

ECONOMIC AND FINANCIAL ANALYSIS

I. ECONOMIC ANALYSIS

A. Introduction

1. The project will support the Government of Mongolia to strengthen public financial resource management through improved information and communication technology (ICT) systems, especially for tax administration and public investment management. The proposed ICT systems will improve access to and exchange of information among all stakeholders and help create a seamless public management information system.

2. The economic analysis was conducted in accordance with the Asian Development Bank (ADB) Guidelines for the Economic Analysis of Projects¹ and *Handbook for Integrating Risk Analysis in the Economic Analysis of Projects*.²

B. Macroeconomic Context

3. In the 1990s, Mongolia undertook market reforms and transitioned from a state-run to a market economy. Foreign direct investments to extract substantial mineral resources transformed the economy, which grew rapidly after 2000 as a result of market liberalization and rising commodity prices. The country experienced double-digit gross domestic product (GDP) growth rates during 2011–2013, largely because of commodity exports to nearby countries and high government spending domestically. The economy then slowed, from 7.9% GDP growth in 2014 to 2.4% in 2015 and 1.2% in 2016,³ because of a sharp weakening in investments, exports, and government spending. Exports declined because of weak prices for coal and copper, and slowing demand from the People's Republic of China, which is Mongolia's main trading partner.

4. The economy recovered in 2017 with GDP growing by 5.1% because of strong coal exports, recovery of foreign direct investments, and improved business sentiments. The growth outlook remains positive in 2018 and beyond. Despite the improving outlook, structural challenges and limited export diversification remain and could amplify the vulnerability of the economy to commodity price or other shocks given its reliance on the mining industry, which accounts for about 20% of GDP.⁴

5. ADB's country partnership strategy for Mongolia, 2017–2020 cited the need to develop a more resilient and diversified economy that can consistently deliver rapid, inclusive, and sustainable growth.⁵ Small and medium-sized enterprises must play a greater role in promoting diversification and job creation, particularly in developing value chains for Mongolia's unique agricultural resources. This will require structural reforms to broaden and deepen financial intermediation to enhance access to finance, and infrastructure investments and regional integration to improve connectivity and access to external markets. Developing a better-skilled workforce and enhancing the quality of life in urban areas will also be critical, and will require

¹ ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

² ADB. 2002. *Handbook for Integrating Risk Analysis in the Economic Analysis of Projects*. Manila.

³ ADB. 2018. *Economic Indicators for Mongolia*. <https://www.adb.org/countries/mongolia/economy>

⁴ World Bank. *Mongolia Overview*. <http://www.worldbank.org/en/country/mongolia/overview>

⁵ ADB. 2017. *Country Partnership Strategy: Mongolia, 2017–2020—Sustaining Inclusive Growth in a Period of Economic Difficulty*. Manila.

further infrastructure investment, policy reform, and institutional strengthening to improve the inclusiveness and efficiency of social service delivery.

6. **Impact of the tax administration and information system and public investment management information system.**⁶ The proposed tax administration and information system (TAIS) will examine and evaluate the current business process of tax administration and provide necessary support for reform. Based on the new business process, a comprehensive TAIS will be developed and installed for more efficient and transparent tax administration, with complete data migration and validation from the old systems. The proposed public investment management information system (PIMIS), on the other hand, will improve the current business process of public investment management among various government agencies by integrating the functions of receiving applications, conducting due diligence, decision making, budget execution, and monitoring and evaluation. The improved public financial management will result in transparent allocation of public funds, efficient revenue collection, and robust monitoring of public expenditures, which will lead to opportunities to prioritize resources towards inclusive development. The project benefits will be shared with all Mongolian residents and businesses, foreign investors, and the donor community.

7. The project is in line with ADB's country partnership strategy for Mongolia, 2017–2020 (footnote 5) and the Government Action Plan, 2016–2020⁷ to sustain inclusive economic growth and improve transparency and accountability of the public sector management systems. This is to help ensure that the financial resources of both ADB and the government are used appropriately and effectively by strengthening tax administration and public investment management. The design of the project also follows ADB's sector and thematic operation plan, the Financial Sector Operational Plan.⁸

C. Derivation of Economic Costs

8. The financial prices were converted to economic prices using the domestic price numeraire, which adjusts border prices to the equivalent domestic values using a shadow exchange rate factor of 1.02. A conversion factor of 0.7 was applied to unskilled labor and 1.0 was applied to skilled labor to take into account the considerable underemployment in Mongolia for unskilled labor. Capital and recurrent operation and maintenance (O&M) costs, inclusive of physical contingencies, in constant 2018 prices were converted into economic costs by subtracting all transfer payments, including taxes and duties, and applying the appropriate conversion factors as shown in Tables 1 and 2. Annual costs and benefits were evaluated over a 20-year period up to 2037, allowing for a 5-year implementation period starting in 2018 followed by a benefit period of 15 years. The details of the capital investment costs are in Table 1.

