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Economic Modernization in Mongolia:

The Impact of Tax and Regulatory Policies on the Mining Sector

A Research and Analysis Report by Dr. Robert Shapiro and Sonecon, LLC, International Economic Advisory Firm

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Table of Contents

I.	Executive Summary3
н.	Fact Sheet5
ш.	Introduction7
N7	De chevrour d
IV.	Background
V.	Prospects for Continued Growth by the

VI.	Policy-Related Obstacles to Developing
	Mongolia's Mining Sector17
VII.	Alternative Approaches for Allocating
	Mining Profits
VIII.	Conclusion29

Economic Modernization in Mongolia:

The Impact of Tax and Regulatory Policies on the Mining Sector¹

I. Executive Summary

As Mongolia, along with other developing countries, continues to experience the effects of the global economic crisis, its government must review its policies that that can affect foreign investment in mining and other industries crucial to Mongolia's economic future. The mining industry has come to symbolize prosperity and the long-term modernization of Mongolia. Foreign direct investment grew from \$2 million per-year in the early 1990s to more than \$500 million in 2007, with most of those FDI inflows related to mining and natural resources.

As Mongolia, along with other developing countries, continues to experience the effects of the global economic crisis, its government must review its policies that that can affect foreign investment in mining and other industries crucial to Mongolia's economic future. The mining industry has come to symbolize prosperity and the long-term modernization of Mongolia. Foreign direct investment grew from \$2 million per-year in the early 1990s to more than \$500 million in 2007, with most of those FDI inflows related to mining and natural resources.

In 2006, several amendments were passed to the 1997 Minerals Law that undermine Mongolia as an attractive nation and economy for mining investment. These amendments increased the tax and regulatory burdens on mining projects and introduced the prospect of mandatory government ownership stakes in new mining projects.

This report examines six major, planned mining projects including: Tavan Tolgoi; Oyu Tolgoi; Tumertei; Asgat; Dornot; and Gurvanbulag-Mardai. The positive economic impact these projects could have on the Mongolian economy include:

- \$1.5 billion increase in GDP per year;
- 45,000 new jobs created for Mongolian workers during construction and operational phases combined; 56,122 new jobs total created;

- \$2.45 billion increase in exports per year; and
- \$385 million per year in additional government revenues per year.

However, the Government of Mongolia has adopted new policies that could halt these projects and cost the country their economic benefits. These unfavorable conditions include an increase in the mineral royalty fees from 2.5 percent to 5 percent, a recordhigh windfall profits tax of 68 percent on copper and gold, partial government ownership stakes in the mines (from 34 percent, and up to 50 or possibly 51 percent), reduced tax preferences for mining operations, and reduced duration of mineral licenses.

Many of these new taxes and regulations are so burdensome that while they promise to provide a short-term boost in government revenues, they will eventually lead to sharp declines in those revenues as companies reduce production, and consider other countries for mining exploration and development. By analyzing these amendments and other government policies in relation to these six potential projects, we found that:

- An increase in mineral royalty fees from 2.5 percent to 5 percent would raise the overall effective tax rate on mining to among the highest levels in the world.
- The Mongolian government's revenue will increase more than 24 percent as a result of the royalty fee on

¹ This economic and research analysis was supported by World Growth Mongolia. The analysis and views are solely those of the author.

the new projects, even if it is reduced to 2.5 percent.

- A 68 percent windfall profits tax on copper and gold will produce the highest effective tax rate on mining in the world exceeding 80 percent.
- A proposed government ownership of either 34 percent or 50-51 percent of operations would require the government to invest up to \$1.98 billion, more than the country's entire foreign currency reserve.
- A government "free" ownership stake in the projects would lead to negative returns for private investors on the projects, forcing the companies to suspend these projects.
- A product sharing arrangement between the Mongolian government and a mining company

With new mining projects estimated to take 4-5 years for construction to move into operation, the Mongolian government should act now to ensure economic prosperity in the future. would likely be infeasible: Minerals produced vary in quality and purity, so the value of the shares allocated to companies and the government could not be fixed or even known in advance.

• A Resource Rent Tax (RRT) could effectively place a cap on rates of return for these projects, which would discourage investment as well as future exploration. Additionally, the RRT would be costly to implement and maintain, which would reduce its net revenues to the government

Further, this report finds that not only will these new tax and regulatory policies slow or even halt the six projects examined here, they also will discourage future flows of foreign investment into Mongolia's mining sector. With new mining projects estimated to take 4-5 years for construction to move into operation, the Mongolian government should act now to ensure economic prosperity in the future. There are other attractive options for mining investment across the developing world, and Mongolia should take a stand to retain investor interest. The Mongolian government can begin to reform its investment climate by lowering the mineral royalty rate to 2.5 percent, rollingback the windfall profits tax, and reevaluating their bid for public ownership or equity in these mining projects.

II. Fact Sheet

- Six projects analyzed:
 - Tavan tolgoi (Coal)
 - Oyu tolgoi (Copper, gold, silver)
 - Tumertei (Iron ore)
 - Asgat (Silver)
 - Dornot (Uranium)
 - Gurvanbulag-Mardai (Uranium)
- Average life of each project: 22.3 years
- Foreign investment: \$5.7 billion over projects' lifetime, or \$945 million per project
- Positive overall economic effects of these projects:
 - GDP: \$1.5 billion increase per year
 - New Jobs: 45,000 person-years of new employment for Mongolian workers during construction and operational phases combined; 56,122 person-years of new employment total created
 - Exports: \$2.45 billion increase per year
 - Additional government revenues: \$385 million per year
- Combined net present value of the six deposits: \$3.9 billion, or an average of \$647 million perdeposit
- Gross output of the six mining projects: \$64 billion over the mines' life spans
- Government revenue from royalty fees increases by

over 24 percent from 2007 levels, even if the fee is lowered from 5 percent to 2.5 percent

- A 34 percent "free" government ownership stake in the mining projects results in negative returns for 5 out of the 6 projects analyzed; a 51 percent free ownership stake results in negative returns for all 6 projects
- Mongolian government would have to provide \$1.32 billion to purchase a 34 percent stake in these projects or \$1.98 billion to purchase a 50-51 percent stake, which would exceed the country's international currency reserves. If financed through taxes, it would impose a large tax burden on Mongolian taxpayers. If financed through borrowing, it would increase the country's national debt by nearly 120 percent to attain a 50 percent ownership stake, and the interest costs to service that debt would cost the government between \$825 million and \$1.2 billion for its stake during the 4-to-7 year period before the project produces positive cash flows
- Government-owned equity stakes in the projects, unless paid for up front, would end the development of all six projects, due to the negative rates of return to private investors
- Attractiveness of Mongolia for mineral exploration fell to 62 out of 65 countries in 2007, based on the Fraser Institute survey of mining executives
- Fitch Ratings have downgraded Mongolia's economic outlook from "stable" to "negative," which would increase government borrowing costs to finance projects

^{6 •} Economic Modernization in Mongolia

III. Introduction

As Mongolia and its government grapple, along with most other countries, with the current global economic decline, Mongolia's prospects for a sound recovery and continued development will depend not so much on the financial reforms or stimulus carried out by the United States and other large economies, as on the decisions its own government takes regarding the taxation and regulation of the new mining projects now being developed by foreign firms.

Over the last decade, mining has driven much of Mongolia's economic growth, and the success of mining in Mongolia has rested largely on the tax, regulatory and investment reforms contained in the 1997 Minerals Law and 2006-2007 tax reforms, and the consequent inflows of foreign direct investment into Mongolian mining. Foreign direct investment soared from \$2 million per-year in the early 1990s to more than \$500 million in 2007, and most of the FDI flowing into Mongolia since 1997 have gone to mining and other natural resource projects. The result is that mining sector's share of Mongolian GDP grew from 10 percent in 1996 to 25 percent in 2007, and the sector's value-added increased more than seven-fold.

Moreover, Mongolia holds vast potential for further minerals development, since only a fraction of the country's natural resources have been explored. Future exploration and development in the mining sector, however, will depend on a favorable legal, regulatory and tax environment for foreign direct investment, as well as vigorous public investment in areas such as transportation, health care, education and water resources.

