oyu Tolgoi". Therefore, it is very important for us to utilize these non-renewable resource revenues according to the policy implications and recommendations for the resource-rich developing economies proposed by international organizations such as JICA, WB and IMF.

The study of IMF (2013) on Pubic Financial Management (PFM) shows that a few countries that successfully avoided the "resource curse" had a strong institutional and PFM systems. Mongolia still has a weak institutional system, and it is in need of PFM reforms, for example, an efficient public investment policy.

Figure 3 shows that the budget deficit of Mongolia has been increasing rapidly since 2011 compared to that of its previous period. In addition, there is the less development on monitoring and evaluation of public financing. The budget deficit is still high and keeping its growth rate to the rate in the period of high commodity price. Although the budget revenue has been limited after a fall in international resource prices, the budget expenditure has been expanding continuously. Moreover, the public financing decision-making process is getting more centralized on the Parliament, and because of that there is a high risk on public financing with political interest of Mongolia. For example, some political parties promised very expensive and inefficient social welfare programs during the election to get a majority of the Parliament. This situation also tells that the PFM should be renewed as soon as possible for an independency from political influences.

Figure 3. Budget Balance of Mongolia between 1990–2017



Source: National Statistical Office, Mongolia

Resource-rich developing countries have to select special operational mechanisms for public financing and their resource revenue management. Resources revenues should be saved and invested in right time, so that returns on optimal investment establish a permanent stream of income (Coutinho, 2011). The most frequently-used mechanisms in PFM for the allocation of resource revenues is natural resource funds (NRFs) (IMF, 2012). Demachi and Kinkyo (2015) shows that natural resource funds, though its name differs among countries from "oil fund" and "stabilization fund" to "future generation fund", are crucial for resource-rich developing countries like Mongolia. Moreover, the NRFs are considered as a policy tool for PFM with two different time-frames: dealing with high price volatility in the short-run and stabilizing macro economy to avoid the resource curse in the long run.

The Parliament of Mongolia approved the Law on Fiscal Stability in 2010. According to this law, a "fiscal stabilization fund", as one of the NRFs, was established for the purpose of macroeconomic and fiscal sustainability. Also, the Law on Future Heritage Fund was enacted by the Parliament in 2016 and was putted into force for the purpose of saving natural resources income for future generation since 2017.

In order to give an answer to the questions "Is Mongolia blessed or cursed by its resources?" and "Could current NRFs of Mongolia be a successful case or not?", this study will use a vector auto-regression (VAR) model for an analysis by employing quarterly data between 2000-2017 (72 data) from the NSO under the "Dutch Disease" hypothesis.

The reason why this study selected the year of 2000 as the first year of the estimation is related to the resources export percentage to the total export. Because it can be easily noticed from the Figure 1 that minerals ratio to the total export is increasing rapidly since 2000 and it is around 80.0 percent of the total export in recent years. Moreover, the "Minerals Law" contributed to attracting FDI on mining sector, and a booming of that sector was happened from 1998. Since we have the "Dutch Disease" hypothesis for the study, its effects on the economy could be estimated in the period of minerals export booming.

This paper consists of following sections: the second section presents the literature review; the third section describes a theoretical framework; the fourth section conducts an empirical study; the fifth section extracts policy implications and discusses public financial management issue of Mongolia; and the final section concludes.

2. Literature Review

The literature related to the "Dutch Disease" hypothesis and its effects on economy including the studies on Mongolian cases, and the PFM for resource rich developing countries are reviewed in this section. Moreover, it is important to underline this study's contribution to the topic.

2.1 Literature on the "Dutch Disease"

The word of "Dutch Disease" was used first time in the "Economist" journal in 1977 to describe the fact that the decline of manufacturing sector was caused by the discovery of big natural resource in the Netherlands late of 1950s. The most of academic studies related to the "Dutch Disease" have, however, cited Corden and Neary (1982), which introduced "resource movement effect" (RME) or "direct de-industrialization" and "spending effect" (SE) or "indirect de-industrialization" in small open economy. It described that the high wage and labor demand in the mining sector causes labor movement from the manufacturing sector, and it makes "direct de-industrialization"; after that more spending on consumption is triggered by the higher real income resulting from the booming sector, which leads to a real appreciation defined by the relative price of services to traded manufacturing goods, and it further makes a reduction of manufacturing employment and production, namely, "indirect de-industrialization". In the long run, the boom in mining sector would further lead to a decline in higher value-added manufacturing sector and a constraint to a main source of technological progress in the economy. Therefore, an extreme result of the "Dutch

Disease" is a crowding-out of manufacturing activities both in short and long-term. Sachs (2007) added the longer-term intertemporal perspective, namely, the "capital accumulation effect" (CAE), to the "Dutch Disease" framework. Sachs (2007) also argued that the "Dutch Disease" could be avoided if natural resource revenue were not used for consumption but for public investment, since the positive benefits of increased public investment on the non-mining traded sector through productivity improvement would outweigh any negative consequences of the "Dutch Disease". These two studies of Corden and Neary (1982) and Sachs (2007) will be illustrated and used for the theoretical framework section of this study.

The "Dutch Disease" hypothesis is mostly examined in aspect of a real exchange appreciation and its effects on manufacturing sector of a certain country or regions during the booming period of mineral resources. For instance, Sachs and Warner (2001) showed that resource-rich countries, "cursed" by minerals, tended to have less economic development compared to resource-poor countries, because of their high prices derived by booming of the resource sector; and that there is less evidence of geographical and climate variables' influence on the economies. They confirmed that high priced economies finally crowded-out its high-value-added manufacturing activities. Ismail (2010) revealed four main facts of oil-exporting countries using structural factor model. First, oil-exporting countries have experienced a reduction of manufacturing output caused by oil boom. Second, in that countries, which are more open to foreign investment, oil windfall shocks have more adverse impacts on manufacturing sector. Third, if windfall increases, there will be appreciation of relative price of labor to capital. Finally, labor-intensive tradeable sectors are affected more negatively by windfall shocks compared to capital intensive ones. Therefore, developing capital intensive manufacturing could help avoid volatility of commodity prices.

There are many studies examining the "Dutch Disease" hypothesis on Asian resource-rich developing countries. The results differ among the countries/regions and time period of resource booming. Taguchi and Lar (2016) examined the "resource curse" hypothesis for 37 Asian countries and showed the different results of two periods using VAR model with panel data. The existence of the "Dutch Disease" effect was observed in 1980-1995, while there is no evidence of the effects on those economies in 1995-2014 but evidence of the capital accumulation effect in that period instead. Moreover, Taguchi and Khinsamone (2018) examined selected five resource-rich countries of ASEAN, and found the fact that the forerunners of Malaysia and Indonesia have no "Dutch Disease" effects on the economy during the period of 1997-2015, whereas the latecomers of Myanmar and Lao

PDR have experienced the resource movement effect of "Dutch Disease" over the sample period. From this result, they extracted the following lessons from the forerunners' experiences in order for the latecomers to escape from the Dutch Disease: to establish some funding system of resource allocation for investment projects, to diversify economy through improving domestic industries and business environments, and to improve institutional quality to strengthen resource control.

Moreover, it is important to study how windfall revenue from booming sector should be managed to sustain the long-term growth and what kinds of macroeconomic and fiscal policy and management have been taken in resource-rich developing economies (RRDEs) over last few decades. Coutinho (2011) showed that some resource-rich countries, such as Nigeria, Saudi Arabia, and some countries in Latin America, are cited as the countries that poorly managed their resource revenues; and that they had experienced common patterns that the governments spent more money in overly ambitious and inefficient projects, and implemented inadequate strategy and policy for protecting manufacturing and keeping the real exchange rate from the shocks of resource booms. The failure stories also showed that there were less policy and investment on education and human resource to improve labor productivity. On the other hand, very few economies managed its resource revenues in the way of "blessing", such as Norway with "bird-in-hand" rule. For Asian countries, Malaysia and Indonesia, among less-industrialized economies, are the examples of successful cases. According to the economic theory that deals with natural resources, it is impossible to conclude all cases into single theory, but we should understand specific cases and experiences of successful stories. Common actions of successful stories showed that they have implemented a policy for supporting manufacturing and diversifying their economy, have managed a pegged exchange rate policy or devaluation of its currency, and have used optimal PFM for windfalls revenues with political stability. Moreover, human capital got more attention from the government in the best stories. One of the most successful policies avoiding resource "curse" and managing windfall revenue is an establishment of NRFs. In other words, they saved and invested mineral revenues as NRFs in good times and assured permanent stream of income in bad times.

