ECONOMIC RESEARCH INSTITUTE

REVENUE MANAGEMENT

Fiscal Sensitivity Analysis

ULAANBAATAR

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List of Abbreviations

BoM	Bank of Mongolia
CGE	Computable general equilibrium
FDI	Foreign direct investment
FSF	Fiscal Stability Fund
FSL	Fiscal Stability Law
GDP	Gross domestic product
GNP	Gross national product
GoM	Government of Mongolia
IMF	International Monetary Fund
MNT	Mongolian togrog
MoF	Ministry of Finance
NPV	Net present value
ToT	Terms of trade
USD	United States dollar
YoY	Year-on-year

Introduction

Mongolia has experienced a number of economic upturns and downturns over the years. One of the recent economic slowdowns was following the boom in 2012, when mineral commodity prices significantly fell on the world market. As budget expenditure increased and revenues fell, the government's public foreign debt grew substantially. The Fiscal Stability Law (FSL) was adopted in 2010 and a Fiscal Stability Fund (FSF) was established in 2011 to prevent economic fluctuations and to promote sustainable economic growth instead. However, the implementation of these fiscal policies has been delayed and amended a number of times since then.

In the previous study, the impact of the implementation of the FSL on the economy was assessed. The simulations ran indicated that the FSL could counteract and lessen the de-industrialization effect of mining development.

In this study, we analyze sensitivity of economic performance to changes in some of the key requirements in the FSL. The FSL sets ceilings on four key budget indicators such as budget revenue, budget expenditure, deficit, and public debt. In accordance with the FSL, all these quantitative targets have to be met. However, there has been no analysis undertaken on how the budget and economic performance is sensitive to changes in these targets. This study tries to fill this void.

Specifically, we relax the following two key benchmark parameters in the FSL in order to determine their impact on the budget as well as on the economy: ceiling on the growth of budget expenditure and restriction on the budget revenue. The revenue and budget requirements reflect some of the major fiscal issues resource dependent countries face while budget deficit and debt requirements are necessary elements for the FSL.

International cases

For resource-rich developing countries whose economies are mainly driven by commodity exports, some of the issues faced when trying to achieve stabilization and debt sustainability are volatility of commodity prices and depletion of natural resources. Volatility of prices creates macroeconomic instability and depletion of resources can undermine fiscal sustainability and also bring about the question of how to allocate the resource wealth across the generations in a fair and equal manner.

Fiscal rules place a relatively permanent quantitative constraint on government finances by providing a numerical ceiling or target for key budget aggregates, such as budget balance, debt and expenditures. A successfully implemented fiscal rule may help overcome three macroeconomic challenges associated with sustainable management of natural resources: short- to medium-term pro-cyclical fiscal policy, long-run boom-bust cycles and Dutch disease. These challenges have been observed in the case of Mongolia, especially pro-cyclicality and entrapment in the boom-bust cycle. During periods of economic boom, the Mongolian government had a tendency to increase spending and then during bust periods when revenues decline, the government becomes unable to finance salaries or planned development projects.

In a report by the Natural Resource Governance Institute (NRGI), of the 79 countries assessed in its Resource Governance Index (RGI), 34 have at least one fiscal rule in place. Around 40-50 percent of countries have a fiscal rule in place, which is in line with the numbers provided by the IMF dataset. According to the dataset, there were 92 countries with fiscal rules in place in 2015, which is 48 percent of the 193 United Nations member countries.

In order for the fiscal rules to be successful, the rules need to be tailored to each specific country, including that of its mining sector, and enforceability must be supported by strong political institutions, commitment and transparency.

For comparison of fiscal rules, the 89 countries which are included on the Resource Governance Index (RGI) was utilized. In most of the countries listed in the RGI, fiscal rules are legislated and is at a national level.

The two most common fiscal rules implemented are budget balance and debt with 27 and 23 countries implementing it, respectively. A budget balance rule allows governments to accumulate savings or balance their budgets. Similar to Mongolia, Chile, Colombia, Peru and the United Kingdom have structural budget balance rules, which allows for adjustments of target depending on whether there is a boom or downturn. Alternatively, Tanzania, Norway, Botswana and Ecuador use a non-resource budget balance target that is the difference between expenditures and all revenues except for resource revenues. This rule ensures that the government follows the same budget plans irrespective of resource revenue fluctuations, thus stabilizing the macroeconomy and lessening the dependence upon resources.

Of the RGI countries, 23 countries have a debt rule in place, which limits public debt as a percentage of GDP. In the short term, level of debt is often impacted more by interest and exchange rates rather than budgetary measures and policies. However, in the case of resource rich countries, the debt rule blocks a government from borrowing during a slump in commodity prices.

Resource-rich countries consider expenditure rules to curb spending stemming from expected future wealth. For instance, Tanzania has in place a limit on its recurrent expenditure growth which is in nominal GDP; however, this can cause pro-cyclical tendencies if rising resource GDP boosts nominal GDP. Revenue rules are ideal for resource-rich countries where flow of resource revenues into the budget and sovereign wealth funds are limited. However, this rule is only effective if paired with limitation on borrowing or debt. Otherwise, governments may save the appropriate amount but borrow to achieve elevated levels of spending.

Most countries with fiscal rules in place have more than one type of rule implemented. Mongolia, for instance, combines these four main fiscal rules in its own way.