In this study, we examine the potential impact of recent tax and regulatory policy decisions on the prospects for six, new major mining projects. First, we find that if these projects go forward, they should produce enormous, long-term economic benefits for the Mongolian economy. The projects will involve an estimated \$5.7 billion in foreign investments over their average operational span of 22.3 years; and over this period, these investments should generate:

• Increases in Mongolian GDP averaging \$1.5 billion per-year, the equivalent of a 38 percent increase in the country's 2007 GDP;

- Jobs gains for Mongolian workers totaling 45,000 person-years of employment, including more than 2,200 during the construction phase and nearly 43,000 over the long period of the projects' operations;
- Increases in annual exports averaging \$2.5 billion per-year, the equivalent of 125 percent of the country's 2007 exports; and,
- New government revenues averaging at least \$385 million per-year or \$8.6 billion over the 22.3-year period (if the government restores the royalty rate on minerals to 2.5 percent), or the equivalent each year of 24 percent of revenues collected in 2007.

All of these future gains are at risk, because recent amendments to the 1997 Minerals Law and other legal changes have created major concerns for large foreign investors in Mongolian mining. For example, a 2006 amendment to the Minerals Law doubled the royalty rate on minerals from 2.5 percent to 5.0 percent, even as many of Mongolia's competitors have reduced their royalty rates to 3 percent or less. With this recent increase, Mongolia now has one of the world's highest mineral royalty rates; and with other taxes on mining companies, Mongolia's effective tax rate on mining is the highest in the world. In 2006, Parliament also approved a new, 68 percent windfall profits tax on copper and gold production when their prices exceed preset levels. While commodity prices have recently fallen below those levels, when those prices recover, the new tax will produce an 80.8 percent effective marginal tax rate on sales of Mongolian copper and gold, again the world's highest marginal tax level. In response, foreign mining companies have slowed or halted exploration and development activities in Mongolia, and the production and export of these minerals have declined. We conclude that these new tax burdens will markedly slow or conceivably halt the modernization of Mongolia's mining sector.

All of these future gains are at risk, because recent amendments to the 1997 Minerals Law and other legal changes have created major concerns for large foreign investors in Mongolian mining. Mongolia now has one of the world's highest mineral royalty rates; and with other taxes on mining companies, Mongolia's effective tax rate on mining is the highest in the world.

> The 2006 amendments also permit Mongolia's government to claim substantial ownership stakes in new mining projects (up to 34 percent or 50 percent, or under a Parliamentary resolution setting guidelines for negotiations, up to 51 percent). Most other countries have turned away from government ownership stakes in mining, because such political involvement often halts foreign investment or, when investment continues, reduces performance. In Mongolia's case, the consequences would be far-reaching, either imposing prohibitive costs on the government if its' stakes are purchased or, if the stakes are provided at no cost to the government, eliminating any prospects of a reasonable return for the private investors in these projects. We estimate, for example, that,

- Government purchase of a 34 percent or 50-51 percent stake in the six new mining projects would cost Mongolian taxpayers the equivalent of nearly 40 percent or 60 percent of 2007 GDP, respectively;
- These government purchases, if distributed over the operational periods for these projects, would cost the equivalent of 4 percent to 6 percent of 2007 government revenues, each year over those periods;
- If the purchases were funded through government borrowing, the annual interest charges on those borrowed funds would claim the equivalent of 13 percent to 19.5 percent of 2007 government revenues, every year for the indefinite future.

The analysis also found that the Mongolian government could generally secure higher returns than those projected for the mining projects, from investing instead in the major areas urged by the Millennium Challenge Project, including vocational education, health care and railway transportation. Further, the alternative of the government claiming major ownership stakes in mining projects without paying for them would almost certainly result in their cancellation. A 34 percent government ownership share in these projects, acquired at no cost to government, would produce negative projected returns for private investors in five of the projects; and a 51 percent government stake claimed at no cost would leave private investors with very negative projected returns in all six cases. Similarly, a product sharing arrangement would impose substantial fiscal and management burdens on the government and discourage companies from proceeding.

While direct government ownership of a share of these projects or a product sharing arrangement would be unsustainable, there are sound approaches for sharing their benefits. For example, the Mongolian government could consider sequestering part of the revenues from normal taxes on mining sales for direct distribution to Mongolia's people, on the model of the Alaska Fund, or use those revenues to support the public investments that can help raise productivity and attract more foreign direct investment, or use them to balance the national budget and fund state pensions, on the Norwegian model. However the Mongolian government determines to use income generated by its enormous mineral wealth, it should maintain a tax and regulatory environment that will attract the foreign direct investment required to continue to both generate that income in the future and drive the nation's economic development.

Actions to improve this tax and regulatory environment are needed urgently. The development of major mining projects requires four or more years of preparation and construction, and the current conditions in Mongolia threaten those commitments. Moreover, the current global economic decline and lower commodity prices have increased pressures on international mining companies to focus their development activities in nations with the supportive tax and regulatory regimes. Global economic conditions are unlikely to improve substantially for several years, by which time Mongolia's current high taxes and threat of mandatory equity participation could well have forced international mining companies to shift their resources from these six major projects to alternatives in other countries.

IV. Background

For many centuries, the economy of Mongolia, a country with a land mass of 1.6 million square kilometers, a population of 2.6 million people, and a severe climate, centered on agriculture and animal herding. In recent years, however, foreign companies have invested heavily to develop the country's mineral deposits, and its future economic development will depend in important part on the expansion and modernization of the key mining sector.

The prospects of Mongolia developing a large and globally-competitive mining industry will depend critically on the laws and regulations which the Mongolian government applies to potential investors in Mongolian mining operations. Since the early 1990s, Mongolia's government has worked with the International Monetary Fund, the World Bank and Asian Development Bank to put in place reforms to modernize the economy and attract international investors. These efforts began as Mongolia, like other formerly, centrallyplanned economies, experienced a severe transformational recession following the collapse of the Soviet Union and its trading bloc. From 1990 to 1993, the country's real GDP declined 22 percent, including a nearly one-third drop in industrial employment and production, and a 40 percent reduction in exports. (Table 1, below) Drawing on the recommendations of international financial institutions, Mongolia managed a successful transition to a market-based economy by the late 1990s. One of the most critical reforms was the 1997 Minerals Law, broadly seen by the international mining community as one of the developing world's most successful programs for protecting mineral licensee rights and obligations. Its provisions helped attract large-scale foreign direct investment (FDI) to Mongolian mining, driving the sector's rapid modernization.

These reforms and the attendant FDI flows produced impressive results. In the decade from 1997 to 2007, the Mongolian economy grew at an average annual rate of 5.7 percent, doubling the nation's real GDP over the ten-year period. Overall, the industrial sector grew at an average annual rate of 5 percent, with the mining industry expanding 7.1 percent per-year and

Table 1

The Mongolian Economy: Selected Measures, Average Annual Growth Rates or Levels²

1981 - 1989	1990 - 1996	1997 - 2007
1001 - 1001	0.001 - 0.001	1557 - 2007
C 00/	1.00/	F 70/
0.0%	-1.9%	5./%
2.9%	0.8%	1.0%
7.2%	-4.6%	5.0%
-	-	7.1%
-	-	3.9%
8.5%	-2.2%	6.8%
\$744.0	\$435.4	\$1,066.7
\$1,657.4	\$570.6	\$1,178.0
ion) –	\$6.0	\$120.7
-	\$100.3	\$425.4
1985	1996	2005
589,500	769,600	968,300
199,700	358,100	386,200
-	18,300	39,800
-	65,300	45,600
	1981 - 1989 6.0% 2.9% 7.2% - - 8.5% \$744.0 \$1,657.4 ion) - 1985 589,500 199,700 - - -	1981 - 1989 1990 - 1996 6.0% -1.9% 2.9% 0.8% 7.2% -4.6% - - - - - - 8.5% -2.2% \$744.0 \$435.4 \$1,657.4 \$570.6 ion) - \$6.0 - \$100.3 1985 1985 1996 589,500 589,500 769,600 199,700 - 18,300 - - 18,300 - - - 18,300

2 World Bank. "World Development Indicators," 2008; International Monetary Fund. "Mongolia: 2008 Article IV Consultation—Staff Report," https://www.imfbookstore.org/pubDetails.aspx?id=10371.

manufacturing growing 3.9 percent per-year. While the contraction of former state enterprises cost the economy some 20,000 manufacturing jobs, the expansion of other sectors created more than 160,000 new, non-manufacturing jobs. Mongolian exports rebounded from an average of \$435 million per-year in 1990-1996 to more than \$2.5 billion in 2007, and imports expanded from an average of \$570 million per-year in 1990-1996 to nearly \$2.6 billion in 2007. Consequently, total foreign currency reserves grew from \$23 million in 1991 to nearly \$1.4 billion by the end of 2007. Throughout the course of 2008, however, reserves declined sharply, falling to \$606 million by the end of November 2008³.

