REVENUE MANAGEMENT

MONGOLIA'S SOVEREIGN WEALTH FUNDS AND THEIR ECONOMIC IMPACT

Contents

List of Figures

List of Tables

Glossaries

CES	Constant Elasticity of Substitution
CET	Constant Elasticity of Transformation
CGE	Computable General Equilibrium
ESSF	Economic and Social Stabilization Fund
FHF	Future Heritage Fund
FSF	Fiscal Stability Fund
FSL	Fiscal Stability Law
GDP	Gross Domestic Production
GPFG	Government Pension Fund Global
HDF	Human Development Fund
NSO	National Statistics Office
PRF	Pension Reserve Fund
SAM	Social Accounting Matrix
SWF	Sovereign Wealth Funds
TFP	Total Factor Productivity
CPI	Consumer price index
DIIS	Department of industry, innovation and science

Abstract

The main objective of this study is to assess the impact of the Fiscal Stability Fund (FSF) and the Future Heritage Fund (FHF) on the economy. The FSF was established in 2011 when the FSL was implemented. The purpose of the FSF was to mitigate fiscal expenditure fluctuations caused by swings in mineral commodity prices and to encourage sustainable economic growth. In addition to the FSF, the Government of Mongolia (GoM) established the Future Heritage Fund (FHF) in 2016 to allocate mineral wealth across future generations. To assess the impact of the wealth funds, we developed an in-house dynamic computable general equilibrium (CGE) model which is used to simulate the economy for the next 23 years under four scenarios. To calibrate the model, we built a 2017 Mongolian Social Accounting Matrix of Mongolia. As the results suggest, the FSF has a stabilization effect on budget revenue, budget expenditure and macroeconomic variables. On the other hand, the FHF decreases the economic growth while helps to allocate the mineral wealth of the country across generations restraining budget expenditure growth.

JEL: C68, H71

1. Introduction

1.1. Objective

The main objective of this study is to assess the impact of the Fiscal Stability Fund and the Future Heritage Fund on the economy. The Fiscal Stability Fund (FSF) was established in 2011 in light with the Fiscal Stability Law (FSL). The purpose of the FSF was to prevent fiscal expenditure from the fluctuations related to the mineral commodity prices and encourage the sustainable economic growth. In addition to FSF, the government established the Future Heritage Fund (FHF) in 2016 to allocate the mineral wealth across the generations. The money accumulated in the FHF will not be spent until 2030 and assets will be invested in a way that will maximize returns. The majority of the revenue into the FHF is expected from mining royalty taxes while the remaining revenue is from dividend of state-owned enterprises and the net income of the fund itself.

In the base study, "Revenue Management" (ERI, 2017), the economic effects of implementing the Fiscal Stability Law was assessed by utilising an in-house Computable General Equilibrium (CGE) Model. The simulations conducted in the study indicated that the FSL could counteract and lessen the de-industrialization effect of mining development in the country. Then, in the first update of the study, the sensitivity of economic performance to changes in some of the key requirement of the FSL were analyzed using the same approach as the main study. Two key benchmark parameters of the FSL were relaxed: ceiling on the growth of budget expenditure and restriction on the budget revenue. The results from the study indicated that 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 Fiscal Stability Fund played a key role in limiting economic fluctuations caused by revenue.

In all simulations in the previous studies, we have assumed that the FSF implements as reflected in the FSL and did not consider the effect of FHF. Furthermore, the simulations in the previous studies do not reflect the fluctuations observed in real life as the impacts of revenue fluctuations are subdued by the implementation of the FSF.

Two wealth funds are important tools of the budget revenue management as Mongolia is a mineral resource dependent country. In this update of the study, our research questions are: Does the funds have stabilization effect on economy during the volatile commodity prices? If does, what is the size of the impact? What legal requirements and constraints related to the funds are the most important?

1.2. Methodology

To assess the impact of the wealth funds, we developed an in-house Dynamic CGE model, which is quite different from the model developed under previous two studies. The funds are designated to smooth business cycle fluctuations that occur in budget expenditure that would contribute to achieve economic stability in the long term. Thus, in order to examine the funds' impact, we developed a long-term

baseline economic projection for upcoming 20 years including commodity price fluctuations with the in-house Dynamic CGE model. Then, we introduced the FSF and FHF into the model as alternative scenarios. Comparing the results of alternative scenarios with result of baseline scenario, we can assess the economic impact of the two funds. In particular, the impacts are implied as a difference between the results of baseline scenario and alternative scenarios as shown in the following figure.

FIGURE 1. POLICY IMPACTS ANALYSIS
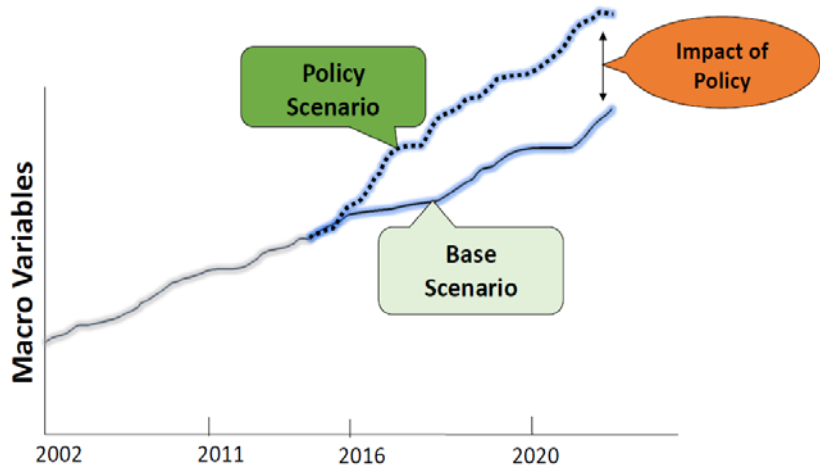
Source: ERI, 2017

Dynamic CGE model

We used an extension of the dynamic CGE model, which is used in Galindev et al., (2019), as a main tool for the analysis.[1] This is a general equilibrium model where a change in one part of the system affects all other parts of the system.

The model has the following basic features:

- The production side of the model is divided into different activities/industries. Each activity has a nested structure, and each level uses a production function with constant returns to scale. Specifically, the first level of production is a Leontief function of value added and intermediate consumption.
  At the next level, value added ($VA_{j,t}$) function in activity j at period t is a constant elasticity of substitution (CES) function of labor ($L_{j,t}$) augmented with technical change ($A_{j,t}$) and capital ($K_{j,t}$) as follows.

$$VA_{j,t} = B_j\big(\beta_j\big(A_{j,t}L_{j,t}\big)^{-\rho_j} + (1-\beta_j)K_{j,t}^{-\rho_j}\big)^{-\frac{1}{\rho_j}} \qquad (1)$$

  where is B_j a scale parameter, β_j is a parameter relating to labor income share and ρ_j is the elasticity of substitution.

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[1] This model is an extension of the PEP-1-t model which is described fully in Decaluwé et al. (2013).

$A_{j,t}$ is also considered as total factor productivity (TFP) for sector j and we estimated it using the conventional growth accounting method as a Solow residual. We consider the growth rate of the estimated TFP for the projections.

Stock of capital in each sector increases by investment but decreases by depreciation as in growth models such as Solow (1956). Investment in public services, mining activities and livestock sector are exogenous while investment in other industries is endogenous depending on the return (ratio between the rental rate and user cost of capital - the depreciation and interest rate).

Total labor supply grows at an exogenous rate same as the population growth. In each period, labor is mobile between activities.

- Intermediate consumption of each commodity, on the other hand, is proportional to production by sector. Each sector may produce multiple commodities, which are aggregated by a constant elasticity of transformation (CET) function. Finally, quantities to sell domestically or to export are governed by a CET function and relative prices.

- On the demand side, the consumption of a commodity is a CES function of domestic and imported quantities. A representative household allocates its disposable income from capital, labor, and transfers between consumption and savings. Its demand for commodities is governed by a linear-expenditure system. Demand for commodities for investment and government spending purposes are proportional to respective total expenditures. Investment demand distinguishes between gross fixed-capital formation and changes in inventories. Export demand for domestic commodities is an iso-elastic function of relative prices (foreign price expressed in domestic currency divided by domestic price).

- Government revenue from income taxes and indirect taxes (production, commodities, and foreign trade) and transfers from other agents are divided between savings, current expenditures and transfers to other agents, and wealth funds according to the Fiscal Stability Law and Law on Future Heritage Fund. Here, government spending and transfers to other agents are exogenous.

- The model specifications also include public debt dynamics, which changes by budget deficit.

- The model is a savings-driven-investment model – i.e., total investment is the sum of savings of all agents and net changes of wealth funds.