2.2 Literature on Public Financial Management for Resource-Rich Countries

Another issue related to the management of resource revenues is how well-designed PFM with NRFs and fiscal policy are playing a massive role in resource-rich countries to

avoid resource "curse" and escape from "Dutch Disease". Baunsgaard et al. (2012) showed that a flexible fiscal policy, which considers country-specific characteristics such as resource horizon, development needs (capital scarce or ample) and resource dependency, should be developed, and then should address both volatility and windfall shocks. Demachi and Kinkyo (2015) also discussed macroeconomic management for RRDEs in the JICA report of Myanmar's economic development program. They argued that many RRDE governments with poor institutional power could not perform expected economic growth even though they had resource funds financed by windfall revenues. Establishing NRFs is not so flexible for all RRDEs in long-term fiscal sustainability, if they have a weak institution and high political influences and corruption. Successful experiences in preventing the "Dutch Disease" showed that countries' circumstances and institutional conditions were favorable for NRFs in facing the booming.

Therefore, many international organizations including IMF, JICA, and WB have developed the PFM and fiscal policy for RRDEs and recommended certain policy priorities and implications which RRDEs should follow depending on a country characteristic.

IMF (2013) defined the PFM in such a way of managing government finances, estimating economic conditions and prospects, allocating public money and reporting financial results. The report also suggested that optimal PFM and macro-prudential policy are essential for RRDEs. Moreover, IMF guided some important fiscal policy frameworks in RRDEs as follows:

- Sustainability of fiscal policy that enhances capital accumulation
- Appropriate fiscal anchors such as non-resource current balance rules, which are essential for short and midterm policy
- To enable the scaling-up of growth-enhancing spending financed by resource revenue
- To address the volatility and uncertainty of resource revenue, which are critical for policymakers to achieve long-term fiscal sustainability.
- A well-designed resource fund(s)

JICA (2016) also recommended sound fiscal and PFM policies for resource-rich countries (RRCs) by means of three case studies including Mongolia. According to the report, four important recommendations for fiscal and PFM policies for RRCs are: to increase non-resource fiscal revenues by tax-base expansion, to strengthen public debt management and fiscal discipline through public debt-GDP ratio ceiling and fiscal deficit reduction, to enhance the transparency of resource-revenue flow, which means central

control of revenue information and to understand and develop an optimal resource revenues allocation through NRFs and special account system.

WB (2016) also emphasized that many RRCs have established resource funds with the purposes of fiscal and macroeconomic stabilization, future generation savings, and national development and portfolio management. This WB report indicated that Mongolian "Fiscal Stabilization Fund" has not net financial wealth yet since 2010.

In sum, all international organizations and some studies above reviewed have a common idea for RRDEs that the allocation of resource revenue is one of the most important factors in any PFM and fiscal priorities and policies.

2.3 Mongolian Studies and Contributions

This study is focusing on the "Dutch Disease" effects on Mongolian economy, and trying to examine the current PFM including the NRFs of Mongolia that could be a successful solution to avoid "Dutch Disease". There are a few studies to analyze the "Dutch Disease" effect on Mongolian economy. Batsukh and Avralt-Od (2012) evaluated the economic impact of the massive capital inflow in Mongolian mining sector using a New Keynesian Dynamic Stochastic General Equilibrium (DSCE) model. Through resource movement and spending effects, the study showed that an increase in wages and marginal product in the non-manufacturing sector leads to an increase in labor demand and the production of non-tradable goods and thereby a decline in manufacturing production. Therefore, the study proved that the inflow shocks of FDI and sharp increase of commodity price of mining sector make the "Dutch Disease" effects on the economy. In contrast, Ragchaasuren et al. (2016) argued that a rapid expansion in mining sector has no strong negative effects on the production of the other sectors. In this sense, they did not find out any serious "Dutch Disease" effects on the economy and showed only that there are small negative effects on other exports goods through real exchange rate appreciation. A model used in the study was a single-country static Computable General Equilibrium (CGE) model calibrated to a 2010 Mongolian social accounting matrix (SAM). However, Khan and Gottschalk (2017), economists at the WB, showed that the development of big mining projects are leading Mongolian economy to the "Dutch Disease" by using a CGE model, and the mining sector demand for domestic factor inputs explains two-thirds of the appreciation of the real exchange rate as the strongest channel for explaining the "Dutch Disease". They suggested that in order to expand the economy's long-term sustainability,

policy-makers should take action to reduce the usage of domestic labor in the mining sector and channel resource revenue toward public investment. Battogtvor E. (2018) presented evidence of the Dutch Disease effect on Mongolian economy through the estimation of vector error correction model (VECM) and showed that one percent increase in mining sector's output makes two percent decline in manufacturing output by using the framework of Corden and Neary (1982).

This study contributes to the literature reviewed in this section by enriching the evidence on the applicability of the Ditch Disease hypothesis to Mongolian economy among limited previous studies with different results on the topic. For an empirical study, it applies a vector auto-regression (VAR) model with a quarterly data since the VAR model allows for potential endogeneity between the variables of concerns, and also for tracing out the dynamic responses of variables to exogenous shocks. Moreover, this study extracts some policy implications to avoid the "Dutch Disease" risk i.e., the policy suggestions for transforming the PFM including current NRFs from resource-curse form to resource-blessing one for the future development of Mongolia.

3. Theoretical framework

As mentioned in the previous section, the theoretical framework for the Ditch Disease analysis of empirical study is based on the description of the "resource movement effect" (RME) and the "spending effect" (SE) as the Ditch Disease effects initially defined by Corden and Neary (1982), and also the "capital accumulation effect" (CAE) added by Sachs (2007) from an intertemporal perspective.

The four main assumptions are taken under the "Dutch Disease" hypothesis in the framework of Corden and Neary (1982). First, a small open economy is producing three kinds of goods. Two of them (mining[1] and manufactures) are traded at a given international market price. The third good is non-traded goods or service, and its price is set by the equilibrium of domestic supply and demand. Each of the three sectors uses labor which is perfectly mobile between sectors. Second, a boom in the mining sector originates from a once-and-for-all Hicks-neutral improvement in technology[2]. Third, the models are purely real ones and ignore monetary considerations: only relative prices (expressed in terms of the

[1] *Originally, two goods were energy and manufactures. However, since Mongolian mining sector is booming, it was changed to "mining" for further understanding.*

[2] *A. Hicks views on neutrality is "an invention which raises the marginal productivity of labor and capital in same proportion". Thus, a technical change is neutral if the ratio of marginal product of capital to that of labor remains unchanged at constant capital labor ratio. (www.economicsdiscussion.net)*

given prices of traded goods) are determined, and national output and expenditure are always equal, so that trade is always balanced overall. The fourth assumption is that there are no distortions in commodity or factor markets. In particular, real wages are perfectly flexible, ensuring that full employment is maintained at all times.

Based on these assumptions, we will explain the pre-boom equilibrium and the "Dutch Disease" effects (RME, SE, and CAE) as follows.