9. The recurrent costs include the annual O&M costs and the replacement costs for ICT infrastructure and hardware (every 7 years), equipment and/or computers (every 5 years), and ICT software and technical services (every 10 years) The details are in Table 2 below.

⁶ ADB. Mongolia: *Strengthening ICT Systems for Efficient and Transparent Public Investment and Tax Administration Project*. <https://www.adb.org/projects/51084-001/main>.

⁷ Government of Mongolia. 2016. *Government Action Plan, 2016–2020*. Ulaanbaatar.

⁸ ADB. 2011. *Financial Sector Operational Plan*. Manila.

Table 1: Capital Investment Costs

Project Cost Item	Total Financial Costs	Financial Costs Without Tax	Financial Costs Excluding Tax								Total Economic Costs
			Unskilled Labor		Skilled Labor		Local Materials		Foreign Costs		
			%	Total	%	Total	%	Total	%	Total	
1. Civil Works	700	700	10%	70	20%	140	70%	490	0%	0	679
2. ICT infrastructure and hardware	4,080	4,080	0%	0	20%	816	10%	408	70%	2,856	4,137
3. ICT software and technical services	6,237	6,169	0%	0	20%	1,234	0%	0	80%	4,936	6,268
4. ICT maintenance	5,325	5,256	0%	0	20%	1,051	20%	1,051	60%	3,154	5,319
5. Equipment	3,483	3,456	0%	0	10%	346	0%	0	90%	3,111	3,519
6. Consulting Services	680	680	0%	0	50%	340	0%	0	50%	340	687
7. Project Management	1,030	1,030	0%	0	30%	309	20%	206	50%	515	1,040
8. Capacity Building	710	710	0%	0	50%	355	0%	0	50%	355	717
Subtotal Base Cost	22,244	22,082	0%	70	21%	4,591	10%	2,155	69%	15,266	22,366
Total Baseline Costs	22,244	22,082	0%	70	21%	4,591	10%	2,155	69%	15,266	22,366
Physical Contingencies (5%)	1,112	1,104	0%	4	21%	230	10%	108	69%	763	1,118
Total Project Costs	23,356	23,186	0%	74	21%	4,820	10%	2,263	69%	16,028	23,484

ICT = information and communication technology.

Source: Asian Development Bank.

Table 2: Recurrent Costs

Project Cost Item	Total Financial Costs	Financial Costs Without Tax	Financial Costs Excluding Tax								Total Economic Costs
			Unskilled Labor		Skilled Labor		Local Materials		Foreign Costs		
			%	Total	%	Total	%	Total	%	Total	
A. Operations & Maintenance	2,017	1,834	10%	183	20%	367	20%	367	50%	917	1,797
B. Other Costs											
ICT infrastructure hardware – every 7 years	4,080	4,080	10%	408	20%	408	60%	408	60%	2,448	4,006
Equipment (computers) – every 5 years	3,483	3,456	10%	346	20%	346	60%	346	60%	2,074	3,394
ICT software and technical services – every 10 years	6,237	6,169	10%	617	20%	1,234	50%	1,234	50%	3,085	6,046

ICT = information and communication technology.

Source: Asian Development Bank.

D. Estimation of Economic Benefits

10. The economic benefits considered for the project include (i) cost savings because of a more efficient tax information system, (ii) savings in travel costs for taxpayers and tax inspectors, and (iii) savings because of improved efficiency in investment planning and project implementation. The methodology for the calculation of economic benefits is described in Table 3.

11. With the TAIS, savings will be realized by avoiding the following: (i) costs to procure server computers in 32 tax offices which will be integrated into a single database through the TAIS, (ii) maintenance costs of servers and equipment for 32 tax offices, and (iii) costs to procure Oracle licenses and operations systems for 32 tax offices. The cost savings because of a more efficient tax information system are estimated at \$117,000 per year.

12. Savings in travel costs will be realized for taxpayers in *soums*⁹ who currently have to travel to a center of an *aimag*¹⁰ to receive tax services. The TAIS system will result in travel cost savings of MNT414,000 (\$172) per taxpayer per year. Overall, taxpayers will save about \$4.1 million per year.