- Current account balance in the balance of payments is determined by the amount of exogenous foreign savings. Private savings and government savings are endogenous.

Main database of the model – Social Accounting Matrix 2017

The main database of CGE models is Social Accounting Matrix (SAM). Our model is calibrated to a 2017 Mongolian SAM which we built for this study using the 2017 Supply and Use Tables, Balance of Payments and government budget data.[2]

The SAM is a square matrix with 47 columns and rows. Its accounts consist of the same twelve sectors/commodities (Crop, Livestock, Coal and oil, Metal ore, Other mining, Electricity and water supply, Manufacturing, Construction, Trade, Financial

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[2] We followed the same approach in Galindev et al., (2019) which complied the Mongolian SAM for 2014.

activities, Public services and Other services); two production factors (capital and labor); three types of institutions (private, government and the rest of the world); three types of taxes (income tax, import duties, and taxes on commodities); and saving (investment) accounts divided into public investment, and changes in inventories.

TABLE 1 shows the macro SAM with 15 accounts as the share of 2017 nominal GDP (27 trillion MNT). Along the rows, one can see the spending of each account. Along the column, on the other hand, it shows the receipt of each account. Household consumption and government expenditure constituted around the 70 percent of the GDP (53.5 percent and 12.7 percent respectively). Gross fixed capital formation (both public and private) and inventory changes contributed 38 percent of GDP. The values of both export and import were more than half of GDP (59 percent and 56 percent respectively). The economy was equally intensive in both capital and labor— i.e., the values of payments to capital owners and compensation of employees were both around 45 percent of GDP. The share of value added in GDP was 90.5 percent, and the remaining 9.5 percent came from indirect taxes on commodities (7.4 percent), import duties (1.7 percent), and net taxes on production (0.4 percent).

TABLE 1. MACRO SAM 2017 (PERCENT OF GDP)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Labor								0.6	45.2						46
2	Capital								0.1	45.4						45
3	Households	44.8	33.6		11.6				2.1							92
4	Government			3.2		13.1	1.7	7.4	0.2	0.4		0.0				26
5	Direct taxes			13.1												13
6	Import duties										1.7					2
7	TI										7.4					7
8	ROW	0.9	11.9	0.7	2.0					56.3						72
9	Sectors										126.2	53.8				180
10	Commodities			53.5	12.7					89.1	15.2	4.9	18.7	5.9	6.7	207
11	Export								58.7							59
12	INV_PRI			17.4	(0.3)				8.3							26
13	INV_PUB			4.0	(0.1)				1.9							6
14	VSTK												6.7			7
15	TOTAL	46	45	92	26	13	2	7	72	180	207	59	25	6	7	

Source: SAM 2017

Production structure: Livestock, sales services and public services sectors contributed most to the labor income and highly intensive in labor, while coal and oil, metal ore, manufacturing and financial activities sector contributed most to the capital income and highly intensive in capital (

TABLE 2). As mentioned above, the economy as a whole was equally intensive in both labor and capital.

TABLE 2. PRODUCTION STRUCTURE (PERCENT)

Sectors	Labor	Capital	Value added	Value added/ Total output	Factor intensity	
					Labor	Capital
Crop	0.8	1.0	0.9	41.0	43.2	56.8
Livestock	19.2	1.7	10.5	70.9	91.7	8.3
Coal and oil	1.5	19.1	10.3	54.4	7.3	92.7
Metal ore	6.6	22.6	14.6	55.2	22.5	77.5
Other mining	0.7	0.8	0.8	31.3	47.3	52.7
Manufacturing	5.6	14.2	9.9	36.8	28.2	71.8
Electricity and water supply	2.9	1.8	2.4	28.7	61.9	38.1
Construction	4.9	3.3	4.1	24.2	59.7	40.3
Trade	20.7	4.3	12.5	55.4	82.8	17.2
Financial activities	6.0	21.4	13.7	70.3	21.8	78.2
Public services	17.1	4.9	11.0	64.1	77.6	22.4
Other services	13.9	4.8	9.4	41.1	74.2	25.8
Total	**100.0**	**100.0**	**100.0**	**50.3**	**49.9**	**50.1**

Source: SAM 2017

Trade structure:

TABLE 3 shows the trade structure of economy. Export of the metal ore, coal and oil products contributed to the more than half of the total export (59 percent), while import of the manufacturing and financial activities contributed to the 78 percent of total import. Most of metal ore, coal and oil products were exported while other mining products were fully exported.

TABLE 3. TRADE STRUCTURE (PERCENT)

	Export	**Import**	**Export intensity**	**Import penetration**
Crop	0.9	1.4	25.6	35.6
Livestock	3.4	0.2	13.6	0.8
Coal and oil	26.7	0.0	85.1	0.0
Metal ore	32.8	0.0	95.0	0.0
Other mining	1.2	0.1	100.0	100.0
Electricity and water supply	0.0	2.1	0.0	13.5
Manufacturing	21.4	66.9	35.1	66.1
Construction	0.4	3.7	1.4	12.1
Trade	4.2	5.8	12.7	16.1
Financial activities	3.5	11.5	9.0	23.8
Public services	0.2	2.1	0.8	7.2
Other service	5.2	6.3	16.9	19.1
Total	**100.0**	**100.0**		

Source: SAM, 2017

Demand structure:

TABLE **4** shows the demand structure for each commodity. Most of the crop, financial services and manufacturing commodities were used by households. In contrast, more than half of the public services products were used by government. Most of the coal and oil, financial activities, agriculture and electricity and water supply products were used as intermediate consumption. Manufacturing was mainly used as intermediate inputs as well. 80.7 percent of trade was considered as margin commodity. Whereas, construction products were mainly used for investment purposes.

TABLE 4. DEMAND STRUCTURE, PERCENT

	Household	Government Consumption	Intermediate Consumption	Margin	GFCF	VSTK
Crop	41.1	0.0	69.3	0.0	0.1	-10.5
Livestock	23.8	0.0	36.8	0.0	26.2	13.3
Coal and oil	4.3	0.0	67.6	0.0	0.0	28.1
Metal ore	0.0	0.0	5.8	0.0	0.0	94.2
Other mining	3.6	0.0	565.1	0.0	0.0	-468.7
Electricity and water supply	6.6	2.0	91.4	0.0	0.0	0.0
Manufacturing	35.5	0.1	47.1	0.0	12.5	4.8
Construction	0.1	0.0	37.1	0.0	62.8	0.0
Trade	13.4	0.0	5.9	80.7	0.0	0.0
Financial activities	37.4	2.0	57.9	0.0	2.7	0.0
Public services	25.4	69.3	5.4	0.0	0.0	0.0
Other services	23.8	2.4	65.4	8.4	0.0	0.0

Source: SAM 2017

Structure of government income and expenditure: The government received 63 percent of its revenue from households as direct taxes (50.5 percent) and transfers (12.2 percent). Other sources of income were relatively small. A half of the budget was spent on purchasing goods and services while 44 percent of its budget was received by households as transfers. Government debt was 1.3 percent of its total budget.

TABLE 5. GOVERNMENT BUDGET (PERCENT)

Government revenue		Government expenditure	
Transfers from households	12.1	Transfers to households	44.6
Direct taxes /TD/	50.5	Transfers to ROW	7.7
Import duties /TM/	6.7	Public consumption	49.0
Export taxes	0.0	Savings	-1.3
Net taxes on products /TI/	28.4		
Transfers from ROW	0.8	**Total**	**100.0**
Net taxes on production	1.5		
Total	**100.0**		

Source: SAM 2017

Structure of household (private sector) income and expenditure: The capital ownership and labor were main sources of income for households as they jointly constituted about 85 percent of household total income (TABLE 6). Commodities were bought by most of household income (58.2 percent). 14 percent of income was sent to the government as direct taxes, and 3.4 percent of income was transferred to the government as non-tax payments as well. Savings were equal to about 23 percent of total income while transfers to the ROW was relatively small (0.7 percent).

TABLE 6. HOUSEHOLD INCOME AND EXPENDITURE (PERCENT)

Household income		Household expenditure	
Wages	48.7	Consumption	58.2
Capital income	36.5	Direct taxes	14.3
Transfers from government	12.6	Transfers to the government	3.4
Transfers from ROW	2.0	Transfers to ROW	0.8
Total	**100.0**	Savings	23.4
		Total	**100.0**

Source: SAM 2017

Investment/Savings structure: The most of the total investment (68.2 percent) was financed by household savings while rest of the world contributed 33 percent of total investment (TABLE 7). 67 percent of the total investment budget were dedicated to the financing of private (gross fixed capital formation). Public investment and change in inventories were financed by 15 percent and 17 percent of total investment budget, respectively.