Current state

The FSL is a cornerstone of Mongolia's revenue management policy. The FSL came into effect in 2013. However, during the postponement of some requirements of the FSL, the savings generated in the FSF were inadequate. Without sufficient savings in the fund, the government turned to loans to cover budget deficit during economic difficulties. The increase in public debt prolonged the periods of deficit in recent years. For instance, by the end of 2016, public debt increased to account for over 80 percent of GDP and over 25 percent of budget revenue was allocated to interest payments of public debt.

Figure 1. Public debt, billion USD
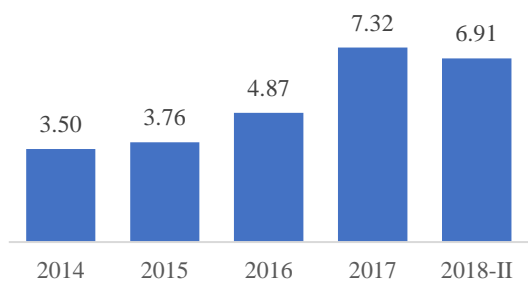
Source: Bank of Mongolia

Figure 2. Interest payment to total budget revenue, percent
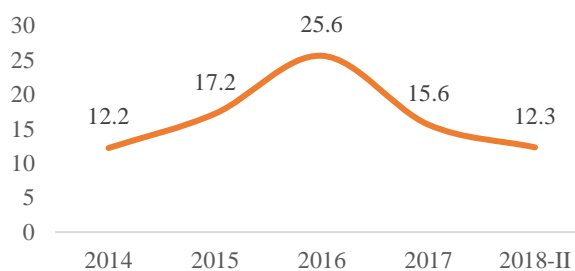
Source: Ministry of Finance

The decrease in the percentage of interest payments to total budget revenue was mainly due to an increase in budget revenue. In 2017, budget revenue increase by over 20 percent as commodity prices surged and the economy recovered. Prices of coal, crude oil, copper, and iron ore increased by between 20-30 percent from 2016 to 2017 (refer to base model for more information on prices of mineral commodities).

The World Bank expects the Mongolian economy to continue to improve, despite large public debt payments and repatriation of profits, due to large FDI inflows and donor assistance as part of the International Monetary Fund (IMF) program. The following debt to GDP forecasts were made by the World Bank considering the ongoing IMF supported adjustment and assistance programs.

Figure 3. Debt/GDP, percent
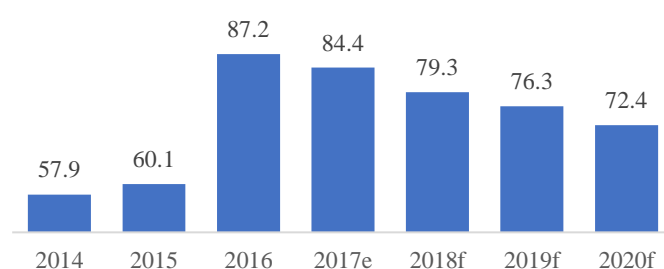
Source: World Bank

Past and current analyses of the Mongolian economy has identified two major vulnerabilities. The economy's performance is extremely vulnerable to global commodity prices. This brought on the adoption of the FSL; however, diligent implementation of the law faces a number of challenges. Another critical long-term vulnerability is that past economic growth was derived from the physical accumulation of capital rather than improvements in factor productivity. These two vulnerabilities are closely related as most accumulation of capital is financed by large inflows of FDI, which in turn is based on the judgment of external investors on the medium and long-term prospects of Mongolia's mining production and exports.

As the simulations will be focused on the budget revenue and expenditure requirements of the FSL, an overview of past budget plans and performance could provide some helpful insights into the projection of revenue and expenditure. The following table compares planned versus actual performance of budget

Table 1. Planned and actual general budget revenue and expenditures from 2012-2017, billion MNT

	2012	2013	2014	2015	2016	2017
REVENUE						
Planned	5,714.02	6,448.55	7,110.24	6,076.34	5,429.14	7,112.87
Actual	4,975.83	5,986.93	6,316.52	5,983.40	5,835.04	7,922.49
Difference	738.20	461.63	793.71	92.94	-405.90	-809.62
Diff/Planned %	13%	7%	11%	2%	7%	11%
EXPENDITURE						
Planned	6,473.72	6,886.65	7,612.05	7,253.17	9,992.15	9,154.51
Actual	6,017.80	6,164.69	7,144.57	7,137.97	9,495.33	8,980.98
Difference	455.92	721.97	467.48	115.20	496.82	173.54
Diff/Planned %	7%	10%	6%	2%	5%	2%
EQUILIBRATED BALANCE	-1,136.63	-224.62	-867.96	-1,156.91	-3,660.29	-1,741.89
% of GDP	8.2%	1.3%	4.0%	5.0%	15.3%	6.4%

Source: State Budget 2012- 2017, Ministry of Finance and ERI's calculation

As it can be observed in the table above, planned and actual budget revenue was pro-cyclical and has fluctuated more than budget expenditure. Moreover, actual revenue performance tends to be short of planned revenue more often than actual expenditure. However, actual revenue exceeded the plan in 2016 and 2017. In general, both revenues and expenditures experience significant fluctuations year to year, which in turn makes projections slightly difficult as observed by the varying difference to planned percentages.