13. Savings in travel expenses will be realized for tax inspectors in 303 *soums* that currently have no network connections. The tax inspectors have to go to a center of their *aimag* to enter their tax statements into the tax information system. Travel costs for tax inspectors are estimated at MNT1,176,000 (\$490) per year. This will translate to total savings of about \$148,470 per year.

14. The improvement in the PIMIS will result in savings because of the reduction in project delays. A study conducted on the costs attributed to project delays during the project preconstruction stages indicates that the cost of project delay is about 4% of the project cost.¹¹ The cost savings from project delays were estimated using the costs of projects being implemented in Mongolia in 2018. With the PIMIS, the planning and implementation delays will be reduced, resulting in estimated cost savings of \$7.7 million per year.

Table 3: Calculation of Economic Benefits

Without Project	With Project	Calculation of Annual Benefits
<p>Cost savings due to more efficient tax administration VAT promotion system, e-filing system, and tax electronic systems have separate databases in 32 tax offices.</p>	<p>Under the TAIS, tax administration will have an integrated database that will be located in one server.</p>	<p>Avoidance of cost to procure server computers in 32 tax offices: \$8,217 (cost per server) x 32 (number of tax offices) / 5 (procure once every 5 years) = \$52,590</p> <p>Avoidance of maintenance costs for 32 servers: \$146 (maintenance cost) x 32 (tax offices) x 2 (twice a year maintenance) = \$9,344</p> <p>Avoidance of cost to procure Oracle licenses for 32 servers: \$8,584 (cost per Oracle license) x 32 (number of</p>

⁹ *Soum*, or district, is a second-level administrative subdivision of Mongolia.

¹⁰ *Aimag*, or province, is a first-level administrative subdivision. Mongolia has 21 *aimags*.

¹¹ Beaty, et al. 2016. *Assessing the Costs Attributed to Project Delay During the Project Pre-Construction Stages*. <https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6806-FY15-WR3.pdf>.

		tax offices) / 5 (procure once every 5 years) = \$54,938
Savings in travel costs for taxpayers Taxpayers have to travel to center of aimags for the tax transactions.	Taxpayers from <i>soums</i> do not need to travel to <i>aimags</i> .	Travel cost savings for taxpayers: \$172 (average travel cost per taxpayer) x 47,507 (number of taxpayers in <i>soums</i> which is assumed to increase by 1.7% per year) x 50% (assumed percentage of savings considered) = \$ 4.1 million
Savings in travel costs for tax inspectors Tax inspectors have to travel to <i>aimags</i> to access tax information systems.	Tax inspectors do not need to travel to <i>aimags</i> .	Travel cost savings for tax inspectors: \$490 (average travel cost per tax inspector) x 303 (number of tax inspectors) = \$148,470
Savings because of increased efficiency in investment planning and project implementation Delays in project implementation because processes of public investment planning, execution, and monitoring are not fully linked.	Integrated project planning, due diligence, execution, monitoring, and evaluation among government agencies.	Savings because of reduction in project delays: \$385 million (total cost of projects) x 4% (cost of project delay) x 50% (assumed % attributed to PIMIS) = \$7.7 million

aimag = province, PIMIS = public investment management information system, *soum* = district, TAIS = tax administration and information system, VAT = value-added tax.

E. Results of Economic Analysis

15. The results of the economic analysis (Table 4) indicate that the base-case economic internal rate of return (EIRR) of 21.14% is higher than ADB's economic opportunity cost of capital of 9%, which shows that the project can be considered economically viable.

Table 4: Economic Internal Rate of Return Calculation

Year	Economic Costs	Incremental O & M	Economic Benefits	Net Benefits
2018	169	0	0	(169)
2019	14734	0	0	(14734)
2020	7569	0	0	(7569)
2021	2822	0	0	(2822)
2022	1115	0	0	(1115)
2023	0	1797	6512	4715
2024	0	1797	13093	11296
2025	0	1797	13164	11296
2026	0	1797	13236	11367
2027	0	1797	13309	11439
2028	3452	1797	13383	8060
2029	0	1797	13459	11586
2030	4497	1797	13536	7165
2031	0	1797	13614	11739
2032	0	1797	13694	11817
2033	10399	1797	13775	1497
2034	0	1797	13857	11978
2035	0	1797	13941	12060

2036	0	1797	14026	12144
2037	4497	1797	14113	7732
EIRR = 21.14%				

() = negative, EIRR = economic internal rate of return, O&M = operation and maintenance.