TABLE 7. INVESTMENT/SAVINGS STRUCTURE (PERCENT)

Source		Allocation	
Household	68.5	Private investment	66.8
Government	-1.1	Public investment	15.5
Rest of the world	32.6	Change in inventories	17.7
Total	**100.0**	**Total**	**100.0**

Source: SAM 2017

2. Sovereign Wealth Funds and Fiscal Rules

2.1.   International Practices

As of 2018, 119 SWFs are operating in the world and overall size of the global Sovereign Wealth Funds (SWF) is above USD 8.1 trillion (SWF Institute, 2019). SWFs are defined as a special purpose investment fund or arrangement, owned by the general government. In terms of policy purposes, the main types of SWFs are: (i) stabilization funds which aim to stabilize the budget and economy against commodity price fluctuations (e.g., Russia and Chile), (ii) savings funds for future generations which aim to convert non-renewable resources into a more diversified portfolio of assets (Kuwait and Norway), (iii) reserve investment corporations (Singapore and Korea) for increasing the return on reserves (IWG, 2008).

In terms of their management, transparency and success, Chile's and Norway's SWFs are considered as international best practices. Therefore, the past performance and fiscal rules of these funds are briefly covered in this section

Chilean Wealth Funds

As one of the resource rich county and the leading copper exporter, Chile established two sovereign wealth funds in 2006 and 2007 which are very same objectives with Mongolian funds. First, the Economic and Social Stabilization Fund (ESSF) has a role to support fiscal stability by accumulating fiscal surpluses during periods of economic boom and higher commodity prices. When commodity prices fall and government has fiscal deficits, the cash is transferred from the Fund to the budget for keeping stable budget expenditures especially on social programs. Second, the Pension Reserve Fund (PRF) receives contributions to accumulate savings for future pension payments (Chilean Ministry of Finance, 2019). As of 2018, these funds have asset of USD 23.8 billion, around 8 percent of country's GDP (World Bank, 2019).

In 2001, the Chilean government started to implement fiscal structural balance rule through its annual budget law to keep its spending level consistent with structural budget income. Then the Chilean government passed Law on Fiscal Responsibility in 2006 which adopted the structural balance rule and created the regulations and institutional framework for the accumulation, management and operations of fiscal savings through the funds. By the Law, the newly elected Presidential Administration should announce structural balance targets in its first year. In 2015, for example, the previous government announced that the structural deficit will be around 0.25 percent of GDP through 2018. However, the target has been missed for the period from 2016 to 2018.

Rules of contributions and withdrawals are regulated by the Fiscal Responsibility Law. As for contribution, depending on the effective fiscal surplus, the PRF must receive a contribution of at minimum 0.2 percent and at maximum 0.5 percent of the previous year's GDP. The accumulation should be continued until the fund asset reaches 900 million unidades de fomento (~USD 41 billion as of 2013). The PRF specifically finances state guaranteed solidarity pension benefits and contributions for the elderly and disabled (NRGI; Columbia Center, 2013). The ESSF must receive any remaining fiscal surplus after contributions to the PRF made, less the amortization of public debt or advance payments to the ESSF in the previous year.

In case of spending, resources can be withdrawn from the ESSF at any time in order to finance fiscal deficits and pay public debt, but the spending is subject to the structural balance rule. Moreover, funds can be transferred from ESSF to the PRF by the decision of the Minister of Finance. Resources from the PRF can only by used pay for pension and social welfare. Until 2016, spending from the PRF must not exceed the Fund's return in the previous year. Since then annual spending can be increased up to an amount equal to third of the difference between the pension payment in the current year and inflation-adjusted pension payment in 2008. In 2017 and 2018, the first withdrawals were made from the PRF. After 2021, the PRF will cease to exist if the withdrawals in a current year not greater than 5 percent of pension spending in that year and its remaining funds will be transferred to the ESSF.

The market value of the ESSF reached to USD 14.1 billion as of 2018. Since 2007, total of USD 21.8 billion has been contributed to the fund, USD 11.4 billion has been withdrawn, and USD 3.8 billion has been earned as net investment income. In case of the RFP, the market value of the fund as of 2018 was 9.7 billion USD. From 2006 to 2018, the fund has recorded total capital contributions of USD 8.9 billion, withdrawals of USD 0.8 billion, and net investment income of USD 1.6 billion. Since the inception of the funds, an annualized net return in USD is 2.41 percent for the ESSF and 3.22 percent for the RFP.

As shown in the figure below, the market value of the PRF has been steadily increased with annual contributions and its net investment return. According the fiscal rule, a contribution to the RFP should be made at first from the state budget when the structural balance ran a surplus or from the ESSF when there was a structural balance deficit. In contrast, contributions to the ESSF should follow the fiscal balance. For instance, the market value of the fund sharply increased at the beginning with annual contributions during an economic boom, but in 2009 it sharply decreased with withdrawal due to a high fiscal deficit. From 2010 to 2013, the value of the ESSF gradually increased with contributions and its investment return as the deficit of the budget structural balance decreased. Then, however, the value of the fund slightly decreased with withdrawals as commodity prices declined.

FIGURE 2. MARKET VALUE OF THE FUNDS (BILLIONS OF USD) AND FISCAL STRUCTURAL BALANCE OF CHILE
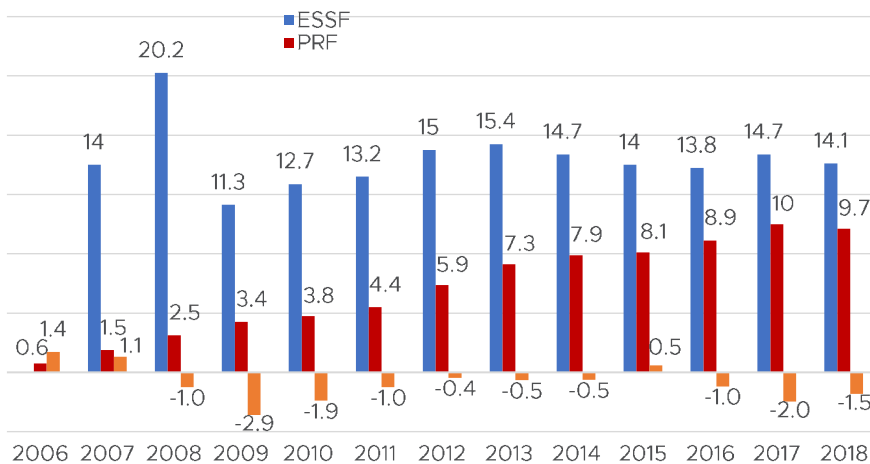
Source: Chilean Ministry of Finance (2018) and TCdata360, World Bank.

The fiscal rules and the funds clearly had an effect of stabilizing the economy during the 2008-09 global financial crisis. Between 2003 and 2007, the average structural budget surplus was 1.1 percent of GDP while the average effective budget surplus was 4.2 percent of GDP as copper prices increased by 220 percent in real terms. In other words, before the crisis, the government had taken advantage of higher copper prices and accumulated annual savings equal to a 3 percent of GDP (Solimando & Guajardo, 2017). In 2009, a USD 9.3 billion was withdrawn from the ESSF. Of this spending, a USD 0.8 billion was used to finance the full contribution of the PRF and the remaining fund was assigned to the economic recovery (Chilean Ministry of Finance, 2019). According to Solimando & Guajardo (2017), two sovereign wealth funds along with an improved macroeconomic framework may have contributed to lower output volatility and the reduced country risk since their inception.

Norwegian Wealth Funds

The world's largest sovereign wealth fund, the Government Pension Fund Global (GPFG)[3], was set up in 1990 by the Norwegian government to avoid higher economic volatility caused by dependency of oil prices. However, only 1996 the fund received 2 billion kroner as its first contribution after the government run a budget surplus. Since then, the value of the fund has been firmly increasing and reached to a USD 1,099 billion as of November 2019 (SWF Institute, 2019). Over the period of 1998-2018, the fund has generated an annual return of 5.5 percent and about half of fund's market value is return on the fund's investments. As of the end of 2018, the fund's investment spanned 73 countries, 50 currencies, 9158 companies and 1254 fixed-income security issuers.

For several years after its inception, there was not any rule related to contributions and spending of the fund. In 2001, the Ministry of Finance introduced a strategy for the use of petroleum revenues of the fiscal budget over the next years in its Guidelines for Economic Policy (Ministry of Finance, 2001). It stated that the fund receives the transfer from petroleum income[4] remaining when the Parliament has decided the share to be used for consumption and investment over the central government budget. In addition, the return on the capital should be deposited in the Fund itself. If necessary, up to the 4 percent of the fund, the estimated expected real (not actual) return, can be withdrawn to the central government budget to cover the non-oil budget deficit and the fund's capital should be fully invested abroad. In 2017, the Government tightened the threshold to 3 percent in order to increase the fund's long-term sustainability due to a decrease of the real return on the fund after the global economic crisis of 2008 (Wirth, 2019).