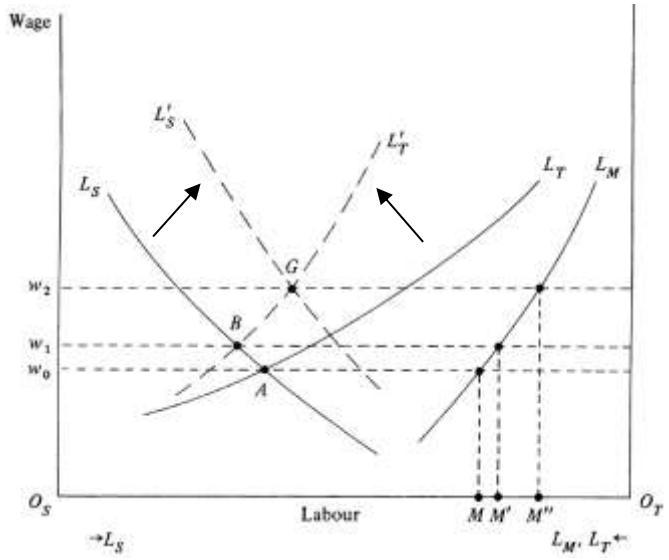
3.1 Pre-boom equilibrium

The model begins by describing the pre-boom equilibrium. The labor market and the commodity market are displayed in Figure 4 and Figure 5, respectively. In the labor market in Figure 4, the wage rate in terms of manufactures is measured on the vertical axis, and the total labor supply is given by the horizontal axis $O_S O_T$. Labor input into services is measured by the distance from O_S, while the distance from O_T measures labor input into two traded goods sectors. The L_M denotes the labor demand for the manufacturing sector, and the L_T is obtained by adding to L_M the initial labor demand for the mining sector ($L_T = L_M + L_{mining}$). The pre-boom labor demand for the two traded goods sector is combined by L_T. The initial labor demand for the services sector is drawn by L_S. Thus, the initial full-employment equilibrium is at *A*, where L_T intersects L_S, and so the initial wage rate is w_0. Figure 4 does not show a complete picture of the initial equilibrium, because the profitability of producing services and the location of the L_S are depending on the initial price of services, which is not exogenous but is determined as part of the complete general equilibrium of the model.

As for the commodity market in Figure 5, traded goods that aggregate mining and manufacturing output are measured on the vertical axis, and services are on the horizontal axis. The pre-boom production possibilities curve is shown by TS and the highest attainable indifference curve is I_0. The initial equilibrium is thus at point *a*, where TS is tangential to I_0.[3] The initial real exchange rate (defined by the relative price of services to traded goods) is given by the slope of the common tangent to the two curves at *a*.

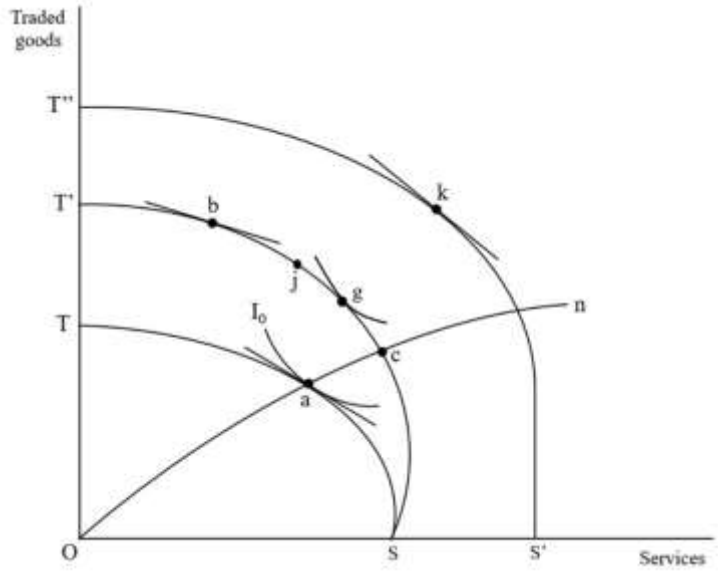
[3] *Indifference curves are summarizing aggregate demands, and ignoring the changes in income distribution.*

Figure 4. Effect of the boom on the labor market



RME: $O_T M \rightarrow O_T M'$
SE: $O_T M' \rightarrow O_T M''$
Source: Corden and Neary (1982)

Figure 5. Effect of the boom on the commodity market



CAE: $T'S \rightarrow T''S'$
Source: Corden and Neary (1982) and Sachs (2007).

3.2 Effects of a Boom: Resource Movement Effect

Beginning with resource movement effect in Figure 4, the mining sector's labor demand schedule shifts upwards by an amount proportional to the extent of the technological progress of the form of Hicks-neutral in the mining sector under the assumption that the real exchange rate is constant. This makes the composite labor demand schedule L_T shift upwards to L_T', and so new equilibrium at *B* is attained through the rise in

the wage rate to w_1. This effect thus causes labor to move out of both the manufacturing and services sectors to the mining sector. Since employment in manufacturing falls from $O_T M$ to $O_T M'$, the resource movement effect can be said to be "direct de-industrialization".

Turning to Figure 5, the boom does not change the maximum output of services, which remains as *OS*, but the booming raises the maximum output of traded goods from OT to OT'. The production possibilities curve therefore shifts out asymmetrically to $T'S$ and the resource movement effect at a constant real exchange rate is represented by the movement of the production point from *a* to *b*. The movement of labor out of both the manufacturing and services sectors leads to a fall in their outputs. Therefore, the point *b* lies on left side of the point *a* in the figure.

3.3 Effects of a Boom: Spending Effect

The description turns to the spending effect in Figure 5. Provided the demand for services rises with income (i.e. services are normal goods), its demand at the initial real exchange rate moves along an income-consumption curve such as *On*, which intersects $T'S$ at point *c*. Since there is excess demand for services under the initial real exchange rate at point *b*, a real appreciation must occur. But the new equilibrium must lie somewhere between *j* (a point with the income-elasticity of demand for services being zero) and *c*, namely at point *g*, so that the output of services is raised comparing to the initial situation. In this case, new equilibrium at *g* is higher relative price of services than that of the initial equilibrium at *a.* As explained in 3.2 section, the resource movement effect tends to lower the output of services, while the spending effect tends to raise it.

Returning to Figure 4, the services sector's labor demand schedule shifts upwards to L_S' because of the rise in the relative price of services to traded goods, i.e. the real appreciation, and so the final equilibrium is attained at point *G*. Thus, it makes rise of wage to w_2, which makes employment in manufacturing falls further from $O_T M'$ to $O_T M''$. The result is a further reduction in manufacturing output, and the spending effect can be said to be "indirect de-industrialization".

To sum up, the boom in the mining sector gives rise to both "direct de-industrialization" reflected in the fall from $O_T M$ to $O_T M'$ through the resource movement effect, and "indirect de-industrialization" reflected in the fall from $O_T M'$ to $O_T M''$ through the spending effect.

3.4 Intertemporal Effect: Capital Accumulation Effect

Above explained the Dutch Disease description of Corden and Neary (1982) is about the sectoral dispute from the short-term. Sachs (2007), on the other hand, added the longer-term intertemporal perspective, namely the "capital accumulation effect", to the Dutch Disease framework. Sachs (2007) argued that production possibilities curve, $T'S$, could be shifted outwards to $T''S'$ in Figure 5, if the resource revenues were utilized for the public investment projects on infrastructure (roads, power, telecoms) that raises the productivity in both the traded goods and services sectors. The Dutch Disease becomes a worry, if the mining revenues are used to finance consumption rather than investment. The goal of the public investment financed by windfall revenues should be typically to transform resource-based economy into capital-intense and knowledge-based economy. Sachs (2007) also emphasized that the boom in the mining sector could lead even to a real exchange rate depreciation at a point *k*, if the public investment financed by the mining earnings raised the productivity of nontraded sector (e.g. by financing improved seed varieties for smallholder farmers in developing countries).

In sum, from a sectoral dimension, the boom in the mining sector might sacrifice the manufacturing production under the Dutch Disease story. From an intertemporal dimension, however, this sectoral repercussion of the boom might be offset through capital accumulation financed by the mining sector.