16. Sensitivity analysis was also undertaken to further test the economic viability of the project. The results (Table 5) indicate that the project is still economically viable in the following scenarios: (i) 10.00% increase in capital costs (EIRR of 19.50%), (ii) 10.00% increase in O&M costs (EIRR of 20.93%), (iii) 10.00% decrease in benefits (EIRR of 19.00%), (iv) 10.00% increase in capital costs and O&M costs plus 10.00% reduction in benefits (EIRR of 17.06%), and (v) delay in the realization of project benefits by 1 year (EIRR of 17.47%).

Table 5: Sensitivity Analysis Results

Year	NET BENEFITS (\$'000)					
	Base Case	Case 1	Case 2	Case 3	Case 4	Case 5
2018	(169)	(186)	(169)	(169)	(186)	(169)
2019	(14734)	(16208)	(14734)	(14734)	(16208)	(14734)
2020	(7569)	(8326)	(7569)	(7569)	(8326)	(7569)
2021	(2822)	(3104)	(2822)	(2822)	(3104)	(2822)
2022	(1115)	(1227)	(1115)	(1115)	(1227)	(1115)
2023	4715	4715	4697	4063	3884	(1797)
2024	11296	11296	11278	9987	9807	4715
2025	11296	11296	11116	9987	9807	11296
2026	11367	11367	11187	10050	9871	11296
2027	11439	11439	11259	10115	9935	11367
2028	8060	7715	7880	6729	6204	7987
2029	11586	11586	11407	10248	10068	11512
2030	7165	6715	6985	5819	5189	7089
2031	11739	11739	11559	10385	10206	11662
2032	11817	11817	11638	10456	10276	11739
2033	1497	458	1318	128	(1092)	1418
2034	11978	11978	11798	10600	10421	11897
2035	12060	12060	11881	10675	10495	11978
2036	12144	12144	11964	10750	10570	12060
2037	7732	7282	7552	6329	5700	7647
EIRR	21.14%	19.50%	20.93%	19.00%	17.06%	17.47%
NPV	17394	15005	16855	12571	9487	10928
SV		55.74	429	42.66		
SI		1.79	0.23	2.34		

() = negative, EIRR = economic internal rate of return, NPV = net present value, SV = switching value, SI = sensitivity indicator.

II. FINANCIAL ANALYSIS

17. The TAIS and PIMIS components of the project are nonrevenue generating. Hence, financial costs and benefits were not analyzed. Instead, a financial sustainability analysis was undertaken. The objective is to evaluate the potential financial impacts of the project on the cash flow of the Mongolian Tax Authority (MTA) (for the TAIS component) and the Ministry of Finance (MOF) (for the PIMIS component) and to determine whether the implementing agencies can provide the loan repayment and recurrent cost budgetary requirements.

18. Towards the end of 2016, Mongolia experienced large fiscal deficit and the depreciation of the currency pushed general government debt up to nearly 90% of GDP. This was attributable to the sharp drop in commodity prices from 2011 onward, which severely affected the balance of payments and fiscal position. In May 2017, the International Monetary Fund (IMF) approved a 3-year extended arrangement under the Extended Fund Facility for Mongolia for \$434 million to support the country's economic reform program. It aims to stabilize the economy, restore confidence, and pave the way to economic recovery. A critical pillar of the program is fiscal consolidation to reduce the pressure on domestic financial markets, stabilize the external position, and restore debt sustainability.¹² Against this backdrop, the MOF and MTA must consider the project's impact in terms of budgetary requirements given the country's fiscal situation.

19. As shown in Table 6, in 2023 the MTA has to allocate MNT4.00 billion (\$1.65 million) for O&M costs for the TAIS component. In 2024, the MTA has to allocate MNT3.70 billion (\$1.52 million) for the principal and interest payments of its \$15.14 million ADB ordinary capital resources (OCR) loan and MNT4.30 billion (\$1.79 million) for O&M costs. These costs represent about 4.8% of the projected operating expenditure of the MTA in 2023 and 8.4% in 2024.

Table 6: Fiscal Projections for the Mongolian Tax Authority (2018–2024)

Item	Actual (MNT billion)					Projections (MNT billion)						
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Recurrent/operating expenditure	4.8	6.8	7.5	41.2	37.4	42.7	48.7	55.6	63.4	72.3	82.5	94.2
Total operating revenues	8.4	8.2	6.0	40.1	38.1	43.5	49.6	56.6	64.6	73.6	84.0	95.9
Surplus/(deficit)	3.5	1.4	(1.5)	(1.1)	0.7	0.8	0.9	1.0	1.1	1.3	1.5	1.7
Government fund required for loan repayments ^a												3.7
Government fund required for O&M costs ^b											4.0	4.3
Project government fund/operating expenditure											4.8%	8.4%

() = negative, O&M = operation and maintenance, TAIS = Tax Administration and Information System.