As shown in the figure below, the market value of the GPFG in percent of mainland GDP (grey line) reached to 284 percent in 2018. During the period of having higher general budget surpluses (orange bar) and lower structural non-oil balance deficits (blue bar), the accumulation of the fund tend to be faster, and vice versa. For instance, from 2012 to 2014 when oil prices were very high, the market value of the fund dramatically increased due to a greater transfer from oil revenue. In addition, during that period the average annual net return on the Fund's investment was 12.3 percent (the target rate was 4 percent) as global economy recovered well. In 2012, as the Norwegian kroner appreciated against the rest of the currencies, the market

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[3] The Fund's original name was the Government Petroleum Fund and it aimed at safeguarding long-term considerations in the use of petroleum revenues (Ministry of Finance, 2001).
[4] It comprised of taxes, royalties, dividends from Statoil state-owned company and state oil fields.

value of the Fund was detracted. However, as the exchange rate depreciated next two years, market value of the fund soared (NBIM, 2019).

FIGURE 3. BUDGET BALANCE AND NET ASSET OF THE GPFG, IN PERCENT OF MAINLAND GDP
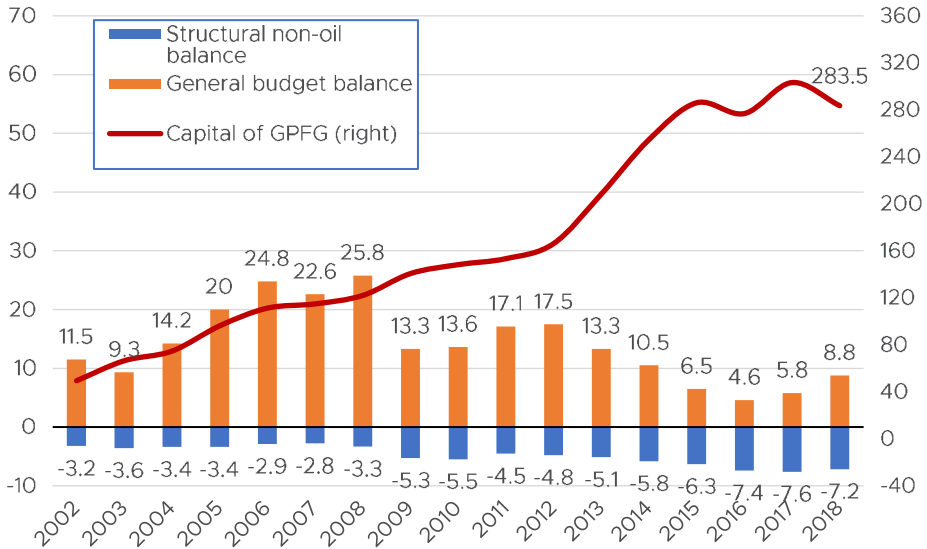
*Source: IMF Article IV Consultation: Norway (2003-2019)*

Since 2015 the market value of the fund has been stagnated and general budget surpluses decreased mainly due to almost 50 percent drop in oil prices even when the return on the Fund has been higher and the exchange rate has been stable. In 2016, the first withdrawals of 101 billion kroner (~1.3 percent of the market value of the Fund) was transferred to the general budget. In 2017, another 61 billion kroner (~0.7 percent of the market value) was withdrawn. However, the net return on the investment covered the spending (NBIM, 2019).

2.2.   Mongolia's Sovereign Wealth Funds and Fiscal Rules

Fiscal Stability Fund

Managing mining revenue in long term is the main pillar for Mongolia since the economy is heavily reliant on mining industry and commodity prices in international market. In particular, revenue from mining sector constituted around 22 percent of the total government revenue in 2018. Ups and downs of government revenue mainly follows the fluctuations of mineral commodity price index which was calculated by using four major commodity prices (gold, iron ore, copper, coal) and its share in total export as weight (**FIGURE 4**).

FIGURE 4. GOVERNMENT REVENUE AND MINERAL COMMODITY PRICE INDEX
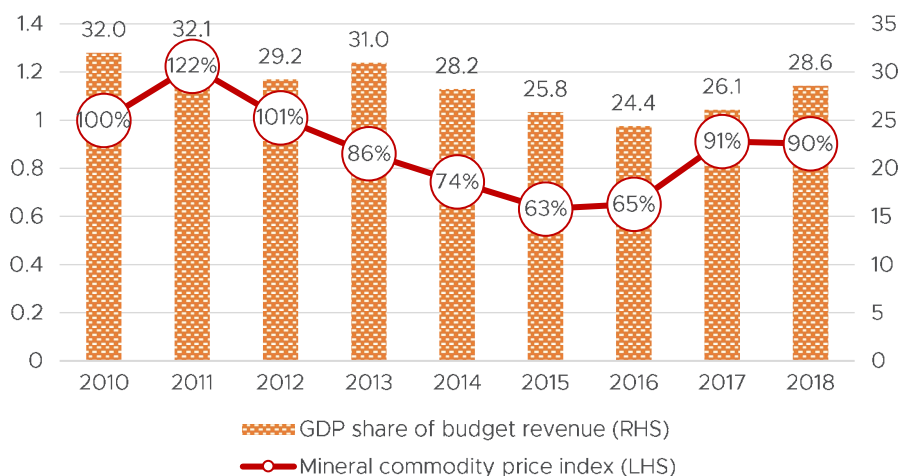
Source: Ministry of finance and research team's calculation based on the World bank and DIIS data

In order to promote the mining revenue management, the FSL (a set of fiscal rules) was approved by the Parliament of Mongolia in 2010 and took effect in 2013. Within framework of the law, FSF was established in 2011 to mitigate the economic fluctuations through stabilizing government budget.

Within the framework of the FSL, equilibrated revenue (i.e., based on pre-determined price of certain mining commodities) and the corresponding budget balance were started to use in process of reporting government budget statistics. Equilibrated revenue is calculated from the equilibrated price of main mining products which account more than 3 percent of government revenue of that year. The equilibrated price is an average of two average prices. The one is an average of last 20 years of price while the other is an average subsequent 3 years (including current year) of price predicted by government-approved international agencies.

According to the FSL, the rules of the FSF are as follow:

Sources of the Fund[5]

- Additional revenue generated when the price of certain commodities exceed the pre-determined level (known as equilibrated price),
- Equilibrated budget surplus
- Unspent leftovers of Government Reserve Fund and Risk Fund,
- Net income of the FSF financial activity,
- Other income allocated by the Parliament of Mongolia to the FSF.

Accumulation in the fund can be transferred to the state budget in following cases:

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[5] Rules of the FSF is explained briefly in order to be clear. Please refer to the original Law on Fiscal Stability for detailed information

- The budget deficit is 4 percent of GDP higher than Budget Plan,
- Budget revenue disruption due to a decrease in major mineral commodity prices,
- Budget revenue disruption due to a 20 percent or more decrease in the volume of major mineral commodities,
- Recession, natural disaster or national emergency,
- If the fund fails to address the second case, the government may borrow. This shall be within the scope of article 6.1.4 of FSL (it will be implemented from 2024).

Additionally, the precautionary saving in the FSF can be made as investment in order to maintain its value. If it exceeds 10 percent of GDP, an appropriate amount of investment in domestic and foreign financial market can be made by joint decision of Bank of Mongolia and Ministry of finance.

The graph below illustrates the revenue, expenditure and stock of the FSF (

FIGURE **5**). The revenue has been volatile following the fluctuations of commodity price index. In order to finance the budget deficit, money from the FSF was allocated to the government budget in 2014 and 2017. Also, the Ministry of Finance increases the fund saving through deposits in commercial banks. For instance, the saving increased by 3.2, 10.1 and 14.5 billion MNT through the interest income in 2015, 2016 and 2017 respectively.