4. Empirical Study

In this section, the empirical analysis of the "Dutch Disease" hypothesis on Mongolian economy is carried out by using a VAR model with a quarterly data from 2000 to 2017 of National Statistical Office, Mongolia (NSO). The reason why this study selects the year of 2000 as the first year of the estimation is that the minerals ratio to the total exports has increased rapidly since 2000, and it is around 80 percent of the total export in recent years. The "Dutch Disease" effects could be noticed in the economy during the booming period of mining sector.

The empirical analysis is based on the theoretical framework presented in the previous section, and so the resource movement effect (RME), the spending effect (SE) and the capital accumulation effect (CAE) from the mining sector shocks are examined by the model, in order to check whether Mongolian economy is suffering from the "Dutch Disease". This

section represents key variables and data, a methodology of the estimation and the estimation outcomes with their interpretation.

4.1 Key variables and its data

The study identifies the following five key variables for a VAR model estimation to examine the RME, SE and CAE: manufacturing-GDP ratio (*moy*), mining and quarrying (*mup*), consumer prices (*cpi*), investment-GDP ratio (*ioy*) and real GDP per capita (*ypc*).

Table 2. Key variables of the estimation and their usage in the model.

#	Variables	Symbols in estimation	Usage of variables
1.	Manufacturing - GDP ratio	*moy*	Resource Movement Effect (RME)
2.	Mining and quarrying at 2010 constant price	*mup*	Resource Movement Effect (RME); Spending Effect (SE); Capital Accumulation Effect (CAE)
3.	Consumer Price Index (2010 = 100)	*cpi*	Spending Effect (SE)
4.	Investment-GDP ratio	*ioy*	Capital Accumulation Effect (CAE)
5.	Real GDP per capita	*ypc*	Control variable

The first variable of manufacturing ratio as GDP (*moy*) is a key variable which is used for examining RME with a combination of Mining and quarrying (*mup*), which is the second variable expressed in terms of 2010 constant price of million MNT. Manufacturing-GDP ratio (*moy*) is expressed as "Manufacturing" as a percentage of GDP, while Mining and quarrying (*mup*) represents the production activity in mining sector.

The third variable is a consumer price index (*cpi*) with the base year being 2010. It is a substitute for a real exchange rate as one of the key variables for examining the spending effect. The usage of consumer prices as a proxy is justified since the exchange rate in Mongolia has been highly controlled. According to Ilzetzki et al. (2011), the authority of Mongolia has adopted the "De facto crawling band and peg to US dollar" as the currency regime since 1997. In the selection of proxy variables of real exchange rate, Frankel (2010) argued in the context of the Dutch Disease that the real appreciation in the currency takes the form of money inflows and inflation if the country has a fixed exchange rate, whereas taking the form of nominal currency appreciation if the country has a floating exchange rate. For the estimation, the combination between *mup* and *cpi* is used for examining the

"spending effect" that leads to "indirect de-industrialization": the effect of mining and quarrying on consumer prices.

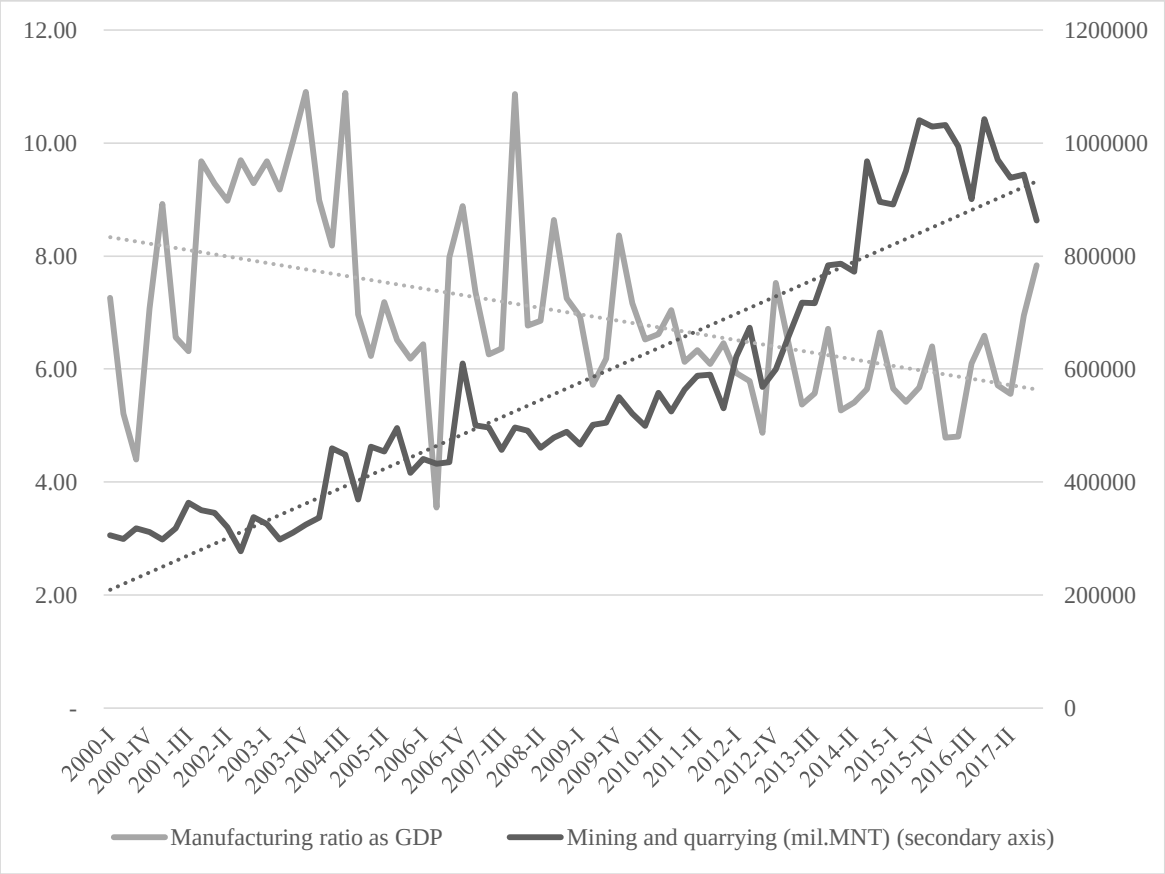
The fourth variable of investment-GDP ratio (*ioy*) is used to check the CAE. The ratio is expressed as "gross fixed capital formation" as a percentage of GDP, derived from the NSO in the category of GDP by type of expenditure. However, the NSO started the calculation of GDP by expenditure type since the first quarter of 2005, and quarterly data of investment-GDP ratio is only available from that time. The combination of *mup* and *ioy* is used for estimating the CAE.

The last variable of real GDP per capita (*ypc*) is a control variable in a VAR model estimation since the development stage of a country might affect manufacturing and investment to GDP ratios.

The data for the mining and quarrying (*mup*) and real GDP per capita (*ypc*) variables are processed by a seasonal adjustment (x12). For the VAR model estimation, the data for all the variables are converted into natural logarithm form to avoid the heteroskedastic in the error terms.

Figure 6 shows that the linear trends of *mup* and *moy* might have an ultimate effect of the "Dutch Disease", which is a crowding-out of manufacturing. However, it should be evaluated statistically by using the VAR model. Then, we would like to find what kinds of macroeconomic and public financial policies should be implemented to escape from the crowding-out effect on the manufacturing sector, if Mongolian economy is in the beginning stage of "Dutch Disease".