Despite regulatory fiscal and budget reforms over the years, fiscal discipline remains weak. Macroeconomic assumptions and revenue forecasts tend to be overly optimistic and these elevated assumptions lead to extra-budgetary spending, which is then financed with debt whenever actual revenue fall below planned levels. The reason for high revenue projections and optimistic macroeconomic parameters is due a political imperative to expand budget spending. The combination of overestimation of revenue and underestimation of expenditure leads to a deficit equivalent to 5 or more percent of GDP.

Impact of FSL

In the previous report, it was discussed that Mongolia's economic booms and busts are attributable to changes in the mining sector, specifically changes in mineral commodity prices with inflow of foreign direct investment playing a key role. Internationally, fiscal and monetary policies are used to minimize economic fluctuations; however, in Mongolia's case, it seems to amplify the fluctuations. In order to control this amplification, the government and parliament of Mongolia approved the FSL in 2010 to stabilize the economy during mineral commodity price swings. The FSL initially set the following ceilings on four key budget indicators:

1. Total budget revenue must be calculated using an equilibrated method /based on average price of main minerals in last 20 years and average price of subsequent 3 years/

2. The growth rate of total expenditure must not exceed the maximum of the growth rate of non-mining GDP in the same year and the average growth rate of non-mining GDP in the past 12 years

3. The budget deficit based on the equilibrated method must not exceed 2 percent of GDP in the same year or must become surplus

4. The net present value of government debt must not exceed 60 percent of GDP of the budget year

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Box 1. Change in enforcement timeline of FSL

The four fiscal requirements outlined in the FSL were concerning budget revenue, budget deficit, budget expenditure, and net present value (NPV) of government debt, which will be referred to by respective legislative articles 6.1.1, 6.1.2, 6.1.3, and 6.1.4 for clarity.

Over the years, the only fiscal requirement which was amended slightly was Article 6.1.4 where NPV of government debt was increased from 40 percent of GDP to 60 percent in 2016. Although the fiscal requirements have not changed much, the enforcement procedures have been amended a number of times. The table below lists the 2010 and present versions as well as the changes made in between.

2010 version	Present version
• Article 6.1.2 and 6.1.3 shall become effective from 2013	• Article 6.1.2 shall become effective from 2023 and Article 6.1.3 from 2017
• Article 6.1.4 shall become effective from 2014	• Article 6.1.4 shall become effective from 2021
• In order to meet Article 6.1.4 requirement in relation to the real need for development investment sources, revenues to be generated	• In order to meet Article 6.1.4 requirement ~~in relation to the real need for development investment sources, revenues to be generated~~

from minerals deposits of strategic importance, availability of advance payment from the mining of these deposits and repayment schedule of foreign loans disbursed in the previous years, NPV of total public debt shall not exceed 50% of GDP in 2011, 60% in 2012, 50% in 2013 and 40% starting from 2014 • The government shall issue a loan guarantee to the state-owned development bank for the amount of the NPV of total public debt that exceeds 40% of GDP for the purpose of development investments until the moment of generating financial savings • The condition set for Article 6.1.4's effectiveness shall be provided prior to 2018 • Amendments and alterations to law may be made by a vote of two-thirds of members of the State Great Hural during a plenary session	~~from minerals deposits of strategic importance, availability of advance payment from the mining of these deposits and repayment schedule of foreign loans disbursed in the previous years,~~ NPV of total public debt shall not exceed 58.3% of GDP in 2015, 88% in 2016, 85% in 2017, 80% in 2018, 75% in 2019, 70% in 2020 and 60% starting from 2021 • ~~The government shall issue a loan guarantee to the state-owned development bank for the amount of the NPV of total public debt that exceeds 40% of GDP for the purpose of development investments until the moment of generating financial savings~~ • ~~The condition set for Article 6.1.4's effectiveness shall be provided prior to 2018~~ • ~~Amendments and alterations to law may be made by a vote of two-thirds of members of the State Great Hural during a plenary session~~ • The deficit specified in Article 6.1.2 shall not exceed 5% of GDP in 2015 and 18.5% in 2016 • In calculating the budget deficit, projects and activities financed by foreign borrowings shall not be included • The budget deficit specified in Article 6.1.2 shall not exceed 10.4% of GDP in 2017, 9.5% in 2018, 6.9% in 2019, 5.1% in 2020, 3.6% in 2021, 2.8% in 2022 and 2% or be in surplus starting from 2023

2015
- *Amendment*: Article 6.1.2 shall become effective from 2018 and Article 6.1.3 from 2013
- *Amendment*: Article 6.1.4 shall become effective from 2018
- *Amendment*: Article 19.3 was shorten as shown above and NPV of total public debt to GDP was changed so it would not exceed 58.3% in 2015, 55% in 2016, 50% in 2017, 40% starting from 2018 (**some crossed out**)
- *Invalidated*: Article 19.4 pertaining to government loan guarantee to state-owned development bank (**crossed out**)
- *Addition*: Article 19.6 outlining that budget deficit shall not exceed 5% of GDP in 2015, 4% in 2016, 3% in 2017 and 2% starting from 2018
- *Invalidated*: Article 19.7 pertaining to amendments and alterations to law with a 2/3rd vote (**crossed out**)
- *Addition*: Article 19.8 pertaining to not including foreign borrowing financed projects in deficit calculations (**present version**)