FIGURE 5. INCOME, EXPENDITURE AND SAVING OF FSF, BILLION MNT
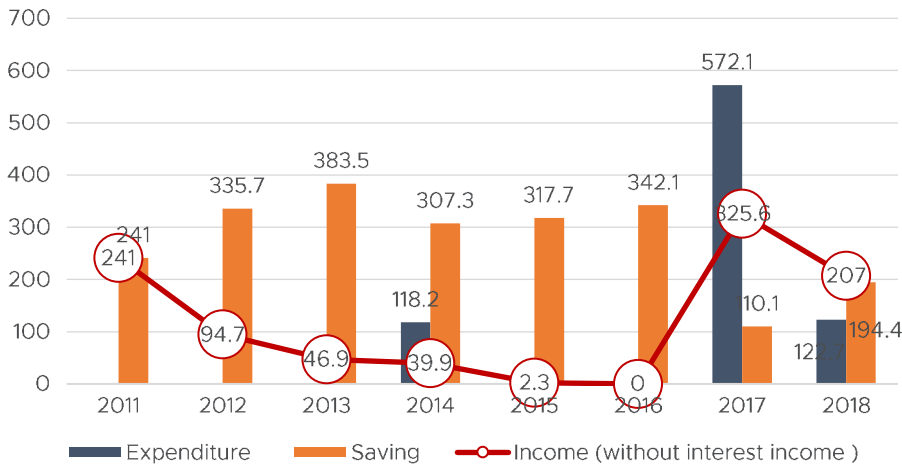
Source: Ministry of Finance: data between 2010-2016 based on the budget proposal 2018 and data for 2017 and 2018 are calculated based on the budget performance of 2017 and 2018

There are several studies accessing the impact of FSL. Galindev (2014) examines the impact of FSL by using a dynamic CGE model and finds that the volatility of economic indicators falls because of the FSL. Our previous revenue management study, the base of this update, finds that the FSL reduces the impact of commodity price volatilities on government budget and shrinks the adverse impact of mining sector on non-mining sector (ERI, 2017). Also, Revenue Management: Fiscal Sensitivity Analysis, the first follow-up study, considers the impact of the four main rules of FSL separately and concludes that the expenditure rule has a significant impact on reducing the fluctuations.

An important issue to note here is the implementation of the FSL. Mongolian Parliament amended the law 12 times within 9 years since 2010. For instance, requirement for net present value of government debt which impose debt ceiling as 40 percent of GDP was amended three times. In February of 2015, exemptions were added in the article that reflects the requirement for government debt before the exemptions were widened in May of 2015. In 2016, government debt ceiling was rose from 40 percent to the 60 percent of GDP (see the first update report for more details).

Future Heritage Fund

Law on FHF was adopted by the Parliament of Mongolia in 2016 and the fund was established in 2017. The main goal of the fund is to create saving from mining revenue for future generation and to promote the governance of mining revenue management. Dividends of state-owned mining companies, most of the mining royalty payment and other mining revenues will be accumulated in the fund. Until 2030, saving of the fund cannot be touched, after that ten percent of the net income of the fund will begin to distribute to the government budget.

In June of 2019, a state owned Future Heritage Fund Corporation was founded by Government of Mongolia. The main function of the corporation is to make investment decision, raising and maintain the real value of the fund's assets. Another important feature of the fund is that the fund invests only in foreign assets. Investing in foreign asset has implication for mitigating effect of Dutch disease.

Source of the Fund[6]

- Dividends distributable to the state owned shares of legal entities with state ownership participation or state owned enterprises in possession of mining licenses
- 65 percent of the mineral royalty payments collected in the budget after distribution to the Stabilization Fund in accordance with Law on Fiscal Stability
- The remaining balance of the fund's net investment income after transfers to the government budget from the 2030
- Starting from 2018, 20 percent of the amount of other minerals revenues to be collected to the state budget in excess of the base year outturn

FHF was established based on the old Human development fund (HDF) which was established in 2009 to allocate the mining revenue to the all citizens equally. The HDF was abolished in 2017 when operation of FHF began. Both FHF and HDF has similar income source such as 65 percent of mining royalty and dividends from the state-owned mining company whereas spending of the two funds is different. Moreover, money of HDF had been distributed to citizens directly, while money of the FHF have to be saved directly.

According to the law on implementing the Future Heritage Fund Law, FHF received an obligation to pay the accumulated debt of the HDF and transfers to the government budget until 2019 from its income. In particular, FHF had debt of 1070 billion MNT and transfers to government budget as 160, 100 and 50 billion MNT in 2017, 2018 and 2019 respectively. The below table show the income, process of

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[6] Rules of the FHF is explained briefly in order to be clear. Please refer to the original Law on Future Heritage Fund for detailed information

debt payment and savings of the FHF. By the October of 2019, FHF has savings of 391 billion MNT after it has finished the payment of HDF's debt and all transfers to the government budged. Income of the FHF increased dramatically due to the sharp rise of mining commodities.

TABLE 8. INCOME, SPENDING AND STOCK OF THE FHF, BILLION MNT

	2017	2018	Oct 2019
Income	357.7	508.7	907.7
Debt payment of HDF	196.9	408.7	466.3
Transfers to the government budget	160.0	100.0	50.0
Net Stock	-875.0	-466.3	391.4

Source: Ministry of finance

3. An Assessment of Potential Impact of SWFs on the Mongolian Economy

In order to assess the economic impact of the Mongolian wealth funds, we simulate the model for 23 years (2019-2040) under the following four scenarios:

- Baseline scenario : Both FSF and FHF are absent;
- Scenario 1: FSF is present, FHF is absent;
- Scenario 2: FSF is absent, FHF is present; and
- Scenario 3: Both FSF and FHF are present.

 The following sub-sections provide main assumptions imposed in the four scenarios and results.

3.1.   Scenarios

In all scenarios, the potential labor supply grows by the population growth which is 1.83 percent for the first 3 years and 1.6 percent in the following years in accordance with the National Statistics Office's (NSO) population projection.

We calculated the TFP growth rate as a weighted average of sector-specific TFP growth rates which are the historical averages estimated from the Solow residual analysis. For the long-term projection of TFP growth, we assumed that the weighted average growth will be maintained near the historical value of 3.4 percent per annum. For some sectors, we impose different TFP growth rates to control their production. Specifically, we impose the following assumptions:

- Livestock sector's growth will be restricted by the pastureland issues. To reflect it, its TFP is assumed to not grow from the 13th year of the projection (2030).
- TFP of Public service sector is assumed to be constant instead of following its historical trend.
- TFP growth rate in the Manufacturing sector will decrease gradually to the weighted average of all sectors' TFP growths (3.4 percent) reflecting gradual shrink of current boom generated by mega projects' development.
- For the other sectors, the historical trend of TFP will continue.

The following exogenous variables grow by the sum of population and the average TFP growth rates:

- Government spending on goods,
- Government capital expenditure,
- Current account balance,
- Remittances from the rest of the world,
- Investment expenditure on livestock sector,
- Inventory changes in all commodities except for other mining and livestock,
- Investment in public, mining and livestock sectors.

To show the impact of the wealth funds in the existence of mining boom and bust cycle, we considered arbitrary series for the main commodity prices. In particular, coal and copper prices are assumed to fluctuate around their equilibrated prices as in FIGURE 6. In addition, we assume that there is a correlation between the changes in coal price and copper price – the correlation coefficient is 0.77. Equilibrated prices are calculated as the average of historical prices of the last 12 years and expected prices of the following 3 years.

FIGURE 6. COAL AND COPPER PRICE PROJECTION
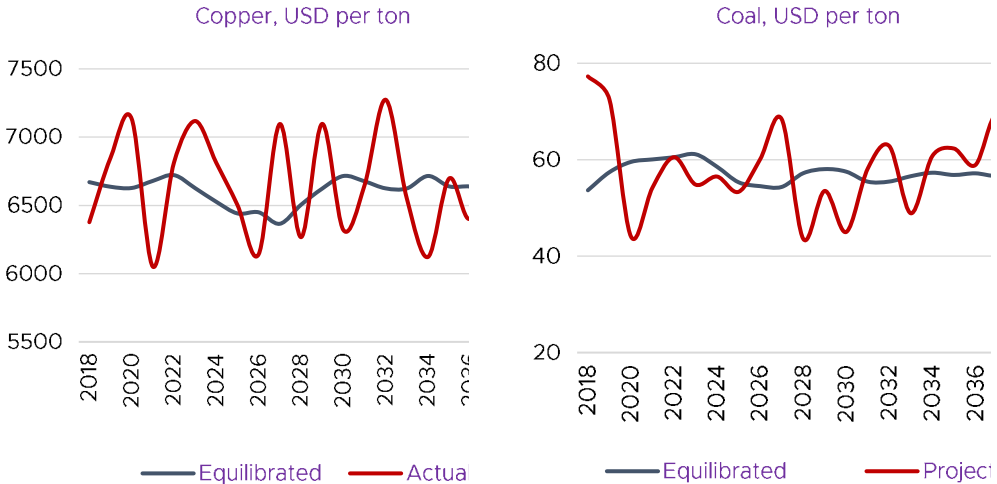
Source: NSO, Authors' calculations

The above-mentioned assumptions are the same for all scenarios. While, each scenario has different assumptions related to the operation of wealth funds. Given the assumptions on exogenous variables, the model solves the values for the endogenous variables.