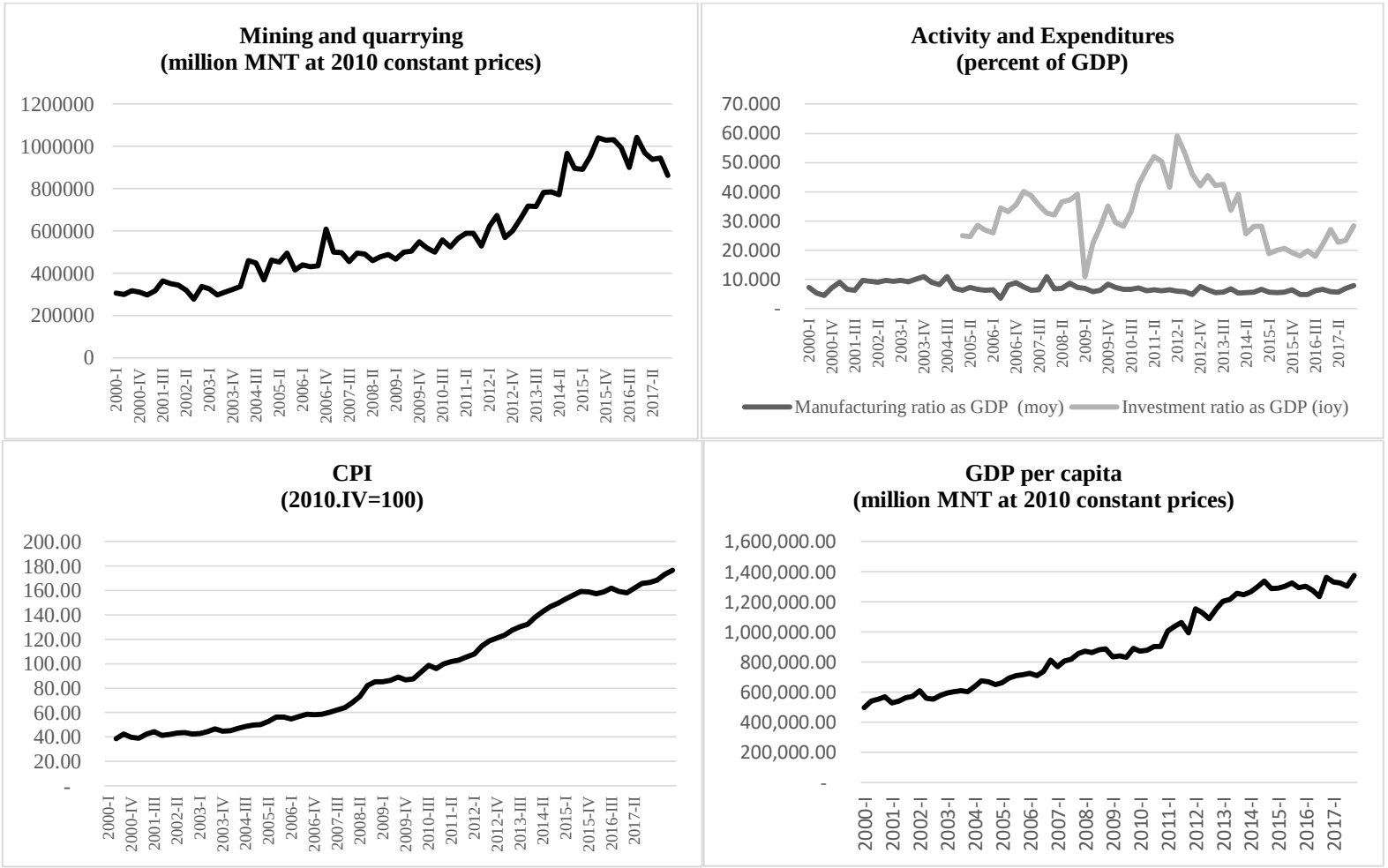
Figure 6. Quarterly time-series data of Manufacturing ratio as GDP and Mining and quarrying (mil. MNT at 2010 constant price) of Mongolia between 2000–2017 with seasonal adjustment



Source: National Statistical Office, Mongolia

Figure 7 simply displays the five variables above with seasonal adjustment. In Figure 7, the manufacturing-GDP ratio does not appear to change so much over the selected period, while mining and quarrying production shows a sharp increasing trend. The hike of consumer prices is also noticeable, thereby seeming to exhibit the "Dutch Disease" phenomenon. The statistical test should, however, be used to check the dynamic correlations of variables in a more sophisticated way, since the variables are interacting with each other. There comes the necessity to conduct a VAR model estimation in the subsequent section.

Figure 7. Time series of the variables used in the estimation (with seasonal adjustment)



Source: National Statistical Office, Mongolia, www.1212.mn

4.2 Methodology for a VAR Model Estimation

This section clarifies the methodology for a VAR model estimation. The reason why the study adopts a VAR model for the "Dutch Disease" analysis is that the VAR model allows for potential and highly-likely endogeneity among the aforementioned five key variables, and also for tracing out the dynamic responses of variables to the structural shocks. The endogeneity can be described, for instance, in the interaction between mining sector's production and manufacturing activity: whereas a boom in mining sector may crowd out manufacturing activity as the "Dutch Disease" effect, the manufacturing activity itself may also affect an economy's dependence on mining sector. In that case, a single-equation regression usually causes an estimation bias. A VAR model, instead, allows for potential endogeneity and lets the data determine the "impulse responses" of variables to the structural shock of mining sector's production. The VAR model estimation thus makes it possible to explore the "Dutch Disease" effects (the resource movement effect and the spending effect) and the capital accumulation effect from the mining sector shock, comprehensively.

Before the VAR model estimation, the unit root test should be conducted for each endogenous variable to examine the data stationarity, and if needed, a co-integration test for a set of variables' data should be checked. The unit root test is conducted with the null hypothesis that individual data is a unit root at their a level and/or a first difference. This study uses the augmented Dickey-Fuller (ADF) test (Said & Dickey, 1984) for examining the stationary property of data. If each endogenous variables are not stationary at their "level", but stationary at first difference, i.e., *I(1)*, the Johannsen co-integration test (Johansen, 1995) could be further examined on the "level" data of set variables. We could finally use the "level" data for a VAR model estimation if the co-integration test shows that a set of variable data have a co-integration.

Table 3 reports the result of both unit root and co-integration tests. For the data of all four endogenous variables, the unit root test identified a unit root in their levels, but rejected it in their first differences at the conventional level of significance, thereby the variables following the case of $I(1)$. The co-integration test was, thus, conducted further on the combination of variables for examining the "Dutch Disease" effect (the resource movement effect and the spending effect) and the capital accumulation effect, and both the trace test and the Maximum-eigenvalue test implied that the level series of a set of variables'

data were co-integrated. Thus utilization of the level data for a VAR model estimation is appropriate.

Table 3. Unit root ADF and Johansen co-integration test results

ADF unit root test

Endogenous Variables	Level (intercept and trend)			First difference (intercept)		
	Statistics		Result	Statistics		Result
mup	t-stat	-0.608798	non-stationary	t-stat	-8.966410	Stationary
	p-value	0.8612		p-value	0.0000	
cpi	t-stat	-2.757322	non-stationary	t-stat	-7.932892	Stationary*
	p-value	0.2179		p-value	0.0000	
moy	t-stat	-1.746156	non-stationary	t-stat	-8.775378	Stationary
	p-value	0.4038		p-value	0.0000	
ioy	t-stat	-1.742403	non-stationary	t-stat	-13.28000	Stationary
	p-value	0.4039		p-value	0.0000	

**-with trend*

Johansen cointegration test

Set of variables	Trace		Max-Eigen	
	t-stat	p-value	t-stat	p-value
mup&moy	48.17349	0.0000	31.07107	0.0001
mup&cpi	26.13406	0.0069	17.40511	0.0288
mup&ioy	53.20270	0.0000	41.31779	0.0000

Source: Author's Estimation

A VAR model for estimation is shown as follows.

$$y_t = \mu + V_1 y_{t-1} + V_2 z_t + \varepsilon_t \qquad (1)$$

where y_t is a column vector of the endogenous variables with year t, i.e., $y_t = (mup_t\ moy_t)'$ for examining the resource movement effect, $y_t = (mup_t\ cpi_t)'$ for the spending effect, and $y_t = (mup_t\ ioy_t)'$ for the capital movement effect; μ is a constant vector; V_1 and V_2 is a coefficient matrix; y_{t-1} is a vector of the lagged endogenous variables; z_t is a vector of the control variable of real GDP per capita (*ypc*); and ε_{it} is a vector of the random error terms in the system. The lag length (-1) is selected by the Schwarz Information Criterion with maximum lag equal to (-6) under the limited number of observations.