2016
- *Amendment*: Article 6.1.2 shall become effective from 2020 and Article 6.1.3 from 2017
- *Amendment*: Article 6.1.4 effective year (**present version**)
- *Amendment*: NPV of total public debt to GDP limitations (**present version**)
- *Amendment*: Article 19.5 pertaining to condition set for Article 16.1.4's effectiveness in 2018 was changed to 2020
- *Amendment*: budget deficit to GDP shall not exceed 5% in 2015, 18.5% in 2016, 9.9% in 2017, 7.5% in 2018, 5.5% in 2019, and be in surplus starting from 2020

2017
- *Amendment*: Article 6.1.2 and 6.1.3 effective years (**present version**)
- *Invalidated*: Article 19.5 (**crossed out**)
- *Amendment*: budget deficit to GDP limitation in 2015 and 2016 (**present version**)
- *Addition*: budget deficit to GDP limitations from 2017 and on (**present version**)

Source: Fiscal Stability Law

Another condition was added to the conditions under which the fiscal requirements could be temporarily suspended in 2015. The additional condition was that if the official exchange rate announced by the BoM at year-end was 15 percent or higher than the previous year, the government foreign debt portfolio specified in Article 6.1.4 may be temporarily suspended for two years as measures are taken to meet the fiscal requirement.

The sections pertaining to the FSF and its management in the FSL underwent a number of amendments and its effective date was postponed to 1 January 2024. These changes will be addressed more in-depth in the next report.

The impact of the FSL is expected to be more significant as the government budget experiences increasing pressure from foreign debt repayment. Thus, previous study looked at Mongolia's revenue management in order to study the economic effects of implementing the FSL using an in-house Computable General Equilibrium Model (CGE). The main findings from the previous study was that the growth of the non-mining sector is higher under FSL, an indication of de-industrialization and the implementation of the FSL does not have a significant impact on the means of select macroeconomic variables; however, the magnitude of variances of select variables were significantly less.

The implementation of the FSL will provide Mongolia with a counter cyclical fiscal policy and reduce the negative impacts of mineral commodity price fluctuations. In addition to this, the government needs to focus on increasing its saving accumulated in the FSF which plays a considerable role in stabilization of the economy during times of economic difficulties related to the mining sector. Ultimately, the stability of the economy depends on the government's implementation and application of the FSL and its fiscal discipline.

However, the law has been amended and modified multiple times to accommodate the government's failure to meet its original budget targets. The study analyzes the sensitivity of economic performance to changes in key FSL requirement. As there have been no analysis made on the budget and economic performance sensitivity to the requirements, this study attempts to provide an insight into this unresearched topic.

Two key benchmark parameters of the FSL is relaxed to determine their impact on the budget as well as the economy. The two parameters we've chosen to focus on is the ceiling on the growth of budget expenditure and restriction on the budget revenue.

Simulations

The aim of the simulations is to assess the impacts of the two major provisions outlined in the FSL, specifically the budget revenue and expenditure constraints. The FSL was put into effect in 2013; however, the requirements related to the budget deficit and public debt were amended to accommodate government's failure to meet its original budget targets. In its nature, these two requirements are necessary elements for FSL. It is clear that the budget and economic performance is very sensitive to changes in these two requirements. For this reason, the research team chose to focus on the impacts of budget revenue and expenditure requirements of the FSL and its impact on the Mongolian economy. Therefore, in our proposed simulations, we carry out four simulations: (i) base simulation with all four main restrictions of the FSL; (ii) simulation-1 relaxes only the restriction on budget expenditure; (iii) simulation-2 relaxes the restriction on budget revenue; and (iv) simulation-3 relaxes both the restrictions on budget expenditure and revenue.

Base simulation

In the base simulation, the four provisions of the FSL are all included, which will illustrate how the Mongolian economy will develop in the future within the scope of forecasted or exogenous variables.

- Population will be consistent with the IMF's forecasts

- The real GDP growth will follow the IMFs forecasts, which takes into consideration the repayments of public debt
- Main mineral commodity production levels will be the same as the previous report
- Mineral commodity prices will be based on estimates made by the World Bank and other international institutions
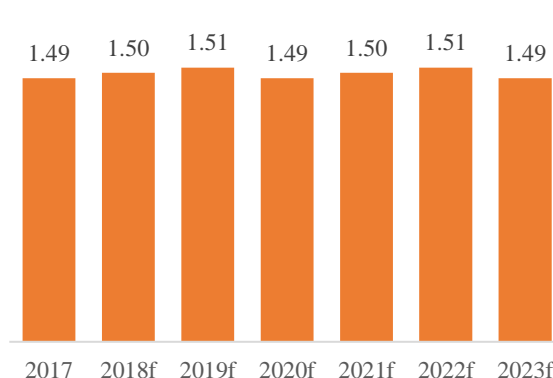
With these exogenous variables, the research team will forecast the economy until 2025. The following figures illustrate the forecasts of the Mongolian economy and population, which are the assumptions the model is based on.