The Role of the Mining Sector in the Mongolian Economy

The Mongolian government has gradually privatized the nation's mining sector since mid-1990s. In 1997, the government revised the Mineral Resources Law and related foreign investment and tax laws to attract foreign direct investment in mining; and additional liberalizing provisions were enacted in 2000. The major provisions of these laws include:⁴

- Reductions in the royalty rate for minerals from 12.5 percent to 2.5 percent;
- Reductions in the corporate income tax rate from 40 percent to 30 percent;
- New tax allowances for capital expenditures on infrastructure and accelerated depreciation of fixed assets;
- The extension of the terms of mining licenses from 60 years to 100 years;
- New, three-year licenses for mining exploration, with a right to two, two-year renewals;
- An exemption for import duties on new, imported plant and equipment;
- Simplification of foreign investment procedures.

These reforms accelerated the modernization of the

mining sector, which in turn produced substantial increases in foreign investment and expertise, economic growth and incomes. Moreover, additional tax reforms enacted in 2006 to take effect in 2007 amplified this progress. The key measures include:⁵

- Apply a 25 percent corporate income tax to all income on larger firms and 10 percent for smaller firms, in place of a 30 percent rate on corporate earned income and 15 percent rate on passive income;
- Replace a three-tier personal income tax with a single 10 percent rate;
- Cut the VAT rate from 15 percent to 10 percent.

Since these reforms, foreign direct investment in the Mongolian mining sector, supported by sharp increases in commodity prices as well as the 1997 Minerals Law and the 2005 tax reforms, has been the engine to the nation's economic growth. Annual foreign direct investments, principally from China, Canada, South Korea, Japan and the United States, increased from an average of \$2 million per-year in early-1990s to \$345 million in 2006 and \$328 million in 2007. Since 1997, more than \$1.3 billion in foreign direct investments have flowed into Mongolia, primarily for mining and oil exploration projects. (Figure 1)

Today, more than 200 foreign and joint-venture mining companies operate in the country; and mining sector employment nearly doubled from 20,000 in 1997 to more than 39,000 people in 2005, when it accounted for one-third of all industrial employment. From 1996 to 2006 when the investment climate in Mongolian mining sector was friendly, mining's share of GDP had grown from 10 percent to 30 percent; and the sector's value-added rose \$122 million to \$812.5 million, or 563 percent. From 1996 to 2006, coal output rose 54 percent from 5,111 thousand tons to 7,885 thousand tons, and coal exports increased 4,400 percent from 500 tons to 2,218 thousand tons. Similarly, gold output increased almost 200 percent from less than 7 tons in 1996 to 20.8 tons in 2006, and gold exports grew 107 percent from 8.5 tons to 17.6 tons. (Table 2)

10 • Economic Modernization in Mongolia

³ Fitch Report, December 2008

⁴ Wu, John C. "The Mineral Industry of Mongolia." U.S. Geological Survey Minerals Yearbook, 1997, 1998, http://minerals.usgs.gov/minerals/pubs/myb.html.

⁵ Tse, Pui-Kwan. "The Mineral Industry of Mongolia." U.S. Geological Survey Minerals Yearbook, 2005, http://minerals.usgs.gov/minerals/pubs/country/2005/mgmyb05.pdf.



Value-Added, Output and Exports, Mongolian Coal and Gold, 1996-20067

	1996	2006	Growth
All Mining, Value-Added (\$ million)	\$122.6	\$812.5	563%
Output (tons)			
Coal	5,111,000	7,885,000	54%
Gold	6.98	20.8	198%
Exports (tons) ⁸			
Coal	500	2,217,800	4,435%
Gold	8.5	17.6	107%

The explosive growth of the mining sector in Mongolia, based on the foreign direct investment attracted by the legal and tax reforms, has outpaced growth in other developing nations. While valueadded of Mongolia's mining sector increased 714 percent over this period, the gains recorded by mining in other countries were 285 percent in Argentina, 212 percent in Chile, 95 percent in Peru, 460 percent in Ghana, and 560 percent in Tanzania.⁹

⁶ World Bank. "World Development Indicators," 2008.

⁷ National Statistical Office of Mongolia and World Bank.

⁸ The earliest available data for gold exports is 2001 figure; in 2001, total gold production was 13.7 tons.

⁹ World Bank. "Mongolia Mining Sector: Managing the Future," 2005, http://www-wds.worldbank.org/servlet/main?menuPK=64187510&pagePK=64193027&piPK=64187937&theSitePK=523679&entityID=000012009_20060502100736.

^{12 •} Economic Modernization in Mongolia

V. Prospects for Continued Growth by the Mongolian Mining Sector

Mongolia possesses some of the world's most extensive mineral deposits, and the increase in exploration activities by foreign investors has produced significant discoveries that can help maintain the extraordinary growth rates of the sector and overall economy. These discoveries include iron ore, lead-zinc and uranium, potentially contributing to the diversification of a sector now focused on copper, gold and coal. Two factors will be critical to prospects of continued progress. Mongolia has vast potential for development in heretofore unexplored and unexploited mineral resources: Only 25 percent of Mongolia's land mass has been mapped geologically at a useful scale (1:50,000). Despite the sector's strong growth, poor infrastructure and a shortage of roads and water resources, as well as regulatory and political uncertainty, still limit exploration. In addition, future exploration and development will depend crucially on a favorable legal and tax environment for future foreign direct investment.

Among a substantial number of potential projects, the Mongolian government has evaluated the financial and operational requirements of six major strategic mining deposits: the Tavan Tolgoi coal deposit, the Oyu Tolgoi copper and gold deposits, the Tumertei iron ore deposit, the Asgat silver deposit, the Dornot uranium deposit, and the Gurvanbulag-Mardai uranium deposits. The following analysis of this report will focus on these six strategic mining projects. While this sample is small in numbers, it covers much of the landscape for future mining development. The six projects include six minerals — copper, gold, silver, coal, iron ore and uranium. The projected life spans of the projects range from 10 years to more than 40 years, with an average span of 22.3 years; and their projected production ranges from 7.4 million tons of silver to more than 6 thousand million tons of coal. (Table 3, below)

These operations represent enormous potential value for the Mongolian economy. The Mongolian government estimates that the six projects will generate some \$5.7 billion in foreign investment inflows, or an average of \$945 million per-project. The Oyu Tolgoi copper and gold deposits alone are expected to require and attract more than \$4.2 billion in foreign direct investment and could produce one of the world's largest mines. Further, the combined net present value of the six deposits totals some \$3.9 billion, or an average of \$647 million per-deposit, with the Tavan Tolgoi coal deposit having the largest potential net present value of \$1.6 billion. The Mongolian government expects to collect some \$3.2 billion in royalty payments (at a 5 percent royalty rate), with the Tavan Tolgoi and Oyu Tolgoi operations accounting for some 87 percent of that total. In addition, income tax revenues associated with the lifetime of the six projects are expected to reach \$6.6 billion, with the Tavan Tolgoi and Oyu Tolgoi deposits again accounting for 85 percent of those revenues (at a 25 percent tax rate). (Table 4, next page)

Table 3

Characteristics of Six Major, Proposed Mining Projects¹⁰

Project	Mineral	Total Production	Life of Mine
Tavan Tolgoi	Coal	6,009 Mt	30 years
Oyu Tolgoi	Copper, gold, silver	32.214 Mt CU, 900.1 t Au	40 years
Tumertei	Iron ore	229.29 Mt	26 years
Asgat	Silver	7.370 Mt	10 years
Dornot	Uranium	28.868 Mt	17 years
Gurvanbulag-Mardai	Uranium	17.177 Mt	11 years

10 Mongolia Ministry of Mining and Energy.

The Financial Projections and Government Revenues of Six, Major Proposed Mining Projects, \$ millions"

Project	Lifetime Net Present Value	Required Investment	Projected Royalties	Projected Tax Revenues
Tavan Tolgoi	\$1,578.2	\$886.0	\$1,069.9	\$2,055.7
Oyu Tolgoi	\$1,295.8	\$4,247.0	\$1,707.1	\$3,525.2
Tumertei	\$251.9	\$291.0	\$217.8	\$436.9
Asgat	\$98.0	\$47.4	\$28.8	\$62.8
Dornot	\$382.9	\$150.4	\$118.4	\$332.2
Gurvanbulag-Mardai	\$275.7	\$47.3	\$55.9	\$176.0
Total	\$3,882.5	\$5,669.1	\$3,197.90	\$6,588.8