Table 4. VAR model lag selection criteria

VAR model	***Schwarz information criteria***	***Akaike information criteria***
mup&moy	*1**	*6*
mup&cpi	*1**	*1*
mup&ioy	*1**	*6*

**-selected lag length for the estimation*

Source: Author's Estimation

Based on the reduced-form VAR model estimation (1), the study examines the impulse responses of variables to exogenous shocks: the response of *moy* to the *mup* shock for examining the resource movement effect, the response of *cpi* to the *mup* shock for the spending effect, and the response of *ioy* to the *mup* shock for the capital accumulation effect.

In examining the impulse response under the assumption of the contemporaneous interaction between the pair of variables, the structural shock should be identified by imposing some restrictions in the VAR model specification. In general, to identify structural shocks, there are several approaches to impose the restrictions: short-run restrictions and long-run restrictions. This study, based on the theoretical framework presented in Section 3, employs the Cholesky restriction as one of the short-run restrictions with the following recursive orders: from *mup* to *moy* for the resource movement effect, from *mup* to *cpi* for the spending effect, and from *mup* to *ioy* for the capital accumulation effect. By imposing the Cholesky restriction, the error term of reduced-form equation (1) could be linked with the structural shock in the model. In the estimated results, the negative response of *moy* to the *mup* shock would imply the existence of the resource movement effect; the positive response of *cpi* to the *mup* shock would suggest the existence of the spending effect; and the positive response of *ioy* to the *mup* shock would indicate the existence of the capital accumulation effect.

4.3 Estimation Outcomes and Interpretation

The estimated outputs of the VAR model are shown in Table 5. Table 6 and Figure 8, respectively. Regarding the Dutch Disease effect, manufacturing-GDP ratio (*moy*) responds negatively to the shock of mining and quarrying (*mup*) at 95 percent significant level in the 2^{nd} to 4^{th} quarter after the shock, thereby implying the existence of the resource movement effect. Consumer prices (*cpi*) responds slightly positive to the shock of mining and quarrying (*mup*) after one-year (first four-quarter) lag. However, impulse response shows a

statistically insignificant result of spending effect at 95 percent significant level. Therefore, we are not able to discuss about SE in this study anymore. The fact is, however, that during the boom of mining sector, Mongolian economy has experienced two-digit inflation and the inflows of foreign direct investment increased sharply. As for the capital accumulation effect, there is no positive response, but even a negative response of investment-GDP ratio (*ioy*) to the shock of mining and quarrying (*mup*).

Thus the estimation outcomes here imply that there is a possibility that Mongolian economy has been suffering from the "Dutch Disease" through the resource movement effect, such that manufacturing activities reduced by the boom in the mining sector and the boom has not contributed to, or even deteriorated the capital accumulation effect that alleviates the "Dutch Disease".

Also, the result of the empirical study could be proven by actual stories in Mongolian economy. For the period from 2001 to 2008 and from 2010 to 2013, Mongolian economy entered two booming stages in the mining sector and accepted a sore of inward foreign direct investment in that sector. Under this situation, a number of workers were shifted to the mining sector (the resource movement effect). At the same time, the Government launched the cash handout to the public from the "Human Development Fund" financed by the mining sector's revenues, which accelerated the inflation through the consumption expansion and the loss of the capital accumulation.

Table 5. Estimated VAR model

Resource movement effect	*mup*	*moyl*
mup(-1)	0.579015* [7.20142]	-0.376116 [-2.06375]
moyl(-1)	-0.098104** [-2.18687]	0.513250 [5.04746]
ypc	0.420123* [5.25813]	0.430300 [2.37592]
Adj. R-squared	0.948382	0.226732
Spending effect	*mup*	*cpi*
mup(-1)	0.628829* [6.92424]	0.008589** [0.27464]
cpi(-1)	0.274076* [3.87670]	0.991256** [40.7128]
C	3.695858 [4.07933]	-0.053900 [-0.17275]
Adj. R-squared	0.941780	0.995831
Capital accumulation effect	*mup*	*ioyl*

mup(-1)	0.567101*	-1.633057
	[6.28108]	[-3.59332]
ioyl(-1)	-0.060973**	0.039018
	[-2.28066]	[0.28994]
ypc	0.433625*	1.812962
	[4.80056]	[3.98737]
Adj. R-squared	0.926903	0.210503

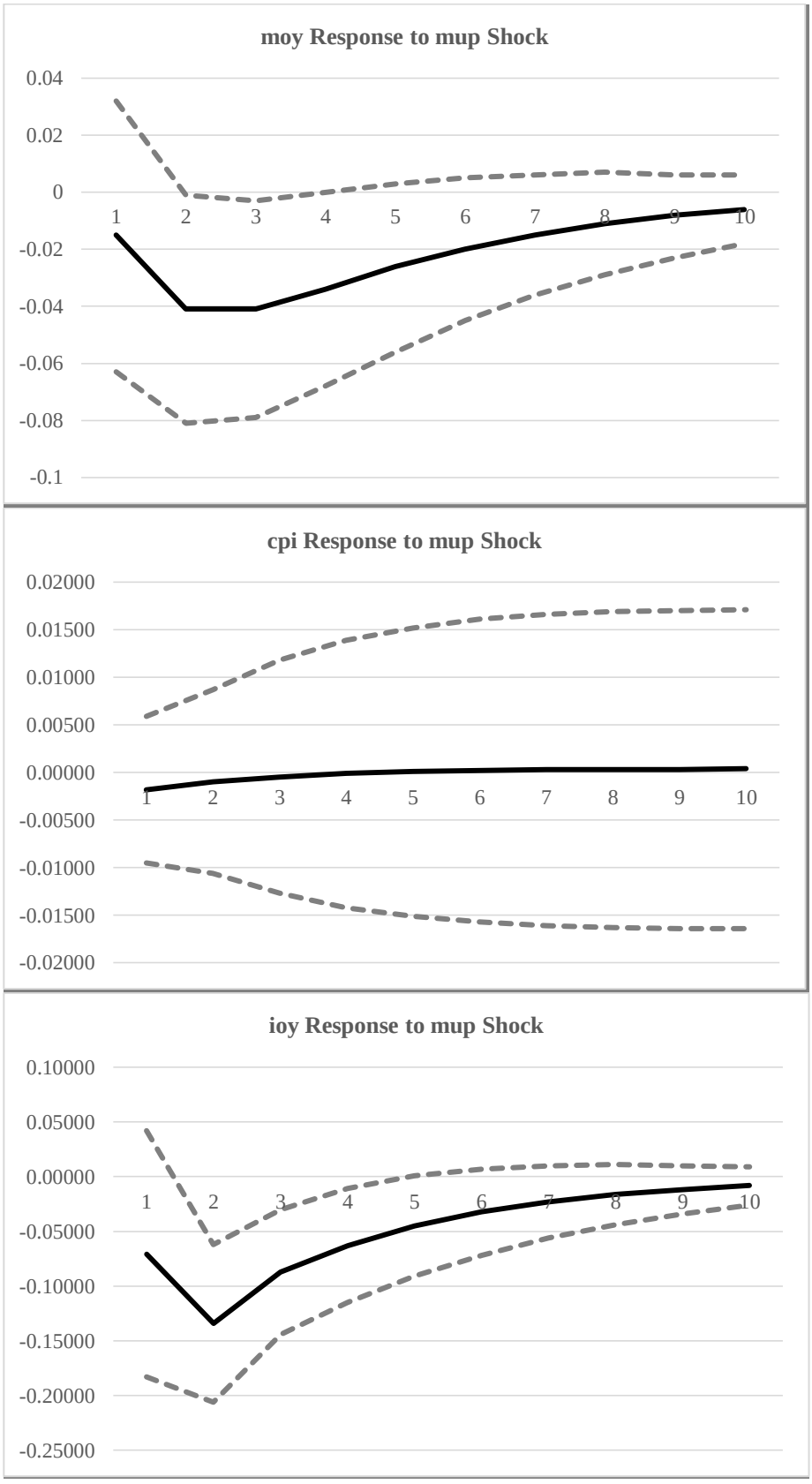
Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively. The figure in [ ] are t-value.
Source: Author's Estimation