Figure 4. Economic growth, YoY %
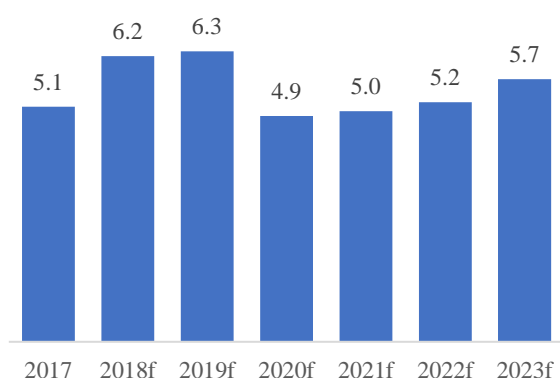
Source: IMF

Figure 5. Population growth, YoY %

Source: IMF

Productions of main mineral commodities, based on the forecasts made by the Ministry of Mining and Heavy Industry, are shown in the table below. With the implementation of the "Gold-2" program by the Government of Mongolia (GoM) and the Bank of Mongolia (BoM), production of gold is expected to increase to promote economic recovery.

Table 2. Mining production forecasts

	2017e	2018f	2019f	2020f	2021f
Coal, mln tn	33.24	36.23	38.76	40.74	40.74
Copper concentrate, mln tn	1.37	1.24	1.22	1.30	1.30
Crude oil, mln barrel	8.10	8.10	8.10	8.10	8.10
Gold, tn	17.00	20.00	20.00	20.00	20.00
Iron ore, mln tn	5.58	5.89	6.20	8.20	8.20

Source: Ministry of Mining and Heavy Industry

Prices of mineral commodities are expected to change in the future. Utilizing various forecasts made by international institutions, the research team created an average price forecasts for five commodities – coal, gold, crude oil, copper concentrate, and iron ore. In this research, the research team assumes that the Mongolian mineral commodity prices will change at the same rate as shown in the figure below.

Figure 6. Average price forecasts of 5 commodities, YoY %
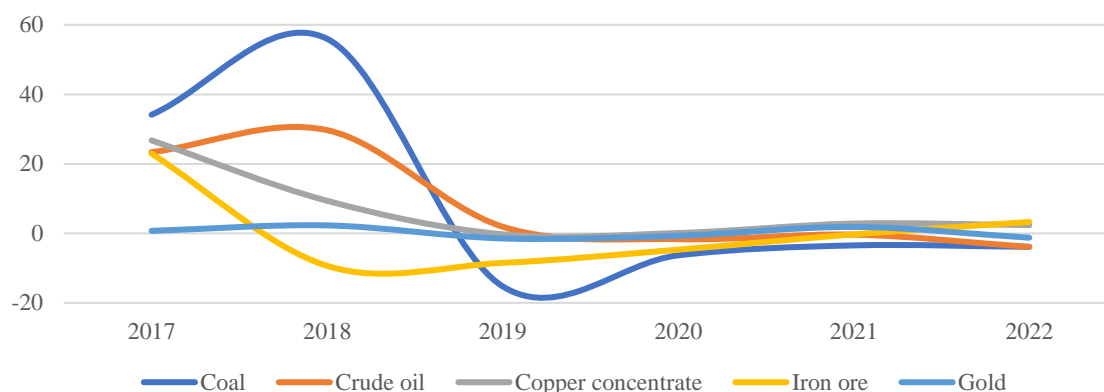
Source: ERI's estimation, World Bank, and other international institutions

The equilibrated price of the commodities is utilized to figure out the funds either deposited or withdrawn from the FSF. The equilibrated price of the commodities are calculated as the average of the past 20 years of the respective commodity. If the commodity price (or the average price calculated above) is above the equilibrated price, then the differ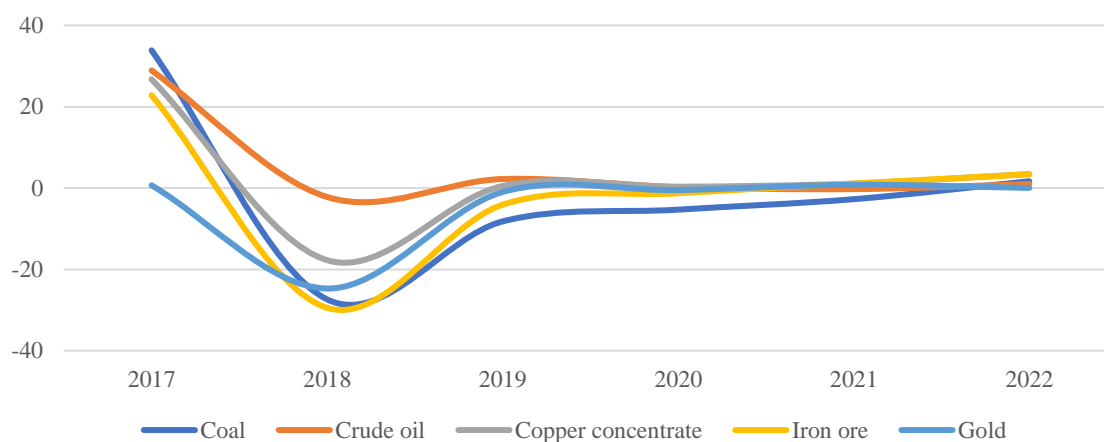ence is deposited into the fund and if the price is below the equilibrated price, then the necessary amount is withdrawn from the fund. In these simulations, the fund is assumed to limitless, in other words, there is never a shortage of funds to withdraw from.