The Potential Economic Benefits of the Six Projects

These six investment projects should deliver substantial economic benefits and progress for Mongolians. Using the Mongolian government's royalty estimates, we project that the gross output of the six major mining projects will total \$64 billion over the mines' life spans, or an average of \$2.9 billion per-year. In order to estimate the benefits arising from this production, we apply standard "multipliers," which measure the overall gains produced for each dollar of investment. Studies have found that the GDP-multiplier for mining investments in Mongolia is 5.9: Every \$1.00 in mining investment should expand Mongolia's GDP by an average of \$5.90. These benefits are distributed across industries and sectors. Two-thirds of these

Mongolia possesses some of the world's most extensive mineral deposits, and the increase in exploration activities by foreign investors has produced significant discoveries that can help maintain the extraordinary growth rates of the sector and overall economy. GDP gains reflect increased output by the mining sector itself, or a multiplier of 3.93: Each \$1.00 in mining investment increases mining output by \$3.93. The remaining one-third of the gains reflect increased output by other sectors stimulated by the new mining operations, or a multiplier of 1.97: Each \$1.00 in mining investment increases output by non-mining sectors by \$1.97.¹²

Using these data, we can estimate the likely effects on the investments in the six mining projects on the overall Mongolian economy. The total investment needed for the six projects is estimated at approximately \$5.66 billion over an average period of 22.3 years, or an average of \$253.64 million per-year. Applying the appropriate multipliers, we estimate the investments in the six strategic projects would increase Mongolia's GDP by an average of nearly \$1.5 billion per-year (\$253.64 million in annual investment x the GDP multiplier of 5.9).¹³ This projected annual increase would be equivalent to 45 percent of the nation's 2007 GDP of \$3.3 billion and 95 percent of the average annual GDP of \$1.58 billion for the decade 1997-2007. (Table 5, above) About two-thirds of this expansion in GDP or nearly \$1 billion would come directly from the mining sector, and would effectively double the size of the sector as of 2007. The increases in GDP from other sectors stimulated by the mining investments would average about \$500 million per-year, the equivalent of

11 *Ibid*.

¹² Stokes, Ernie. "The Economic and Fiscal Impacts of the Oyu Tolgoi Project on Mongolia: Phase 2." The Center for Spatial Economics, 2005.

¹³ Studies have examined the Mongolian mining sector and found that gross mining output in Mongolia contributes roughly 51 percent to value-added GDP. The \$2.9 billion gross output of the six mining deposits would contribute around \$1.5 billion to Mongolian value-added GDP.

Iddie D Impact of Proposed Mining Investments on the Mongolian Economy				golian Economy
c	Output, Revenue and Export Multipliers	Annual Impact of Mining Investments	Impact as Share of 2007 Levels	Impact as Share of Average 1997-2007 Levels
Overall GDP	5.900	\$1,497.7	45.0%	95.0%
Mining sector	3.933	\$998.4	100%	400%
Other sectors	1.967	\$499.2	21.4%	37.6%
Government Revenue	s 1.726	\$438.2	27.7%	75.4%
Income tax (25% ra	ate) 1.162	\$295.0	-	-
Royalty (5% rate)	0.564	\$143.2	-	-
Exports	9.650	\$2,449.6	125%	253%

more than 21 percent of total output by all non-mining sectors in 2007 level and nearly 38 percent of their average output over the decade 1997-2007.

We can also identify and analyze the impact of these annual investments on government revenues and exports. The Mongolian government estimates that the six mining projects would increase government revenues by a total of \$9.8 billion over their operational lifetimes, including \$6.6 billion in income tax revenues and \$3.2 billion in royalty payments. These estimates are based on the current tax rates of 25 percent for income and 5 percent for royalty payments. This suggests a revenue multiplier of 1.73: Every \$1 in mining investment would produce \$1.73 in government revenues from the activities stimulated by the investments, so that the six projects would generate average annual revenues of \$438.2 million (an average of \$295 million per-year in income tax revenues and \$143.2 million per-year in royalty payments). The projected \$438.2 million annual increase in revenues would be equivalent to 27.7 percent of all Mongolian government revenues of \$1.6 billion revenues in 2007 and 75.4 percent of the average annual government revenues over the period 1997-2007, of \$581 million per-year. (Table 5, above)

Similarly, with the export-multiplier for mining investments estimated at around 9.65, each \$1 in additional mining investment should raise Mongolian exports by an average of \$9.65.14 Based on expected annual investments averaging \$253.64 million peryear, the six proposed projects should expand Mongolian exports by an average of \$2.45 billion peryear, based on 84 percent of gross mining output being exported. These additional exports would be equivalent to an average of 125 percent of actual export levels in 2007 and 253 percent of average annual exports levels over the period 1997-2007. (Table 5, above)

About two-thirds of this expansion in GDP or nearly \$1 billion would come directly from the mining sector, and would effectively double the size of the sector as of 2007.

The proposed projects also should create large numbers of new jobs. Mining projects typically involve two basic phases, construction and operations, with foreign workers dominating construction and domestic labor dominating later operations. For example, Ivanhoe estimates that construction for the Oyu Tolgoi copper and gold mining projects will involve 9,200 "person-years of employment," of which 7,800 or 85 percent would be filled by foreigners and 1,400 or 15 percent by local Mongolians.¹⁵ However, the workers employed in the operational phases of these projects are expected to be 3.57 times the number employed in the construction phases, and an estimated

14 Stokes, Ernie. "The Economic and Fiscal Impacts of the Oyu Tolgoi Project on Mongolia: Phase 2."

15 "Person years of employment" refers to the number of jobs times the number of years the jobs would persist.

98 percent of those would be local Mongolian workers. The operations of the Oyu Tolgoi copper and gold projects should create 33,000 person-years of employment, and therefore Mongolians should account for some 32,340 of these person-years of employment.¹⁶

We use the employment projections for the Oyu Tolgoi project to estimate the employment effects from investments in the other five strategic mining projects, and find that every \$101,000 in new mining investment should produce one new mining job for a foreign or local worker, and every \$125,500 in new mining investment should create one new job for a local worker. Since employment in the construction phase is lower than during the operations phase, the employment effects of mining investment are less during the construction phase (\$461,630 investment to create a mining job) than during the operation phase (\$131,947 to create a mining job). Based on \$5.7 billion in total planned investments for the six projects over 22.3 years, we estimate that these projects could create 56,122 person-years of employment, including 12,281 during their construction phases and 43,842 during their operational phases. Moreover, an estimated 45,175 of the 56,122 person-years of employment would go to Mongolian workers.

Table 6

Estimated Person-Years of Employment Created by the Six Mining Projects

	Investment to Create One New Person-Year of Employment	Person-Years of Employment Created by the Investments
Total	\$101,013	56,122
Domestic Employment	\$125,491	45,175
Construction Phase	\$461,630	12,281
Domestic Employment	\$2,564,614	2,211
Operation Phase	\$129,308	43,842
Domestic Employment	\$131,947	42,965

^{16 •} Economic Modernization in Mongolia

VI. Policy-Related Obstacles to Developing Mongolia's Mining Sector

The six proposed, major new mining projects have not vet commenced, because the 2001 and 2006 amendments to the 1997 Minerals Law, as well as the recent decline in commodity prices, have created concerns and uncertainties among the investors. In contrast to the 1997 Law, the more recent amendments are generally seen by international mining groups and investors in the sector as setbacks for the development of commercial mining in Mongolia. As a result, some mining companies have reconsidered their investments in continuing operations in some existing mines as well as the exploration and development of new mines. According to the Fraser Institute's mining company survey for 2006-2007, the attractiveness of Mongolia for mineral exploration, compared to other places, fell from 33 out of 65 countries in 2006 to 62 out of 65 in 2007.17 Unless these issues are addressed promptly, Mongolia's progress in basic economic development will be at serious risk.

The major issues in the amendments that trouble international investors involve taxes, royalty fees, and the size and terms of the government's stake in new mining operations:¹⁸

- An increase in royalty payments on minerals from 2.5 percent to 5 percent;
- Application of a 68 percent windfall profits tax whenever copper prices exceed \$2,600 per-metric ton and gold prices pass \$850 per-troy ounce on the London Metal Exchange¹⁹;
- Provide up to 50 or 51 percent government ownership of "strategically significant" resources, including coal, copper, gold, lead, silver, uranium, and zinc, when the government and private investors jointly fund the project; and up to 34 percent government ownership when foreign investors finance the exploration;

- Reduce tax preferences for mining operations: The 2007 tax changes repealed 2001 tax provisions providing foreign mining corporations with three-year, five-year and ten-year tax holidays or reductions;
- Reduce the duration of mineral resource licenses from 60 years with a possible 40-year extension, to 20 years with two, possible 10-year extensions; and increase licensing fees.