Baseline scenario

It is assumed that there are no wealth funds – i.e., the government doesn't save money and spends all its revenue on its consumption, transfers and investment. As a result, there is no equilibrated budget revenue. In other words, this scenario assumes that the Fiscal Rule 1 is not complied.

Scenario 2: Fiscal Stability Fund

In this scenario, all assumptions imposed in the baseline scenario are valid except that FSF implementation is included (FHF is absent). To simulate the model, we introduced several new equations related to the FSF. Firstly, the fund's stock is modelled as increases by interest income of its financial activities and net changes which can be either revenue or expenditure depending on the commodity prices.

$$Stock_{FSF,t} = Stock_{FSF,t-1} * (1 + int\_rate_t) + Net\_change_{FSF,t} \qquad (2)$$

The net change of FSF shall be determined according to the FSL as described in the FSF part of section 2.2. Since there is only FSF implementation in this scenario, the net change is determined as the difference between total budget revenue and equilibrated revenue.

$$Net\_change_{FSF,t} = YG_t - YG\_Eq_t \qquad (3)$$

where YG_t is total government revenue and YG_Eq_t is government equilibrated revenue which is determined on the basis of the equilibrated prices. If commodity prices are higher than equilibrated, the net change of FSF is positive and should be subtracted from total government revenue. If commodity prices are lower than equilibrated, the net change is negative and government revenue is refunded by the available stock in FSF.

We also assume that net revenue of FSF is invested abroad so that net changes in stock of the fund must be subtracted from the total investment of the period and added to the rest of the world income (Equation 4 and 5).

$$Total\_investment_t = SH_t + SG_t + SROW_t - Net\_change_{FSF,t} \qquad (4)$$

where SH_t is household savings, SG_t is government savings and $SROW_t$ is savings of rest of the world.

$$YROW_t = Imports_t + Transfers_t + Net\_change_{FSF,t} \qquad (5)$$

where $YROW_t$ is foreigners' income.

Scenario 3: Future Heritage Fund

This scenario takes the implementation of the FHF into account but excludes FSF implementation while all other assumptions of baseline scenario remain the same. In other words, this scenario is designed to assess the net impact of FHF. According to the designated schedule in the FHF law, there will be no disbursement from the fund until 2030, and after 2030, 10 percent of the net interest income of the fund will be spent for budget purposes. In the model, the stock of the FHF increases with interest income of financial activities of the fund and its net change until 2030 as follows:

$$Stock_{FHF,t} = Stock_{FHF,t-1} * (1 + int\_rate_t) + Net\_change_{FHF,t} \qquad (6)$$

From 2030, on the other hand, the fund will receive 90 percent of net interest income from its financial activity so that the remaining 10 percent of the net interest income will be transferred to the government budget (Equations 7 and 8).

$$Stock_{FHF,t} = Stock_{FHF,t-1} * (1 + 0.9 * int\_rate_t) + Net\_change_{FHF,t} \qquad (7)$$

$$YG_t = Capital\ income_t + Tax_{income} + Transfers_t + Stock_{FHF,t-1} * (1 + 0.1 * int\_rate_t) \qquad (8)$$

The net change (revenue) of the fund consists of 65 percent of the royalty income from the mining sector and the government's dividend income from state-owned mining enterprises. According to the Minerals Law, mining license owners are obligated to pay royalty of 5 percent of its sales income. Thus, we model the net change of the fund as follows:

$$Net\_change_{FHF,t} = 0.65 * 0.05 * Sum[mc, EXD_{mc,t} * PEfob_{mc,t} + Q_{mc,t} * PC_{mc,t}] + YGK_t$$

(9)

where $EXD_{mc,t}$ is the quantity of mineral commodities exports, $PEfob_{mc,t}$ is FOB price of mineral commodities, $Q_{mc,t}$ is domestic sales of mineral commodities, $PC_{mc,t}$ is domestic prices of mineral commodities and YGK_t is government's dividend income from the mining sector. As there is no FSF, the royalty income is calculated on the basis of actual (not equilibrated) commodity prices.

Since the net fund placed in the FHF is invested abroad, it is subtracted from the total investment in the economy and is deemed as a part of rest of the world income.

$$Total\_investment_t = SH_t + SG_t + SROW_t - Net\_change_{FHF,t}$$ (10)

$$YROW_t = Imports_t + Transfers_t + Net\_change_{FHF,t}$$ (11)

Scenario 4: Fiscal Stability Fund and Future Heritage Fund

This scenario is designed to show the impact of both funds simultaneously. Thus, we develop this scenario as a combination of Scenario 2 and 3. The stocks of the FSF and FHF are determined by equations 2 and 6 respectively.

Since implementation of both funds are included in this scenario, government equilibrated revenue is estimated as the difference between government total revenue and net changes of the funds.

$$YG\_Eq_t = YG_t - Net\_change_{FSF,t} - Net\_change_{FHF,t}$$ (12)

Equilibrated revenue is determined based on the equilibrated prices of mineral commodities while net change of the FHF is calculated as in the Equation 9. Unlike the previous scenario, the royalty income transferred to FHF is calculated based on equilibrated prices when actual royalty income is higher than equilibrated royalty income, and the surplus is transferred to FSF. On the other hand, the actual royalty income is transferred to FHF when it is lower than equilibrated royalty income. This reflects the 7.1.2 of FHF Law. Thus, net change of FSF can be obtained rearranging the Equation 12.

$$Net\_change_{FSF,t} = YG_t - YG\_Eq_t - Net\_change_{FHF,t}$$ (13)

The net changes should be subtracted from the total investment and added to the rest of the world income since the funds are assumed to be invested in foreign capital markets.

$$Total\_investment_t = SH_t + SG_t + SROW_t - Net\_change_{FSF,t} - Net\_change_{FHF,t}$$

(14)

$$YROW_t = Imports_t + Transfers_t + Net\_change_{FHF,t} + Net\_change_{FSF,t}$$ (15)

In the following sub-section, the results of the four scenarios are presented in a comparative way.

3.2.   Results

Since the main source of the FSF revenue is the additional surcharge revenue from major commodities prices' increases above the equilibrated price, the net change of FSF is following the fluctuations in the mineral commodity prices. In other words, net change in FSF is positive when prices are higher and negative when prices are lower. The following figure illustrates the net change of the FSF for all scenarios. Since FSF implementation is not included in the Baseline and Scenario 3, net change of FSF is zero for those scenarios.

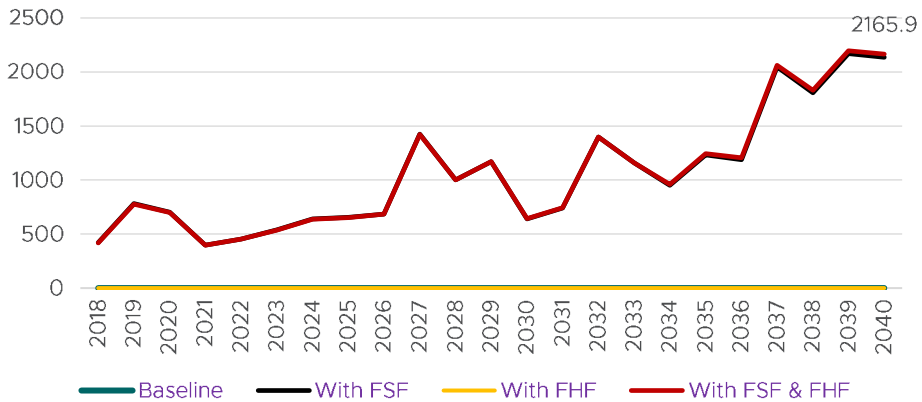*FIGURE 7. NET CHANGE OF FSF, BILLION MNT*
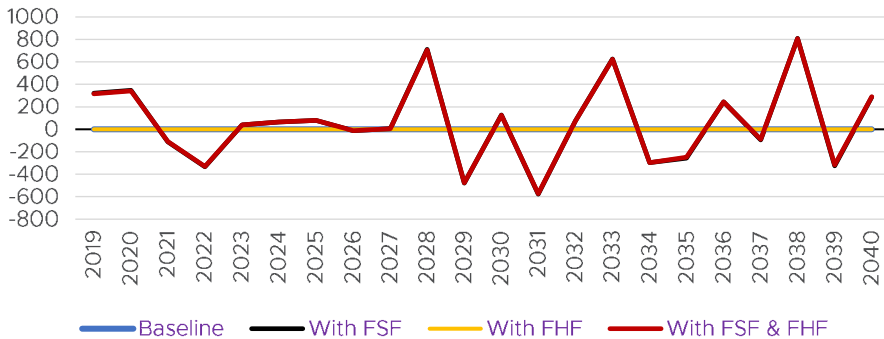
FIGURE **8** shows the FSF stock which is accumulated during higher prices of mineral commodities and refunds the budget revenue shortfalls with the accumulated stock when mineral prices fall. By 2040, the stock of the fund is estimated to reach about 2.17 trillion MNT in Scenario 2 and 4.