Figure 7. Equilibrated prices of 5 commodities. YoY %

Source: ERI's estimation, World Bank and other international institutions

As mentioned before, the four main provisions outlined in the implementation of the FSL will be included in the base simulation. And any budget surplus from when mineral commodity prices are higher than the equilibrated prices are deposited into the FSF. The savings accumulated in the fund are then spent to stabilize the economy when prices are lower than the equilibrated price.

Thus, the base simulation will simulate the economy within the scope of these exogenous variables and under the implementation of the FSL and its guidelines for the government budget. The following table shows how macroeconomic variables are expected to change under the base scenario. The following results are forecasts derived from the CGE model created in the previous study report with updated assumptions such as economic growth, population growth and commodity prices.

Table 3. Base scenario results under FSL

Macro variables %	2018*	2019*	2020*	2021*	2022*	2023*	2024*	2025*
Inflation	5.44	7.18	4.77	4.32	6.45	3.94	2.91	2.26
Real GDP	6.20	6.30	4.90	5.00	5.20	5.70	5.00	4.50
Real exports	8.23	9.63	10.74	9.39	8.57	6.31	5.43	4.55
Real imports	3.38	6.27	5.76	5.61	4.73	4.44	3.87	3.25
Mining sector output	11.43	13.38	9.52	16.06	17.18	15.43	15.15	13.55
Non-mining sector output	4.71	4.26	3.42	1.52	1.91	2.89	2.16	1.90
Real wage	-1.55	-4.02	-0.35	-0.71	-1.11	0.70	-0.35	-0.43
Terms of trade (ToT)	1.18	3.96	-0.39	-0.69	2.19	0.42	-0.23	-0.25
Gov't spending growth	6.41	6.48	6.92	7.46	7.39	7.53	7.36	7.08

Source: ERI's estimation

The reason why the results of the simulation differ from the previous year's policy scenario is due to the updated forecasts and assumptions. For instance, the economic growth and population growth rates differ significantly and forecasts of commodity prices have been updated to reflect the current positions. The macroeconomic variable which remains constant through the simulations is real GDP. Real GDP was held constant to highlight the impact of the fiscal budget requirements on the other key macroeconomic indicators and simulate a relatively constant economy.

Simulation 1

In the this simulation, all the provisions of the FSL will be included except the restriction on expenditure. In other words, the growth rate of the expenditure will not have the maximum growth rate constraint in place. Budget revenue will be calculated utilizing the equilibrated method, the equilibrated budget deficit will not exceed 2 percent of GDP and the debt-to-GDP ratio will not exceed 60 percent.

Under the FSL, the growth rate of budget expenditure must not exceed the maximum growth rate of non-mining GDP or the average of the past 12 years. Contrarily, in this simulation, the growth rate expenditure can exceed the limit or can be higher the growth rate of the base case. For simplicity and demonstration purposes, we assume the growth rate of expenditure will follow the growth rate of nominal GNP (pro-cyclical). Under this assumption, budget expenditure will grow in the period of 2018 to 2025 by 18.84, 16.22, 14.16, 12.83, 11.13, 13.56, 11.77, and 12.81 percent.

The following table exhibits the impact of the FSL on the economy excluding the expenditure provision.

Table 4. Results without expenditure constraint

Macro variables %	2018*	2019*	2020*	2021*	2022*	2023*	2024*	2025*
Inflation	9.04	10.20	6.49	5.60	8.11	4.65	2.91	3.78
Real GDP	6.20	6.30	4.90	5.00	5.20	5.70	5.00	4.50
Real exports	5.75	8.78	11.30	7.12	8.84	5.97	4.77	3.79
Real imports	5.54	7.98	8.69	6.95	6.43	5.75	2.76	4.51
Mining sector output	11.32	13.75	9.02	16.83	17.02	14.34	16.53	13.02
Non-mining sector output	4.82	4.02	3.95	1.31	2.02	3.06	3.21	2.48
Real wage	-2.50	-4.73	-1.35	-0.94	-2.52	0.93	2.44	1.41
Terms of trade (ToT)	2.84	4.66	1.88	-0.69	1.19	0.42	-0.44	-1.22
Gov't spending growth	10.32	9.83	8.91	9.37	9.12	8.21	6.20	8.59

Source: ERI's estimation

As mentioned above, we assumed that the growth rate of expenditures should be equal to that of GNP growth; however, that is not that case when looking at the results in the last row of the table. This is due

to the budget deficit being 2 percent of GDP, which constrains the growth rate of expenditure. If expenditures followed the GNP growth rate, the budget deficit would exceed 2 percent. Thus, in order to ensure the other three provisions are fulfilled, the growth in expenditure is at the maximum rate allowed under the 2 percent budget deficit provision. This implies that when expenditures grow at a rate of 10.32 percent in 2018, the maximum growth rate under the 2 percent budget deficit threshold has been reached.

Simulation 2

In the second simulation, the guidelines placed on budget expenditure, deficit and government debt will be included while the budget revenue constraint will be relaxed. Growth in expenditures will be constrained by the growth of non-mining GDP growth rate and the budget deficit will not exceed 2 percent of GDP. As for calculating the budget revenue, the maximum price forecasts of the prices used to calculate the average price was taken. Thus, instead of utilizing the average prices as calculated in Figure 6, the maximum price forecasts were utilized to project budget revenue.