The first three provisions are generally considered the most detrimental for future foreign investment. Mongolia's government, therefore, should determine whether these policies will seriously set back the development of the country's most important natural resource and its largest industrial sector. To provide assistance and guidance in making these judgments, we will assess the economic impact of these three provisions.

The Increase in the Mining Royalty Rate from 2.5 percent to 5 percent

Mining companies aiming to develop new resources can often choose among many nations and generally focus on those places with the most favorable geology and the least costly tax and regulatory systems. In its efforts to attract new foreign investment in mining, the Mongolian government should take into account not only its own needs, but also those of investors operating across the international marketplace.²⁰ Nations whose tax burdens significantly exceed global norms should expect to attract relatively little new foreign direct investment.

For example, while Mongolia doubled its royalty rates in 2006, most of its competitors for FDI in mining development and operations have reduced their royalty rates to 3 percent or less, or eliminated them entirely.²¹ Under current law, Mongolia now has one of the world's highest mineral royalty regimes. (Table 7)

¹⁷ Fraser Institute. "The Frasier Institute Annual Survey of Mining Companies 2007-2008," http://www.fraserinstitute.org/researchandpublications/publications/5179.aspx.

¹⁸ Tse, Pui-Kwan. "The Mineral Industry of Mongolia." U.S. Geological Survey Minerals Yearbook, 2005, http://minerals.usgs.gov/minerals/pubs/country/2005/mgmyb05.pdf.

¹⁹ The 2006 law imposed a 68 percent tax on gold sales when the price exceeded \$500 per-ounce, when global gold prices exceeded that level. In late-2008, however, the trigger price was raised to \$850 per-ounce.

²⁰ Otto, James. "Competitive Position of Mongolia's Mineral Sector Fiscal System: The Case of a Model Copper Mine," 2007, http://21576430.domainhost.com/docs/Dr.%20James%20Otto%20—%20Mongolia%20Competitive %20Tax%20Report%20%202007.pdf.

²¹ Ibid.

Mining Royalty Rates in Selected Developing Countries²²

	Mineral	Select	ed Mining Commo	dities
	Royalty Rates	Copper	Gold	Coal
Africa				
Bostwana	3%-10%	3%	5%	5%
Ghana	3%-12%	3%-12%	3%-12%	3%-12%
Mozambique	3%-12%	3%-8%	3%-18%	3%-8%
Namibia	5%-10%	5%	5%	up to 5%
Tanzania	0%-5%	3%	2%	3%
Zambia	2%	2%	2%	2%
Zimbabwe	0%	0%	0%	0%
Asia				
China	1%-4%	2%	4%	1%
India	0.4%-20%	3.2%	\$225-\$235/kg	65-250 rup/ton
Mongolia	5%	5%	5%	5%
Myanmar	1%-7.5%	3%-4%	2%	-
Papua New Guinea	2%	3%-4%	2%	2%
Philippines	2%	2%	-	10 pesos/ton
Latin America				
Argentina	0%-3%	3%	-	-
Bolivia	1%-6%	1%-5%	-	-
Brazil	0.2%-3%	2%	-	-
Chile	0%	0%	-	-
Dominican Republic	5% of export	5% of export	-	-
Mexico	0%	0%	-	-
Peru	0%-3%	0%-3%	-	-
Venezuela	3%-4%	3%	-	-

This high royalty rate raises the overall effective tax rate on mining investments in Mongolia. A company's "effective tax rate" is calculated by summing all of its annual taxes and other payments to a government and dividing the result by the company's annual cash flow in that country. On this measure as well, Mongolia falls far behind most other mining-intensive countries. For example, among 23 selected countries with copper mines, Sweden has the lowest effective tax rate of 28.6 percent; and other countries such as China and Chile fall in the lowest quartile with effective tax rates, respectively, of 41.7 percent and 36.6 percent. Mongolia, by contrast, falls in the highest tax quartile, along with Indonesia, Ghana, Uzbekistan, Ivory Coast and Canada. Under the former, 2.5 percent royalty rate, Mongolia imposed an effective tax burden of 61.7 percent on copper mining companies; under the current royalty rates, that effective rate has risen to 67.9 percent, *the highest in the world*. (Table 8) Studies have estimated that every one percentage point increase in the mining royalty tax rate in Mongolia raises the total effective tax rate on mining investments by 2 percentage points and reduces a mining company's investment returns by 50 basis points.²³

While the increase in the royalty fees generated additional royalty revenues for the government, it also reduces corporate tax revenues because royalty pay-

 $wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2007/08/21/000020439_20070821121641/Rendered/PDF/39009 0MN.pdf.$

²² World Bank. "Mongolia Sources of Growth, Country Economic Memorandum," July 2007, http://www-

²³ Otto, James, op. cit.

Effective Tax Rates for Copper Mining, Across Countries²⁴

Lowest Quartile	Second Quartile	Third Quartile	Top Quartile
Sweden	Papua New Guinea	Peru	Indonesia
(28.6%)	(42.7%)	(46.5%)	(52.2%)
W. Australia	South Africa	Tanzania	Ghana
(36.4%)	(45%)	(47.8%)	(54.4%
Chile	Philippines	USA	Mongolia: 61.7% with 2.5% royalty rate
(36.6%)	(45.3%)	(49.9%)	
Zimbabwe	Indonesia	Mexico	Uzbekistan
(39.8%)	(46.1%)	(50.2%)	(62.9%)
Argentina	Kazakhstan	Greenland	lvory Coast
(40.0%)	(46.1%)	(50.2%)	(62.4%)
China		Guinea	Canada
(41/7%)		(51.3%)	(63.8%)
			Mongolia: 67.9% with 5% royalty rate

Table 9

Impact on Mongolian Government Revenues of Higher Royalty Rates, Six Proposed Mining Projects, \$ millions

	5% Royalty Rate	2.5% Royalty Rate	Reduction in Corporate Tax Revenues	Net Change in Government Revenues
Tavan Tolgoi	\$1.069.9	\$535.0	\$133.7	\$401.2
Oyu Tolgoi	\$1,707.1	\$853.6	\$213.4	\$640.2
Tumertei	\$217.8	\$108.9	\$27.2	\$81.7
Asgat	\$28.8	\$14.4	\$3.6	\$10.8
Dornot	\$118.4	\$59.2	\$14.8	\$44.4
Gurvanbulag-Mardai	\$55.9	\$28.0	\$7.0	\$21.0
Total	\$3,197.90	\$1,599.0	\$399.7	\$1,199.2
Annual Average	\$533.0	\$266.5	\$66.6	\$199.9

ments are tax deductible for corporate income tax purposes. Since the Mongolian corporate income tax rate is 25 percent, every dollar increase in royalty payments reduces corporate income tax revenues by 25cents. We calculate that over the lifespan of the six proposed projects, the higher royalty rate should increase royalty payments by \$1.6 billion and reduce corporate income tax payments by \$400 million. (Table 9) The change should produce a net increase in government revenues of \$1.2 billion over 22.3 years or an average increase of \$53.8 million per-year, equivalent to 3.4 percent of government revenues in 2007 and 9.2 percent of average annual tax revenues from 1997 to 2007.

As noted earlier, the six proposed projects could significantly increase Mongolian government resources. Under the current system of a 5 percent royalty rate and a 25 percent corporate income tax rate, the government's average annual tax revenues in theory could increase by 27.7 percent compared to the 2007 level, and by 75.4 percent compared to the average for the 1997-2007 period. This can occur, however, only if the proposed projects go forward; and the increase in the

 $24 \ \textit{Ibid}.$

royalty rate is almost certain to reduce investment returns and so discourage mining investment. Moreover, we estimate that if the royalty tax rate remained at 2.5 percent, Mongolian government tax revenues still would increase, on average, by 24.3 percent compared to 2007 levels, and by 66.2 percent compared to the average for 1997-2007.

The Impact of the Windfall Profits Tax on Copper and Gold Mining

Legislation enacted in 2006 also introduced a new windfall profits tax on copper and gold production modeled on the Russian oil export tax triggered when their prices exceed predetermined threshold. The adverse experiences of other countries with windfall profits taxes strongly suggest that this approach will prove to be counterproductive for Mongolia as well, especially given the low thresholds and high tax rates of the Mongolian version. windfall profits taxes in other countries, the Mongolian version does not adjust its price thresholds for inflation.