Table 6. Estimated Impulse Responses of the model

Period	***moy* response to *mup* shock**	***cpi* response to *mup* shock**	***ioy* response to *mup* shock**
	RME	***SE***	***CAE***
1st quarter	-0.015273	-0.001787	-0.070551
	(0.02376)	(0.00384)	(0.05637)
2nd quarter	**-0.041106****	-0.000965	**-0.134346****
	(0.02011)	(0.00483)	(0.03597)
3rd quarter	**-0.040923****	-0.000453	**-0.086893****
	(0.01886)	(0.00611)	(0.02847)
4th quarter	**-0.0340****	-0.000135	**-0.063072****
	(0.01680)	(0.00701)	(0.02597)
5th quarter	-0.026485	6.27E-05	**-0.044958***
	(0.01466)	(0.00759)	(0.02298)
6th quarter	-0.020079	0.000185	-0.032135
	(0.01260)	(0.00794)	(0.01973)
7th quarter	-0.015038	0.000261	-0.022959
	(0.01067)	(0.00816)	(0.01653)
8th quarter	-0.0112	0.000308	-0.016405
	(0.00893)	(0.00828)	(0.01357)
9th quarter	-0.008319	0.000337	-0.011721
	(0.00739)	(0.00835)	(0.01097)
10th quarter	-0.006171	0.000355	-0.008375
	(0.00606)	(0.00839)	(0.00875)

Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively. The figure in ( ) are standard errors.
Source: Author's Estimation

Figure 8. Estimated Impulse Responses



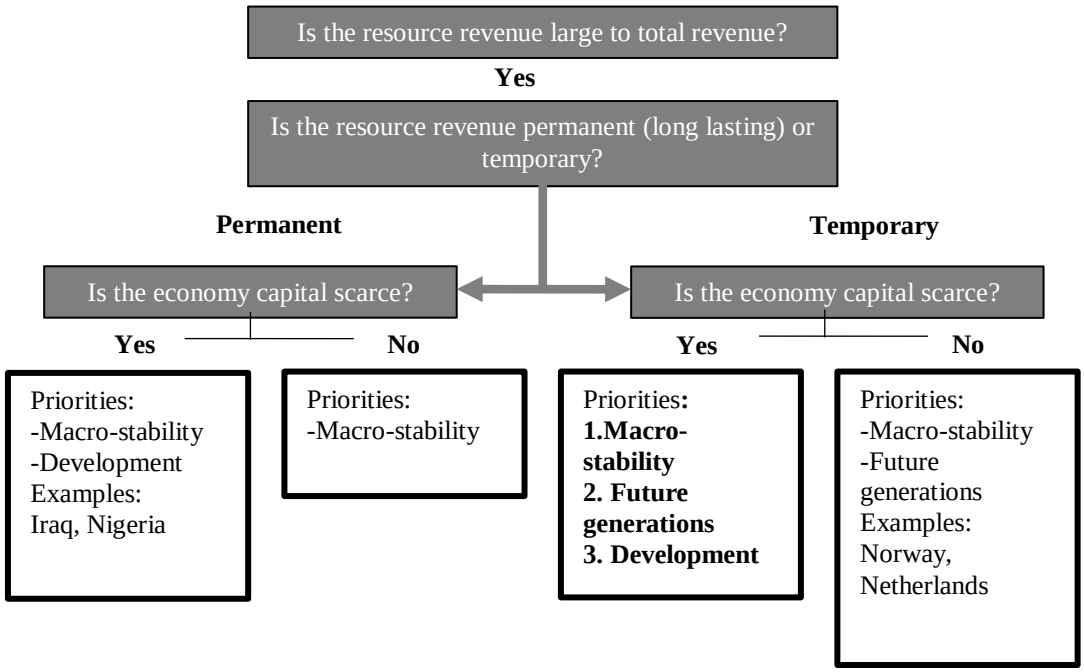
Note: The dotted lines represent a 95 percent error band over two and half-year horizons .
Source: Author's Estimation

5. Policy Implications: Strengthening of Public Financial Management

The empirical study in the previous section showed that Mongolian economy, although expected to sustain economic growth as a middle-incomer, would fall into the resource "curse" in terms of the Dutch Disease. The boom of the mining sector attracted labor force from the manufacturing sector and the resource movement effect of the "Dutch Disease" was found by the result of VAR model estimation. At the same time, during the booming period of mining, windfall revenues were used by the Government of Mongolia to finance social welfare programs, especially cash-handout to the public. Thus this process negatively affected the capital accumulation of the country, as the empirical study indicated. Therefore, the answer to the question of how Mongolia could escape from the "Dutch Disease" is obviously to strengthen its PFM from resource "curse" from to resource "blessed" one. Then the issue in this section is how to strengthen the current PFM, including NRFs of Mongolia as international organizations and the literature suggested.

According to the IMF (2007) classification, if a country's resource revenue is large (20-25 percent) to total fiscal revenue, it is considered as a resource-dependent country. As mentioned in the literature review, Baunsgaard et al. (2012) developed a decision tree to determine public financing policy priorities for RRDEs based on countries' specific features and characteristics as follows. Figure 9 shows that those RRDEs, who have a temporary resource revenue and capital scarce economy like Mongolia, should implement a fiscal and public financial policy and management with three main priorities: the first one is a macro-stability, which is a common strategy needed for all resource-rich countries; the second priority is to save money for a future generation; and the last priority is a development in terms of capital accumulation, specifically, for the fields of education, human resource development, and economic infrastructure to promote industrial diversification. We herein discuss these three priorities as follows.

Figure 9. Decision Tree to Determine Public Financial Management Priorities



Source: Baunsgaard et al. (2012)

Regarding the first priority of macro-stability, as many international organizations and scholars argued, the fluctuation of resources prices causes unpredictable resource revenue and uncertainty for macroeconomic policy. The boom-and-bust cycles of the economy have occurred in Mongolia since the 2000s, and her economic growth has followed the serious fluctuation of international resource prices. Moreover, public financing would be influenced by short-term political interests and rent-seeking activities, which would lead to the over-spending for wasteful consumptions and low-return investments (and would finally lead to the Dutch Disease). Hence comes the necessity to insulate fiscal spending from these volatilities and political pressures. For that purpose, setting up natural resource funds (NRFs) could be one of the useful tools in public financial management (PFM) in resource-rich countries. Demachi and Kinkyo (2015) showed that the NRFs are considered as a policy tool in PFM with two different time-frames: dealing with high price volatility and stabilizing the macro economy to avoid the resource "curse". In Mongolia, the "Fiscal Stabilization Fund" (FSF) was established according to the Fiscal Stability Law (FSL) enacted by the Parliament in 2010. The main purpose of the FSF is to manage and handle windfall mining revenues and to improve macro-economic stability and fiscal disciplines. The income of the FSF is coming from the difference between actual income and the calculated income based on the benchmark prices, which are defined as a 16-year backward and forward moving average of mineral prices. The past 12-years actual prices, and current and next three-year

future prices are included in the moving average calculation. The FSF receives the income transfers when actual income is higher than the calculated benchmark income. This rule is applied even though there is a budget deficit in the FSL. On the other hand, the World Band (2016) reported that no net financial wealth has been accumulated in the FSF since 2010. In fact, there were the cases that the FSF money was used to finance promissory note by the Government with political influences in 2015 and 2016. The current situation of the FSF in Table 7 shows that the net financial accumulation will be around 40.0 million USD (104.2 billion MNT) in 2019. Within 10 years since its establishment, the FSF's accumulation is relatively low compared to neighboring countries: for instance, Kazakhstan has a national wealth fund established in 2008 with a total asset of 74.1 billion USD, which is 1,800 times larger than the Mongolian FSF.