Table 5. Results without revenue constraint

Macro variables %	2018*	2019*	2020*	2021*	2022*	2023*	2024*	2025*
Inflation	6.12	7.83	7.35	6.36	5.77	3.49	3.39	2.65
Real GDP	6.20	6.30	4.90	5.00	5.20	5.70	5.00	4.50
Real exports	8.71	9.98	11.07	9.73	8.91	6.38	5.54	4.70
Real imports	3.18	6.04	5.58	5.41	4.54	4.39	3.79	3.15
Mining sector output	11.66	13.14	9.90	16.22	16.96	15.14	15.48	13.58
Non-mining sector output	4.61	4.33	3.29	1.51	1.94	2.95	2.12	1.90
Real wage	-1.49	-3.52	-0.28	-0.64	-1.31	-0.12	-0.33	-0.44
Terms of trade (ToT)	1.50	3.77	1.58	0.32	-1.00	-0.75	-0.61	-0.23
Gov't spending growth	6.41	6.48	6.92	7.46	7.39	7.53	7.36	7.08

Source: ERI's estimation

Despite projecting budget revenue at the maximum price possible, all price fluctuations were stabilized through the FSF in such a way that during periods of low mineral commodity prices, the amount needed will be withdrawn from the fund and vice versa during periods of high mineral commodity prices.

If the FSF balance is negative, there is no way to channel the impact of this on the economy. Additionally, as observed by the results, the growth in government expenditure is equal to that of the growth exhibited in the base simulation as government expenditure limitations are in place.

Simulation 3

In the third simulation, both the budget revenue and expenditure constraints will be relaxed in the model to identify how these guidelines impact the economy.

As mentioned previously, the revenue will be based on the higher forecasted mineral commodity prices. The expenditure growth rate will follow the growth rate of nominal GNP. This will not be constrained by the budget deficit limitation of 2 percent as revenues are not constrained either. The following table exhibits the impact of only implementing the budget deficit and government debt provisions of the FSL on the economy.

Table 6. Results without expenditure and revenue constraint

Macro variables %	2018*	2019*	2020*	2021*	2022*	2023*	2024*	2025*
Inflation	13.30	15.34	10.31	10.11	8.74	6.62	5.30	5.10
Real GDP	6.20	6.30	4.90	5.00	5.20	5.70	5.00	4.50
Real exports	4.24	8.21	9.15	6.70	7.25	3.62	2.51	2.54

Real imports	6.24	8.12	9.20	7.91	6.43	5.75	2.76	4.51
Mining sector output	10.50	14.05	8.11	16.79	12.00	15.40	14.72	13.06
Non-mining sector output	4.56	5.78	3.90	2.32	3.02	3.05	3.16	2.45
Real wage	-3.68	-7.11	-2.14	-1.70	-2.72	1.32	4.45	1.91
Terms of trade (ToT)	4.17	7.01	2.98	-1.25	1.28	0.59	-0.79	-1.65
Gov't spending growth	18.84	16.22	14.16	12.83	11.13	13.56	11.77	12.81

<div align="right">Source: ERI's estimation</div>

Comparison of simulations

Comparison of the three simulations will exhibit the impact of the revenue and expenditure provisions of the FSL on the economy. Overall, in all the simulations, removing even one constraint on the budget destabilized the economy in such a way that the standard deviation of most macroeconomic variables increased relative to the base simulation. As shown in the table below, the results of all three simulations are compared by using the average and standard deviation of the macroeconomic variables observed in all simulations. The average and standard deviation of the macroeconomic variables was calculated for each simulation from 2018 to 2025.

In the first simulation, the growth constraint of expenditures was relaxed; however, the impacts of the budget deficit constraint limited the growth of expenditure. Relative to the base simulation, the growth in government expenditure was significantly higher in the first simulation, resulting in an increase in real imports and a decrease in real exports. Government spending positively affected demands for domestic and imported products. As the demand for domestic products increases, it creates the pressure to raise market prices. This can be easily shown from the mean and standard deviations of inflation. In addition to inflation, since mineral commodity prices are expected to be relatively higher, the Mongolian terms of trade will improve. In our simulation, Mongolia is a price-taker, meaning that the growth in imported products will not influence the prices of exported products.

As seen in the past, Mongolia tends to spend considerably during economic upturns, later spiraling the economy into debt when the cycle flips. This later forces the government to pay down previous debt by accumulating more debt. In this case, government expenditure did not increase as much as expected due to the other provisions, such as revenue and budget deficit, still in place. As revenue is calculated using the equilibrated method, revenue is limited as the budget deficit cannot exceed 2 percent of GDP limiting the growth of expenditures. However, if the other provisions were not in place, expenditures would skyrocket and greatly destabilize the economy. This can be observed from the standard deviations of most of the macroeconomic variables.

As for sector output, mining sector output decreased slightly while its standard deviation increased slightly and non-mining sector output increased while its standard deviation remained relatively stable. The increase in non-mining output is associated with government spending. In other words, the government demand for non-mining products increase, which lead to growth in the sector's output. However, as it can be observed in the comparison table, the magnitude of the impact was not considerable. Real wages are affected as the standard deviation of inflation was greater compared to the base simulation.