The extraordinarily high tax on gold and copper sales in Mongolia has had the predictable effect: As Mongolian gold and copper production has become less competitive, mining companies have slowed or halted their exploration activities there; and production and export of the two metals has declined. From 2005 to 2007, Mongolian gold production (including both companies and individuals) declined from 24.1 tons to 17.4 tons or by 28 percent, and Mongolian gold exports fell by more than half, from 23.8 tons in 2005 to 11.5 tons in 2007.²⁶

This experience is very similar to developments in other countries which adopted windfall profits taxes in the past, and very few countries today apply such levies to their mining production or sales. The United

...while Mongolia doubled its royalty rates in 2006, most of its competitors

for FDI in mining development and operations have reduced their royalty rates to

3 percent or less, or eliminated them entirely.

The windfall profits tax enacted in 2006 imposes a 68 percent tax on gold sales when its price exceeds \$500 per-ounce (raised to \$850 per-ounce in late-2008) and on copper sales when its price exceeds \$2,600 per-ton. Gold and copper prices well exceeded the law's thresholds when the law was enacted, and are likely to return to high levels in the future. The result, according to the International Monetary Fund, is the world's highest effective marginal tax rate on sales of those metals - 80.8 percent compared to effective marginal tax rates in other windfall profits tax nations such as Peru at 34.3 percent or Zambia at 72.0 percent.²⁵ The major reason for the difference is the rates of their windfall profits taxes, 68 percent in Mongolia compared to 8 percent in Peru and 50 percent in Zambia. Furthermore, the distortions produced by the Mongolian tax are likely to worsen, because unlike States, for example, enacted a windfall profits tax on oil sales in 1980, in a misguided attempt to capture some of the revenues flowing to domestic and foreign oil producers from oil price increases driven by the revolution in Iran and OPEC production quotas. The tax raised only 10 percent of the projected revenues, since domestic exploration and production fell, and much like the Mongolian version, windfall profit tax payments were deductible from the corporate taxes due. Analysis found that from 1980 to 1988, when the U.S. Congress repealed the tax, it reduced U.S. oil production by between 1.2 percent and 8.0 percent.²⁷ The impact of Mongolia's windfall profits tax on gold and copper production will be greater, because its domestic markets for those metals are small, the tax is disproportionately high, and the foreign gold and copper mining companies that dominate Mongolian produc-

²⁵ International Monetary Fund. "Mongolia: Selected Issues and Statistical Appendix." IMF Country Report No. 08/201, 2008, http://www.imf.org/external/pubs/ft/scr/2008/cr08201.pdf.

²⁶ Naranhuu, Bolor. "Assessing the Economic Impacts of the Gold Windfall Tax." *Mongolian Mining Journal*, November 3, 2008, www.mongolianminingjournal.com.

tion can go elsewhere. Left in place, this tax will markedly slow the modernization of the gold and copper mining sectors in Mongolia.

The Impact of a Resource Rent Tax

There also has been some interest in a variation of a windfall profits tax, a resource rent tax which also is tax triggered by a threshold. As commonly discussed, a resource rent tax on Mongolian mining would be triggered when a project reached a threshold rate of return, so that the government can claim an additional share of the profits above a designated rate of return. While resource rent taxes have been the subject of academic and government discussions for several decades, they have actually been applied in only a few cases, notably for mining and petroleum projects in Papua New Guinea, the Gold Ridge mine in the Solomon Islands, and the Roxby Downs mine and offshore petroleum operations in Australia.

The objective is to maximize the taxes collected without discouraging new investment, which requires careful fine-tuning of the threshold rate of return. A resource rent tax system also is difficult and expensive to administer, since it involves costly monitoring of the financial and other aspects of the projects subject to it, which in turn reduces the net revenues collected by the government under the tax. The tax also imposes an arbitrary cap or ceiling on a project's potential returns, which will discourage many companies from exploring new projects. Large, international mining companies invest in many projects at once, and their targeted rate of return is always an average of some projects which turn out to produce low returns and others that ultimately yield very high returns. A resource rent tax arrangement may effectively cap the higher rates of return and so reduce the average return. Since global mining companies have numerous places where they can profitably invest, a cap on a project's returns imposed by a Mongolian resource rent tax may be sufficient to shift investment to other places without such a tax, in order to protect these companies' targeted, average rates of return.

The Impact of Partial Government Ownership of Mining Companies

The 2006 amendments to the 1997 Minerals Law also entitle the Mongolian government to claim up to 50 percent ownership of new mining projects (up to 51 percent under parliamentary guidelines for negotiations with mining companies). While many of the details of such ownership have not been established, this provision also is very likely to slow or even halt modernization and new projects across Mongolian mining. In the view of most experts, such public equity participation compromises a government's ability to effectively regulate the sector and introduces major uncertainties into private mining investment and operations. These concerns are reflected in the December 2008 downgrade of Mongolia's economic outlook from "stable" to "negative" by the international rating organization, Fitch.²⁸ The record also shows that government equity participation in mining sector development often results in weak environmental and work safety standards, since best-practice requirements could reduce the government's dividends, and in general political interference that reduces long-term performance.²⁹ As a result, with the exception of a few West African countries, the world's nations have generally abandoned this approach for mineral development.

The adverse experiences of other countries with windfall profits taxes strongly suggest that this approach will prove to be counterproductive for Mongolia as well, especially given the low thresholds and high tax rates of the Mongolian version.

Moreover, our analysis finds that Mongolian government equity participation in the six major mining projects examined here would be financially infeasible: A government stake in these projects of 51 percent or even 34 percent would either impose prohibitive costs

²⁷ Lazzari, Salvatori. "The Windfall Profits Tax on Crude Oil: An Overview of the Issues." Congressional Research Service Report for Congress, September 12, 1990.

²⁸ Fitch Report, December 2008.

²⁹ World Growth Mongolia Centre for Policy Research. "A Path Forward for Mining in Mongolia," November 2008, http://www.worldgrowth.org/assets/File/WG_Mongolia_Mining_Report_Eng_A4.pdf.

on the government to purchase the stakes or, if the shares were provided at no cost, preclude the projects' continuing development by dramatically reducing their future private returns.

A government policy of purchasing the shares would clearly impose an enormous and ultimately unsustainable burden on Mongolian taxpayers. Standard corporate finance theory holds that the best measure of the value of a business venture is its net present value. The total net present value of the six major mining projects analyzed here comes to \$3,882.5 million, or an average \$647.1 million per-project. Based on this measure, the Mongolian government would have to provide \$1.32 billion to purchase a 34 percent stake in these projects or \$1.98 billion to purchase a 51 percent stake. Mongolia's entire international currency reserves of \$1 billion in mid-2008 would be insufficient to purchase even the 34 percent stake in these projects. (See Table 10, below.) Further, the \$1.32 billion price tag for 34 percent is equivalent to 40 percent of Mongolia's \$3.3 billion 2007 GDP, and the \$1.98 billion price for a 51 percent stake is equivalent to about 60 percent of that GDP. Even if the cost of the shares were distributed across the 22.3-year average lifespan of the projects, the annual payments would equal nearly 1.8 percent of 2007 GDP for a 34 percent stake and 2.7 percent for a 51 percent stake. The government's cost to purchase the 34 percent stake also would be equal to 83.4 percent of all government revenues in 2007, or 125 percent of those revenues for a 51 percent stake. Distributing the cost across the lifetime of the projects would still cost the government the equivalent of nearly 4 percent of 2007 revenues every year for the next generation, for the 34 percent stake, or 5.6 percent of those revenues each year for a generation for a 51 percent stake.