Table 7. Current situation of Fiscal Stabilization Fund, (billion MNT)

Revenue and Expenditures	**2016**	**2017**	**2018**	**2019**
Total Revenues	**10.1**	**345.6**	**122.7**	**322**
Royalties and taxes	-	*325.7*	*122.7*	*322*
Interest income	*10.1*	*14.6*	-	-
Government Fund amount	-	*5.3*	-	-
Total Expenditures	**-**	**572.1**	**122.7**	**322**
FSF accumulation	**332**	**104.2**	**104.2**	**104.2**

Source: Ministry of Finance, Mongolia

Therefore, the Mongolian FSF couldn't sustain her economy during the recession derived by the fall of mineral prices from 2012 to 2016, and domestic and foreign debts with high-interest rate were utilized for public financing.

In sum, on the first priority of macro-stability, Mongolia has the FSF for the purpose of stabilizing her economy from the fluctuations of resource revenues. This fund, however, has no net financial wealth currently, and could not perform well against the volatility during the recession. This is evidence that the FSF management as a tool of PFM is in a need of rethinking and strengthening in order to make it work properly. The FSF management could be reformed only in the case that the decision-makers and political parties understood that Mongolia is beginning to suffer from the "Dutch Disease", and that inefficient projects and programs stopped to reduce budget deficits that are financed by the FSF over the last decade.

As for the second policy priorities, savings for the future generation had never been done in Mongolia, before a law on Future Heritage was approved in 2016 and putted into force in 2017, which established one of the current NRFs named "Future Heritage Fund" (FHF). The FHF is now paying off the debt of Human Development Fund (2009-2017), which replaced the Mongolian Development Fund (2007-2008). As was mentioned before, the previous funds, particularly, the Human Development Fund (HDF), had been utilized for the cash handout to the public for the social welfare purpose, which raised consumption but not an investment and leaded two-digit inflation. In order to fulfill the promise to give 1.5 million MNT (now it is around 600USD) per citizen of Mongolia after the election, 500.0 thousand MNT financed by HDF was given in cash to every citizen during the period of 2010-2012. Remaining 1.0 million MNT was given to citizens by two options to choose. The first option was that those who met special requirements such as age limit and poor living condition could have it in cash by the Resolution#116 of the Government of Mongolia in 2012. It could be the main reason why Mongolian economy could not accumulate capital. All money was poured into consumption and it accelerated the "Dutch Disease". It tells how the PFM in RRDEs is important in macroeconomic policies. The second option of the political promise was that remaining 1.0 million MNT was paid by 1,072 shares of "Erdenes Tavan Tolgoi" state-owned joint company that holds the most strategic mining licenses if a citizen has an account in broker/dealer companies registered in Mongolian Stock Exchange (MSE). The second option is still under the process since all citizens do not have enough knowledge about shares and account related to stock exchanges.

Since 2017, there has also been NO wealth accumulated in the FHF, because the debt shifted from the HDF was paid by the revenues of the FHF as mentioned before. Table 8 shows that: in 2019 more than 70 percent of the revenue of FHF will come from the royalties and tax income from mining and quarrying activities; remaining 30 percent will be transferred from dividends of state-owned companies in mining sector; and only in 2019 553.1 billion MNT is expected to be saved in the fund. This is the first time to start savings from natural resources revenue to future generations of Mongolia.

According to the Law on Future Heritage, the money accumulated in the FHF will not be spent until 2030, unless efficient allocation in the form of domestic and foreign investment and asset is approved by the Government.

Table 8. Current situation of Future Heritage Fund, (billion MNT)

Revenue and Expenditures	2016	2017	2018	2019
Total Revenues	**HDF**	**357.7**	**508.7**	**1,068.5**
Dividends		-	47.8	300.9
Royalties and taxes (65%)		357.7	460.9	767.6
Total Expenditures		**357.6**	**508.7**	**515.4**
Budget financing (according to the law)		160.0	100.0	50.0
Payment for the debt of HDF		197.6	408.7	465.4
Debt amount of HDF	**1,071.9**	**875.0**	**465.4**	**-**
FHF accumulation	**-**	**-**	**-**	**553.1**

Source: Ministry of Finance, Mongolia

Then the question arises on whether Mongolian natural resource funds (NRFs), "Fiscal Stabilization Fund (FSF)" and "Future Heritage Fund (FHF)", have been a successful case or not?". Since there will be no utilization but only savings until 2030, the FHF could rather be a neutral solution against the "Dutch Disease", while the FSF is in need of reformation and independence from the political pressures and interests. In order to answer the question above in a more proper way, however, we should discuss the third priority.

The third PFM priority of "development" is directly related to the allocation of the resource revenues in RRDEs. Basically, there has been a controversy on whether the funds should be saved or invested. This depends on the development stage of a country, and in the case of developing countries including Mongolia, the funds should be used for investments. Sachs (2007) argued that resource earnings should be used for public investment to facilitate capital accumulation. JICA (2016) also emphasized that the domestic investment would have the potential to yield higher benefit compared to the investment to international capital markets, due to the capital scarce situation in developing countries. Baunsgaard et al. (2012) also argued that low-income countries usually have the less capital, which might be below the "steady state-level"; under their capital scarcity the rate of return to capital is likely to be higher than that to financial assets; and investing more resource revenues for domestically could raise potential non-resource growth in their countries.

The concept of the funds for investments is also consistent with the argument of Sachs (2007) with an emphasis on the role of public investment. Focusing on the funds for investment, then, what kinds of investments should be promoted would be another critical

question. Coutinho (2011) represented the investment strategies for managing resource revenues, which could be drawn as common lessons from successful practices in Botswana, Indonesia, Malaysia, and Chile, as follows: the resource revenues should be invested in 1) human resource development and education as a way of boosting permanently incomes, increasing labor productivity and also spreading benefits across generations; and 2) economic infrastructure to diversify the economy so as to insulate it from external shocks in the mining sector in the mid and long term.

This section finally provides the following policy implications and suggestions on current PFM of Mongolia. In managing the FHF, the part of the fund should be allocated for domestic investment as Sachs (2007) suggested, and specifically for the projects on human resource development and education, and economic infrastructure to facilitate industrial diversification as Coutinho (2011) suggested. In particular, the industrial diversification is the vital requirement for Mongolian economy to sustain its growth by enhancing the resilience against the resource sector's volatilities. Another suggestion is that the investment allocation for the NRFs need some framework independent from political pressure. Anty (2007) proposed the establishment of an independent unit that would evaluate the rate of return of each public investment project. Coutinho (2011) picked up the stories on the roles of the "technocrats" in Indonesia and "Chicago boys" in Chile in the resource revenue allocation and economic management.

6. Conclusions

This study diagnosed Mongolian economy on whether the economy has suffered from the Dutch Disease by applying a VAR model with quarterly data from 2000 to 2017 of the National Statistical Office, Mongolia (NSO). The paper also extracted some policy implications for transforming the public financial management from resource-curse form to resource-blessing one. The results of a VAR model estimation found that there is a great possibility that Mongolian economy has been suffering from the Dutch Disease through the resource movement effect such that manufacturing activities reduced by the boom in the mining sector and the boom has not contributed to, or even deteriorated the capital accumulation effect that alleviates the "Dutch Disease".

The strategic policy implications for the current Mongolian public financial management are that the part of the existing resource fund should be used for public investment to facilitate capital accumulation, specifically, for the projects on education,

human resource development, and economic infrastructure to promote industrial diversification. In particular, the industrial diversification is the vital requirement for Mongolian economy to sustain its growth by enhancing the resilience against the resource sector's volatilities. Another suggestion is that the allocation of investment of the current natural resource funds need some framework of independence from political pressure.

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