FIGURE 8. STOCK OF FSF, BILLION MNT

The purpose of the FHF is to allocate the revenue from mineral sector across the current and future generations, and the fund shall receive certain share of royalty

income of the mining sector each year which means that the net change of the fund is always positive as FIGURE 9 shows. Net change of the fund is zero in the Baseline and Scenario 2 because FHF is absent in those scenarios. It can be seen that the receipt of the fund varies depending on the mineral commodities prices' fluctuations. Specially, the variation in the receipt of the fund is higher when FSF is absent (Scenario 3). In addition, the net change of the fund is always lower in Scenario 4 compared to Scenario 3 because the royalty income transferred to FHF is calculated as equilibrated when actual royalty income increases above the equilibrated.

FIGURE 9. NET CHANGE OF FHF, BILLION MNT
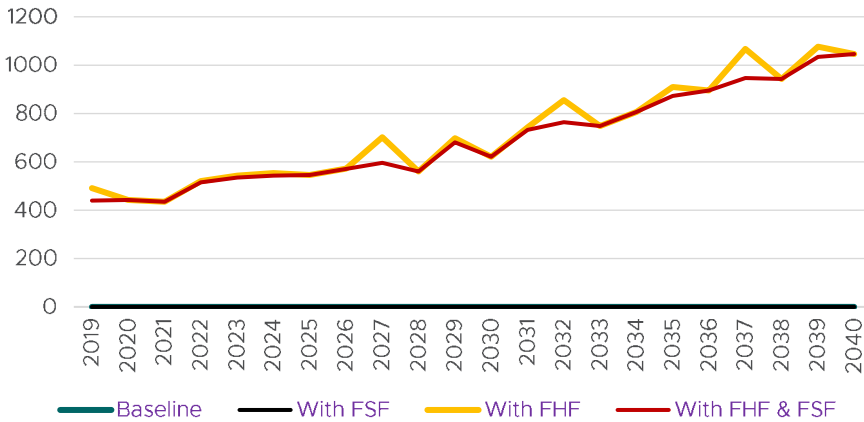
The following figure illustrates the stock of the FHF. It is estimated that the stock of the FHF will reach 24.4 trillion MNT and 23.6 trillion MNT by 2040 from 1.4 trillion in 2019 in Scenario 3 and 4 respectively. On the other hand, the stock of FHF is zero in the other two scenarios as FHF is absent for those scenarios.

FIGURE 10. STOCK OF FHF, TRILLION MNT
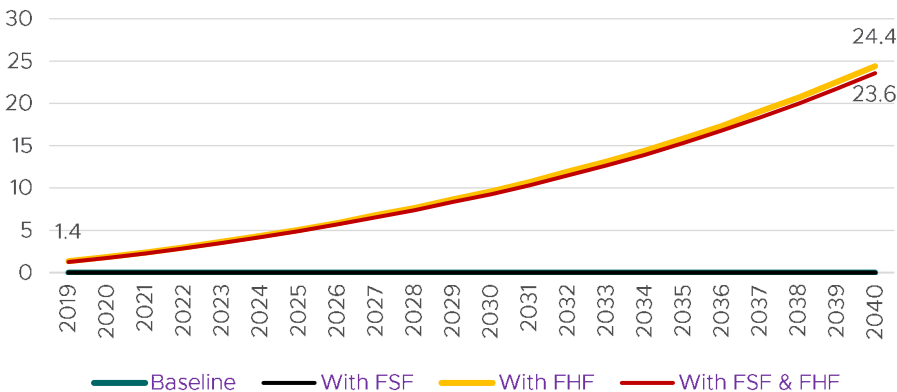
Wealth funds' impact on government accounts

The funds' operation have a direct impact on government revenue. Figure 11 shows the equilibrated budget revenue for the four scenarios. For the Baseline scenario, total budget revenue is equal to the equilibrated revenue because the funds' implementations don't exist in this scenario. In other words, budget revenue is not calculated based on equilibrated prices which makes it volatile. On the other hand, when the FSF is operating, the fluctuations of the budget revenue is lower as the FSF absorbs the price fluctuations. Furthermore, equilibrated budget revenue is lower when FHF implementation is included because the difference between budget revenues in scenarios with FHF and scenarios without FHF is saved in the FHF for the future generations.

*Figure 11. Equilibrated Budget Revenue, trillion MNT*
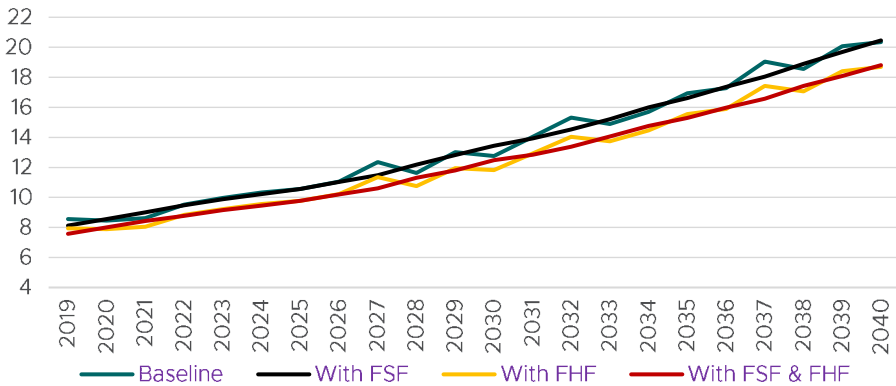
In FIGURE 12, total budget expenditure is shown. As can be seen, the trend of the budget expenditure is the same as the equilibrated revenue for all scenarios which means that the funds have a similar effect on budget revenue and expenditure. In particular, the budget expenditure is more stable when FSF exists while it is lower when the FHF is operating.

FIGURE 12. TOTAL BUDGET EXPENDITURE, TRILLION MNT
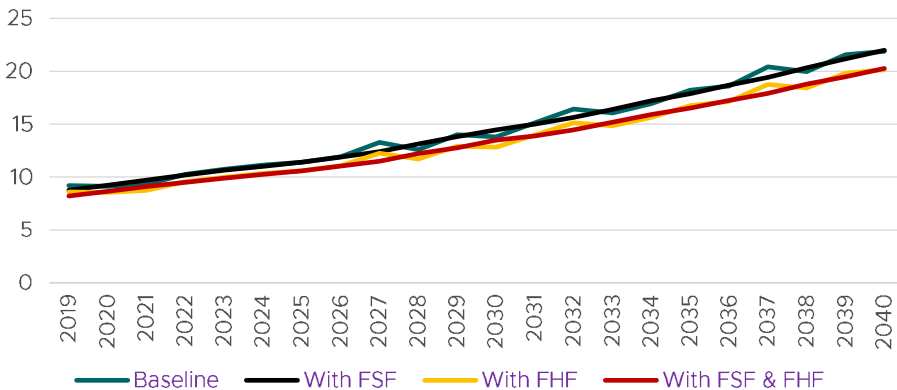
The effect of funds on the budget expenditure is mainly through the government capital expenditure (public investment) as other expenditures (spending on goods and services and transfers) are determined exogenously. The following figure illustrates the effect. As can be seen, the variation of the capital expenditure is higher without the FSF while FHF implementation has effect of lowering the government capital expenditure.