Based on these measures, the Mongolian government could decide to borrow the funds to purchase substantial equity stakes in these projects. This approach also would be unsustainable. Borrowing the entire amount would increase the nation's external debt of \$1.7 billion by nearly 80 percent for a 34 percent stake and by 119.5 percent for a 51 percent stake. Moreover, the carrying cost of this new debt would be very large, since the average interest rate for long-term Mongolian government bonds is roughly 15.6 percent.³⁰ If the government were to issue bonds in its domestic market to finance its stake in these projects, the servicing costs would run \$206 million per-year for 34 percent participation and \$309 million per-year for 51 percent

Table 10

Government Financing Requirements to Purchase Equity Stakes In Six Major Mining Projects (\$ million)³¹

	34 Percent Stake	51 Percent Stake
Oursell Cost	¢1 220 0	ć1 000 0
Overall Lost	\$1,320.0	\$1.980.0
As Share of International Reserves, mid-2008 (\$1.0 billion)	132.0%	198.0%
As Share of 2007 GDP (\$3.3 billion)	39.7%	59.5%
As Share of 2007 Government Revenues (\$1.58 billion)	83.4%	125.1%
Annual cost, amortized over 22.3 years		
As Share of 2007 GDP, per-year	1.8%	2.7%
As Share of 2007 Government Revenues, per-year	3.9%	5.6%
Overall Cost if Borrowed, as Share of 2007 Government Debt	79.7 %	119.5%
Annual Interest Costs at 15.6 percent rate	\$205.3	\$308.9%
As Share of 2007 GDP	6.2%	9.4%
As Share of 2007 Government Revenues	13.0%	19.5%

30 Enkhbold, Ganbat, and Bolormaa Jalbaa. "Bond Market in Mongolia: Current Status and Legal Issues." United Nations Economic and Social Commission for Asia and the Pacific, 2008, http://www.unescap.org/pdd/projects/bondmkt/10_Mongolia_current_status_legal.pdf.

31 International Monetary Fund. "Mongolia: 2008 Article IV Consultation - Staff Report," 2008.

Internal Rates of Return for Six Major Proposed Mining Projects³²

	Simple IRR	IRR Weighted for Net Present Value	IRR Weighted for Investment Needs
Average for All Six Projects	36.7%	30.6%	21.8%
Tavan Tolgoi	33.0%	13.4%	5.2%
Oyu Tolgoi	18.5%	6.2%	13.9%
Tumertei	15.7%	1.0%	0.8%
Asgat	40.0%	1.0%	0.3%
Dornot	36.4%	3.6%	1.0%
Gurvanbulag-Mardai	76.5%	5.4%	0.6%

of the shares (Table 10). These annual servicing costs would absorb the equivalent of 13 percent (34 percent stake) or 19.5 percent (51 percent stake) of all government revenues in 2007. Since these projects are not expected to produce positive cash flows for at least four years (seven years for the Oyu Tolgoi project), the government would have to absorb between \$825 million and \$1.2 billion in interest costs for its stakes, financed by borrowing, until any positive cash flows begin.

Even if the Mongolian government could manage this enormous financing burden, the likely rates of return on the projects would not justify it. The simple average internal rate of return (IRR) for all six projects is 36.7 percent; but the IRR's of the projects vary widely from 15.7 percent for the Tumertei iron ore deposit to 76.5 percent for the Gurvanbuleg-Mardai uranium deposit, as do their investment requirements. (Table 11, above) Therefore, we calculate two additional internal rates of return for the projects - an average internal rate of return weighted for the projects' net present value, and a return weighted for the investments needed. The internal rate of return of the six projects weighted for their net present values is 30.6 percent, and the internal rate of return weighted by the projects' investment needs is 21.8 percent.

These calculations of expected returns on the mining projects show that weighted for investment needs, four of the six projects generate relatively low returns, as do at least half of the projects when weighted for their net present value. It is very likely that investing in these projects would not be an optimal use of the Mongolian government's resources, since many other areas need resources as well, and the expected returns from the six mining projects would be less than the returns from other projects in other areas.

For example, as Mongolia's government has led the country's transformation from a centrally-planned system to one organized around free markets, the deficiencies of the country's Soviet-era infrastructure and public organizations have become apparent. These deficiencies and their attendant costs to the Mongolian economy and modernization process are particularly acute in transportation, land use, education and health care sectors. The Mongolian government and the Millennium Challenge Corporation (MCC) created by the U.S. government are working together to design projects to address these problems, especially in four key areas of vocational education, health care, railway transportation, and property rights.33 The MCC has estimated the internal rates of return on government investments in projects in these four areas, and those returns would substantially exceed the weighted rates of return on government investments in the six mining projects. For example, the expected rates of return are 15 percent to 23 percent for vocational education projects, and 24 percent to 36 percent for railway transportation investments.

³² Mongolia Ministry of Mining and Energy.

³³ The Millennium Challenge Corporation, established in 2004, is a U.S. government corporation that works with some of poorest countries in the world; www.mcc.gov.

Internal Rates of Return (IRR) of Millennium Challenge Projects in Mongolia³⁴

	Mean IRR	Range of Expected Returns
Vocational Education	19.8%	15%-23%
Health Care	21.0%	15%-30%
Railway Transportation	32.2%	24%-36%
Property Registry	38.5%	21%-50%

(Table 12, above) Moreover, the mean rates of return on projects in these four areas range from 19.8 percent to 38.5 percent. The weighted rates of return for all six mining projects are less than the mean rates of return on MCC projects in all four areas.

Based on this analysis, the Mongolian government would be best advised to invest in projects in these areas, rather than the mining projects. Risk diversification considerations point to the same conclusion: The Mongolian government already depends on mining for substantial revenues, through the royalty and corporate tax provisions, and should not increase its dependence on the sector by devoting resources to equity investments that could be better used for education, health care and transportation projects. Purchasing major stakes in the six proposed mining projects would not represent an economically-sound way for the Mongolian government to allocate its resources.

The Implications of "Free" Equity Participation

In principle, the Mongolian government has another option for equity participation in the six projects: It could try to require mining companies to provide shares to the government at no cost to the government. This approach, however, would create severe and likely insurmountable financial obstacles for the six mining projects, since the government's free stake would sharply reduce the investment returns for those

actually financing the projects. The Mongolian government's estimates of the internal rates of return for the six projects range from 76.5 percent for the Gurvanbulag-Mardai uranium mining project to 15.7 percent for the Tumurtei iron ore deposit. We estimate that every one percent of "free" equity stake in these six projects would reduce those internal rates of return for the actual investors by between 1.2 percentage points and 1.8 percentage points (Table 13, opposite page). Based on this calculation and the Mongolian government's estimates of the returns for the six projects, we estimate that if the government required that the mining projects cede equity shares of 34 percent or 51 percent at no cost, the expected rate of return for the private investors financing these projects would become, with the 34 percent free stake, 16.5 percent for the Gurvanbulag project and between negative 7.6 percent (Asgat) and negative 23.6 percent (Tumurtei) for the other five projects. With a 51 percent free equity stake for the Mongolian government, private investors would face expected returns ranging from negative 13.5 percent to negative 43.3 percent.

Based on this analysis, we conclude that a government policy to require large equity stakes in these projects at no cost would effectively stop the development of all six projects. This policy, therefore, would sacrifice the very substantial gains in Mongolian GDP, job creation and overall modernization which these projects should ultimately produce.

34 Millennium Challenge Corporation. "Economic Rate of Returns", 2008, http://www.mcc.gov/programs/err/index.php.

Tab	le	13
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Private	Invest	ors' Ex	pecte	d Ra	ates of	
Return	Under	Differe	nt Eq	uity	/ Arrang	ements

	Tavan Tolgoi	Oyu Tolgoi	Tumurtei	Asgat	Dornot	Gurvan-bulag
TNo Free Shares	33.0%	18.5%	15.7%	40.0%	36.4%	76.5%
Cost to Return from Each 1% of Free Shares	-1.3%	-1.2%	-1.2%	-1.4%	-1.4%	-1.8%
Return with 34% Free Shares	-12.2%	-21.8%	-23.6%	-7.6%	-10.0%	16.5%
Return with 51% Free Shares	-34.8%	-41.9%	-43.3%	-31.4%	-33.2%	-13.5%

Product Sharing Arrangements

Product sharing arrangements are another variant of direct equity participation, in which a government receives a share of a company's production rather than its earnings or profits. These arrangements generally involve highly standardized commodities such as the oil from a particular field; governments with the wealth and capacity to refine, sell and distribute their share of the commodity, such as the major oilproducing states; and products which global customers demand highly and have few alternative sources, most notably OPEC oil. This model could not be directly and successfully adapted to Mongolian mining. Minerals produced there vary in quality and purity from batch to batch, so that the value of the shares allocated to companies and the government could not be fixed or even known in advance. Moreover, the Mongolian government would have to invest very large sums over a substantial period to develop the capacities to refine, sell and distribute mineral products in global markets, and in the process divert public resources from the more important development activities discussed earlier. Finally, product sharing arrangements would likely discourage the investment needed to fully develop the major projects examined here. Such an arrangement for mineral development would prevent the companies from accurately booking the value of their Mongolian reserves, reducing the likelihood of their securing long-term financing for their projects. Moreover, a 34 percent or 51 percent sharing arrangement would sharply reduce the companies' returns from these projects, especially compared to alternative projects in countries without such arrangements, which could well lead the companies to cancel most or all of them.