Table 7. Comparison of results

	Mean				Standard deviation			
	Base	**Sim-1**	**Sim-2**	**Sim-3**	**Base**	**Sim-1**	**Sim-2**	**Sim-3**
Inflation	4.66	6.35	5.37	9.35	1.57	2.43	1.82	3.45
Real GDP	5.35	5.35	5.35	5.35	0.61	0.61	0.61	0.61
Real exports	7.86	7.04	8.13	5.53	2.05	2.32	2.16	2.45
Real imports	4.66	6.08	4.51	6.37	1.06	1.77	1.03	1.95

Mining sector output	13.96	13.60	14.01	13.08	2.37	2.48	2.25	2.63
Non-mining sector output	2.85	3.11	2.83	3.53	1.10	1.08	1.09	1.09
Real wage	-0.98	-0.91	-1.02	-1.21	1.30	2.23	1.05	3.40
Terms of trade (ToT)	0.77	1.08	0.57	1.54	1.50	1.86	1.52	2.81
Gov't spending growth	7.08	8.82	7.08	13.92	0.41	1.17	0.41	2.36

Source: ERI's estimation

In the second simulation, restrictions on revenue was omitted, which impacted the economy significantly less than the first simulation. The reason for the subdued effect on some of the macroeconomic variables is due to the FSF. This simulation considers the budget income shortfall, which the fund plays a central role in covering. The magnitude of variation for most macroeconomic variables remained relatively stable to the base simulation. The shocks mainly affected imports and exports, but their standard deviations were miniscule. The small fluctuations in exports and imports did decrease real wages slightly and barely any impact on the outputs of the mining and non-mining sectors. If the GoM could save a lot of money in the FSF, the income shortfall would not significantly influence the whole economy. Since their impacts on the economy were huge, IMF is imposing the stabilizing program in Mongolia. Insufficiencies of funds in the FSF contributed to the magnification of the economic crisis in recent years; which implies that if the government had implemented the FSF and FSL earlier, the economic downturn would not have been as great. Thus, the key to reducing the economic impact of low mineral commodity prices is a stricter discipline in implementing stabilizing programs.

In the third simulation, both revenue and expenditure restrictions were relaxed. This simulation impacted the economy the most compared to the previous two simulations. As growth in expenditures was not capped by the budget deficit limitation of 2 percent, the mean growth in government spending was around 14 percent, the highest of all simulations ran. The high government spending positively impacted demand for domestic products and imported goods, whose market prices are reflected in the inflation. Revenue, on the other, has a lesser impact on the economy as the FSF is being implemented. So, during periods of high mineral commodity prices, the amount over the equilibrated price is being put into the fund and is withdrawn during periods of low mineral commodity prices. This is why the standard deviation of imports and exports are slightly more muted than otherwise.

Conclusion

In this study, we analyze sensitivity of economic performance to the changes in some of the key requirements in the FSL. In the three simulations, the impacts of relaxing the revenue and expenditure constraints each and then both were compared against the base simulation where all four provisions of the FSL was implemented.

In the first simulation, the growth in expenditure was supposed to follow the growth rate of nominal GNP; however, due to the budget deficit limitation of 2 percent, the growth of expenditure was limited to grow at a rate which maintained budget deficit at 2 percent of GDP. Compared to the base scenario, the growth in budget expenditure is considerably higher, which increases the demands for domestic products, resulting in an increase in inflation. Due to the changes in inflation, real wage, terms of trade, real exports and imports will be fluctuated. It makes the Mongolian economy volatile, which has been shown in the recent years.

In the second simulation, revenue was calculated using the highest forecasts price. Nonetheless, the impact on the economy was muted due to the FSF, which lessened the magnitude of volatility the economy experiences due to fluctuation in mineral commodity prices. Thus, in the second simulation, during periods of high mineral commodity prices above the equilibrated level, the excess amount was saved into the fund and was withdrawn from during periods of low mineral commodity prices. The

simulation main result is to save money to the FSF as much as GoM can allocate. If the FSF has a sufficient money to cover the budget revenue shortfall, the mineral commodity prices cannot influence the whole economy. As mentioned before, the budget income has shortfalls in recent years so that public debt had been dramatically grown.

In the third simulation, the first and second simulation was run together. In this case, the expenditure was not limited by the budget deficit constraint as equilibrated revenues were high so the budget deficit stayed within the 2 percent despite following the GNP growth rate. During the simulation, most of the impact on the economy was due to an increase in government expenditures; however, the impact was slightly curtailed due to the FSF. This simulation provides a clear view of the impacts on the Mongolian economy in the coming years.

Main findings:

- The FSL contributes significantly to the reduction of economic fluctuation. However, the current state is not enough to just have the law be approved, but the law needs to be strictly implemented and adhered to. Only through this will the positive impact of the law on the economy be fulfilled.
- When not implementing provisions related to budget revenue or expenditure or both from the law, the greatest impact on the economy was observed when the government expenditure restriction was not in place. In other words, when budget expenditures significantly increase, the economy becomes more destabilized and prone to fluctuations. Another notable observation was that the FSF played a key role in limiting economic fluctuations caused by revenue.
- If budget revenue forecasts were high and expenditures rose significantly like in previous year, the economic fluctuations would have been more amplified. The simulations ran in this study does not necessarily reflect the fluctuations in real life. In the simulation, as the impacts of the revenue fluctuations on the economy are subdued by the implementation of the FSF, the real impact of a decline in budget revenues may have a greater impact on increasing the budget deficit. The simulation illustrates that although the fund has helped stabilize the impacts of revenue fluctuations during periods of high volatility, the economy is still very fragile.

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