*FIGURE 13. GOVERNMENT CAPITAL EXPENDITURE, TRILLION MNT*
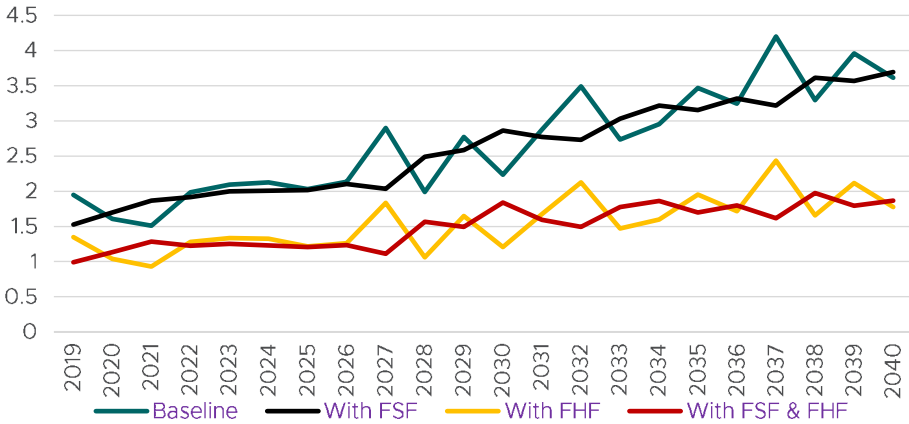
The impacts of the FSF and FHF on the budget can be seen more clearly from TABLE 9 which compares the average growths and standard deviations of the budget items. The funds have no significant impact on the average growth rates of budget variables other than capital expenditure while the FSF reduces the growth rate of capital expenditure. On the other hand, FSF has a stabilization impact on all budget variables as it reduces their standard deviations significantly while the FHF reduces the standard deviations of budget revenue and expenditure in Scenario 3 while increases the standard deviation of capital expenditure.

TABLE 9. COMPARING THE SCENARIOS: GOVERNMENT ACCOUNTS

	Average growth				Standard deviation			
	Baseline	FSF Sce	FHF Sce	FSF & FHF	Baseline	FSF Sce	FHF Sce	FSF & FHF
Budget revenue	4.3	4.4	4.2	4.3	5.1	0.8	4.6	1.0
Budget expenditure	4.3	4.4	4.2	4.3	4.7	0.7	4.3	0.9
Capital expenditure	4.8	4.2	4.8	3.3	20.3	6.4	27.8	13.5

Government debt increases in absolute terms in all scenarios but debt-to-GDP ratio gradually decreases to 63.6 percent with FHF implementation and 61.7 percent without FHF implementation by 2040.

FIGURE 14. GOVERNMENT DEBT TO GDP RATIO, PERCENT
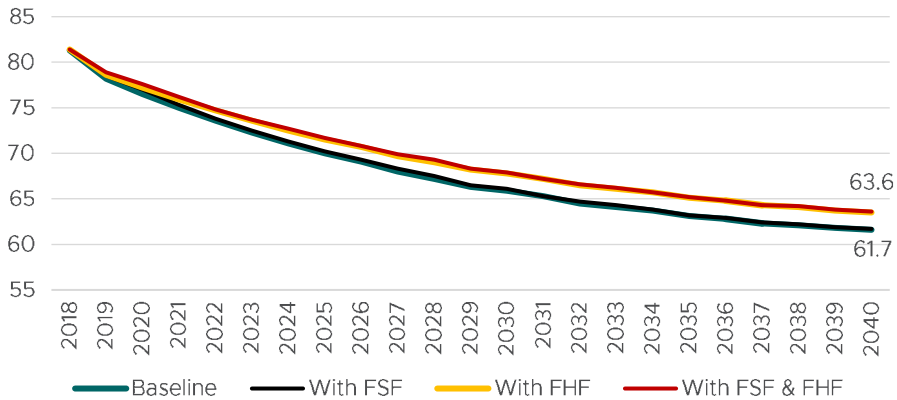
Wealth funds' impact on macroeconomic variables

This sub-section is devoted to show the wealth funds' impact on macro-economic variables. FIGURE 15 illustrates the real GDP growth forecasts under the four alternative scenarios. The GDP growth is forecasted to slow down gradually and stabilize at around 4 percent in the next 23 years for all scenarios. However, the GDP growth is lower in the scenarios with FHF implementation while it is more stable in the scenarios with FSF implementation.

FIGURE 15. REAL GDP GROWTH, PERCENT
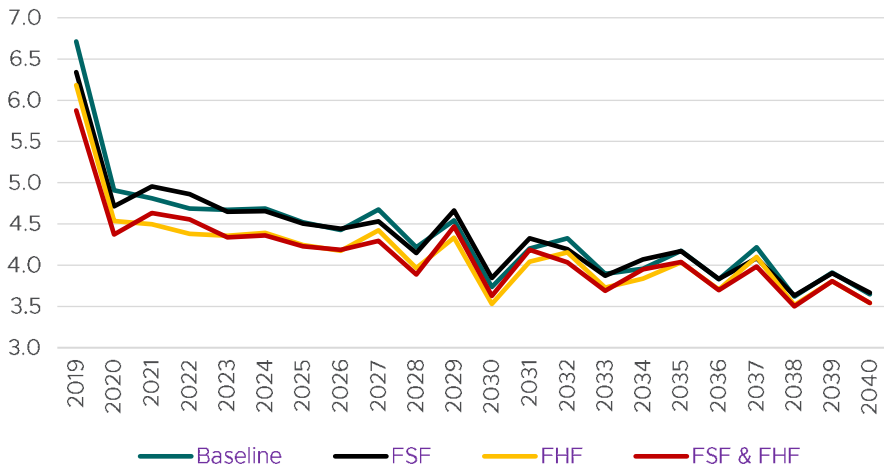
The funds' impact on macroeconomic indicators could be seen more clearly from TABLE 10. The FSF implementation does not have significant impact on the average growth rates of the selected macroeconomic variables. However, with the help of the FSF, the magnitudes of the variations of the selected variables are reduced

significantly. On the other hand, FHF doesn't have significant stabilization effect on macroeconomic variables yet the average growths of variables except for government consumption and CPI are quite lower under scenarios with FHF implementation.

TABLE 10. COMPARING THE SCENARIOS: MACROECONOMIC VARIABLES

Macro variables	Average growth				Standard deviation			
	Baseline	FSF Sce	FHF Sce	FSF & FHF	Baseline	FSF Sce	FHF Sce	FSF & FHF
Real GDP	4.38	4.37	4.16	4.15	0.64	0.57	0.54	0.50
Non-mining GDP	4.21	4.24	4.10	4.13	3.36	2.35	3.31	2.37
Household consumption	4.22	4.23	4.07	4.07	3.76	3.64	3.80	3.70
Government consumption	3.87	3.83	3.93	3.90	2.92	2.32	2.88	2.33
Total Investment	3.77	3.77	3.59	3.58	7.18	3.58	7.04	3.61
Export	4.41	4.41	4.34	4.35	6.87	7.20	6.99	7.29
Import	4.15	4.16	4.08	4.09	5.02	3.43	4.95	3.46
CPI	-0.01	0.01	0.06	0.08	2.03	1.55	2.00	1.55

Overall, the results suggest that FSF has an impact of mitigating economic fluctuations generated by the mineral commodity prices while FHF can help to allocate the revenue from mineral resources across current and future generations despite it reduces current economic growth slightly. If the Government of Mongolia implements the funds persistently, it could help to reduce the vulnerability of the economy to the fluctuations in mineral commodity prices. In addition, if the Government of Mongolia accumulates the FHF stock according to the current law, FHF stock will reach about 33 percent of GDP by 2040.

Conclusions

In this second follow-up study of the Revenue Management (2017), we aimed to assess the economic impacts of the FSF and FHF using our in-house Dynamic CGE model. The Government of Mongolia established FSF aiming to mitigate fluctuations related to the mineral commodity prices and encourage the economic growth in 2011. Additionally, Government of Mongolia designated FHF to save a portion of mineral revenues for the benefit of future generations.

Within the study, we looked into good practices of sovereign wealth funds in Norway and Chile. Chilean has two sovereign wealth funds, ESSF and PRF, which are more similar to Mongolian sovereign wealth funds. The wealth funds prevented the Chilean economy from the 2008 – 2009 global financial crisis and have contributed to lower output volatility and the reduced country risk since their inception. Norway's sovereign wealth fund, the GPFG, is considered one of the best practice examples of revenue management among resource-rich countries. The fund has hampered the occurrence of budget deficit and ensured exchange rate stability during periods of decline in oil prices as observed in 2016.

The results of the simulations indicate that both funds have significant impact on the Mongolian economy. In particular, the FSF could play a crucial role in counteracting and mitigating the economic fluctuations through the smoothing the budget expenditure. In other words, the FSF has a positive impact of restraining fluctuations in the government budget and thereby reducing uncertainty. While the FHF, by its design, have impact of decreasing total demand of the economy through decreasing the budget expenditure but it could help to allocate the rents from mineral sector across the current and future generations. These results suggest that the Government of Mongolia should implement those funds persistently to counteract the economic cycle generated by the mineral commodities prices volatility.

However, recent activities of Government of Mongolia are implying the insufficient implementation of the FSL and Law on FHF. Still, the implementation of the FSL have not been satisfied fully yet. The most important requirements concerning the budget deficit and public debt are still yet to be implemented. Additionally, there is a transparency issue. In particular, revenue and spending of the funds are not so transparent to the public.

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