It is very likely that investing in these projects would not be an optimal use of the Mongolian government's resources, since many other areas need resources as well, and the expected returns from the six mining projects would be less than the returns from other projects in other areas.

26 • Economic Modernization in Mongolia

VII. Alternative Approaches for Allocating Mining Profits

In recent years, issues of how best to manage Mongolia's natural resources and the government's proper role in mining development have been matters of intense political debate in Ulan Bator. The 2006 amendments discussed earlier already are reducing the returns on the foreign direct investments driving the mining sector's modernization and, paired with the equity participation schemes described above, could ultimately cripple the country's modernization process. Members of one of the major political parties, the Democratic Party, have pressed for an equitysharing approach to new mining projects, with a public corporation holding shares allocated to every citizen, which would likely prove unsustainable. The ruling Mongolian People's Revolutionary Party (MPRP) has promoted a different approach, with annual cash disbursements to Mongolian citizens from mining revenues. Given Mongolia's extensive mineral resources, the government must create a system that encourages their exploration and development while generating the revenues to support the broad public investments championed by its collaboration with the Millennium Challenge Corporation.

The Alaska Permanent Fund and the Norwegian Pension Fund provide alternative models of a system for allocating resources revenues between a state or nation's citizens and the private firms that have developed the resources. The principal difference is the how the proceeds are used: The Alaska Permanent Fund distributes some of its funds as annual lump-sum payments to all qualified Alaskans, while the Norwegian Pension Fund uses its income to help finance national budgets, reduce national debt and accumulate wealth for national pension funds. Despite these differences, both approaches share the basic investment principal of diversification: In contrast to the Mongolian proposals to purchase or claim large equity stakes in new mining projects, these systems use their proceeds not to support or invest in their own resource sectors (oil in both cases), but rather invest their assets in capital market instruments.

The Alaska Permanent Fund

The State of Alaska established the Alaska Permanent Fund in 1976 as a state entity to hold wealth created by the new Alaska oil and natural gas pipeline, principally the proceeds of 25 percent of all mineral lease rentals, bonuses, royalties and related income. The Fund is managed by a semi-independent corporation which operates like the trust fund of a pension fund, and the income generated by its assets is held by the state's General Fund. The Board which oversees the Fund has instructed its portfolio managers to earn a 5 percent, inflation-adjusted return, balancing prospects for higher returns against potential risks; and at the end of 2008, the Fund's assets were diversified among equities (53 percent), fixed income instruments (22 percent), real estate (10 percent), private equity funds (6 percent), hedge funds (6 percent), and infrastructure investments (3 percent).³⁵

The managers of the Fund are required to invest all principal in income-generating financial instruments; and the Alaska legislature is permitted to spend or disburse only the income already realized through stock dividends, bond interest, real estate rental income, or realized capital gains. The Fund's distributions to Alaskan citizens also are strictly regulated: Distributions cannot reflect any unrealized gains or losses, and cannot exceed 21 percent of the Fund's total net income over the previous five fiscal years or the Fund's net income for the most recent fiscal year plus any balance in the Fund's earnings reserve account.

Given Mongolia's extensive mineral resources, the government must create a system that encourages their exploration and development while generating the revenues to support the broad public investments championed by its collaboration with the Millennium Challenge Corporation.

35 Alaska Permanent Fund Corporation, www.apfe.org.

Most of the Fund's distributions have been in dividend payments to qualified Alaskan residents; and those payments have ranged from about \$331 perperson in 1984 to \$3,269 per-person in 2008. These payments based largely on the oil prices that generate the revenues and the expansion of oil and pipeline activity in the state. Since 1982, payments to residents have totaled \$30,805 per-person, increasing average family income in the state by more than 10 percent. In fact, the Fund injects more new money into the state's economy than any industry or activity except the U.S. military, U.S. federal civilian activity, and the petroleum industry itself — more, for example, than the seafood industry, construction, tourism, timber, mining, or agriculture.³⁶

These payments based largely on the oil prices that generate the revenues and the expansion of oil and pipeline activity in the state. As a result, the 2009 disbursements will almost certainly fall substantially, given the steep decline in both oil prices and the value of most equities, private equity fund, real estate and hedge fund assets. The Fund's long-term viability and success, however, have depended upon maintaining oil royalties and mineral lease rental payments to the State at levels which permit companies developing the resources to earn competitive rates of return.

Unlike Alaska's approach, Norway does not distribute its Fund's income to its citizens but rather uses the income for national purposes. The Fund's income has been used to balance the national budget – in effect, supporting public investments and spending – and eliminate Norway's national debt.

The Norwegian Pension Fund

Oil was first discovered in Norwegian waters in 1969; and by the 1990s, Norway had become one of the world's three largest oil exporters, with Saudi Arabia and Russia. The Norwegian government is an active player in the global oil industry through its state-owned and independently-operated oil company, Statoil, which generates substantial revenues through its profits and taxes.³⁷ Much like Alaska, Norway quickly accumulated large amounts of oil-related revenues and in 1990 created the Government Petroleum Fund of Norway to manage surplus petroleum income from Statoil's corporate income taxes, licensing fees, dividends and other related income. With the severe Nordic banking crisis and recession of 1990-1992, the first deposits into the Fund occurred in 1995.

Norges Bank Investment Management, part of the Norwegian Central Bank, manages the Fund, investing its resources in non-Norwegian equities, bonds, money market instruments and derivatives from 42 developed and emerging markets, including fixed income investments denominated in 31 different currencies. The Fund's investments in equities are limited to 50 percent of its total portfolio, and the portfolio earns an average, 4 percent inflation-adjusted return. As of September 30, 2008, the Fund's value was about \$300 billion (NOK 2.21 trillion), making it Europe's largest pension fund.³⁸

Unlike Alaska's approach, Norway does not distribute its Fund's income to its citizens but rather uses the income for national purposes. The Fund's income has been used to balance the national budget — in effect, supporting public investments and spending — and eliminate Norway's national debt. In this way, the Fund has become the government's principal means of facilitating the public saving needed to support the rapid rise in state pension expenditures that will accompany the retirement of Norway's baby boomers in coming years.³⁹

³⁶ Alaska Permanent Fund Dividend Division, http://www.pfd.state.ak.us/dividendamounts/index.aspx.

³⁷ Austvik, Ole Gunnar. "Reflections on Permanent Funds: The Norwegian Pension Fund Experience," Pre-Forum Interview and Forum Presentation. Gordon Foundation, http://www.gordonfn.ca/resfiles/Forum_Permanent_Funds_indd.pdf.

³⁸ Norges Central Bank, http://www.norges-bank.no/templates/article____69365.aspx.

³⁹ Norwegian Ministry of Finance, www.regjeringen.no/en/dep/fin/Selected-topics/The-Government-Pension-Fund.html?id=1441.

VIII. Conclusion

Mongolia faces crucial decisions regarding its mining sector, which ultimately will affect its long-term development and progress. It has the opportunity to jumpstart a series of major new mining projects which could substantially expand employment, incomes, government revenues and national wealth. If the six major projects examined in this report go forward as planned, they will boost the country's GDP by an average of \$1.5 billion per-year for the next generation, equal to a 38 percent increase in Mongolia's 2007 GDP. The Mongolian workforce will gain an estimated 45,000 person-years of employment, and exports will increase by an average of \$2.5 billion peryear, or the equivalent of 125 percent of the country's 2007 exports. Moreover, the Mongolian government will gain substantial new revenues to finance other aspects of modernization, including education, health care, transportation and water resources: With a 2.5 percent royalty rate and no windfall profits tax, the investment in the six projects which would follow will generate additional revenues averaging \$385 million per-year for a generation, the equivalent each year of nearly one-quarter of all of the revenues collected in 2007.

All of these gains are jeopardized, however, by a series of recent changes to the 1997 Minerals Law and tax increases which could well induce the foreign investors driving these projects to withdraw. The global financial crisis and falling commodity prices already have created new constraints on investments by international mining companies. As these conditions force these companies to reduce their investment budgets and more carefully choose their investments, Mongolia risks losing these six major projects to other countries which impose lower tax and regulatory burdens and do not claim a government ownership stake or product sharing agreement for new mining development. To best ensure that these projects go forward, Mongolia should restore a 2.5 percent royalty rate, roll back the new windfall profits tax on copper and gold production, and forgo a resource rent tax, direct, government ownership stake or product sharing arrangement in these projects.

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