^a Amount shown in 2024 is the loan repayment requirement (principal + interest) for the TAIS component. Loan repayment for the \$15.14 million ADB OCR loan (TAIS component) will be for 15 years (2024–2038).

^b Annual O&M costs of MNT4.0 billion (\$1.65 million) has to be allocated for the TAIS component.

Sources: MTA and ADB.

20. In addition to the annual O&M costs, the MTA has to allocate budget for other recurrent costs for the TAIS component, including (i) MNT5.00 billion (\$2.08 million) for the replacement of ICT infrastructure and hardware every 7 years, (ii) MNT7.40 billion (\$3.09 million) for the replacement of ICT software and technical services every 10 years, and (iii) MNT7.50 billion (\$3.04 million) for the replacement of equipment (computers) every 5 years. If all the O&M and other recurrent costs are taken into account, the MTA would need to allocate for the TAIS component about 2.9% (in 2036) to 10.3% (in 2028) of its projected operating expenditure. This increase in O&M costs is appropriate given the significant cost savings mentioned in the economic analysis.

21. For the PIMIS component (Table 7), the MOF has to allocate MNT3.40 billion (\$1.41 million) for O&M costs in 2023. In 2024, the MOF has to allocate MNT2.40 billion (\$0.99 million) for the principal and interest payments of its \$9.86 million ADB OCR loan and MNT3.40 billion

¹² IMF website. <https://www.imf.org/en/News/Articles/2017/05/24/17193-imf-executive-board-approves-financial-arrangement-for-mongolia>.

(\$1.41 million) for O&M costs. These costs represent about 0.26% of the projected operating expenditure of the MOF in 2023 and 0.40% in 2024.

Table 7: Fiscal Projections for Ministry of Finance (2018–2024)

Item	Actual (MNT billion)					Projections (MNT billion)						
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Recurrent/operating expenditure	8.0	12.4	11.0	628.8	614.3	698.3	793.9	902.6	1,026.1	1,166.6	1,326.3	1,507.8
Total operating revenues	7.6	12.6	11.3	648.2	633.6	744.5	874.6	1,027.6	1,207.3	1,418.4	1,666.4	1,957.9
Surplus	(0.4)	0.2	0.3	19.4	19.4	46.1	80.7	125.0	181.2	251.8	340.2	450.1
Government fund required for loan repayments ^a												2.4
Government fund required for O&M costs ^b											3.4	3.7
Project government fund/operating expenditure											0.26%	0.40%

() = negative, O&M = operation and maintenance, PIMIS = Public Investment Management Information System.

^a Amount shown in 2024 is the loan repayment requirement (principal + interest) for the PIMIS component. Loan repayment for the \$9.86 million ADB OCR loan (PIMIS component) will be for 15 years (2024–2038).

^b O&M costs of MNT3.4 billion (\$1.41 million) in 2023 has to be allocated for the PIMIS component.

Sources: MOF and ADB.

22. The MOF also has to allocate budget for other recurrent costs for the PIMIS component, including (i) MNT4.80 billion (\$2.0 million) for the replacement of ICT infrastructure and hardware every 7 years, (ii) MNT7.40 billion (\$3.08 million) for the replacement of ICT software and technical services every 10 years, and (iii) MNT1.01 billion (\$0.42 million) for the replacement of equipment (computers) every 5 years. If all the O&M and other recurrent costs are taken into account, the MTA would need to allocate about 0.16% (in 2036) to 0.41% (in 2032) of its projected operating expenditure for the PIMIS component.

23. The fiscal impact of the TAIS component on the MTA and the PIMIS component on the MOF is minimal in terms of the percentage of the recurrent costs to the projected operating expenditures of the implementing agencies. As indicated in the foregoing analysis, the TAIS component will only require about 2.9%–10.3% of the projected operating expenditure of the MTA. Meanwhile, the PIMIS component will require only about 0.16%–0.41% of the projected operating expenditure of the MOF. Nevertheless, the MTA and MOF have to allocate the necessary budget each year for the recurrent costs to ensure continuous operations of the information systems. The O&M costs and the recurrent costs for the replacement of some of the ICT hardware and software every 5–10 years are justified given the significant cost savings from the project as stated in the economic analysis.