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an assessment of the macroeconomic consequences for Mongolia

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School of Economic Studies,
National University of Mongolia
and BAEconomics Pty Ltd

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foreword

The development of the Oyu Tolgoi mine has the potential to positively transform the Mongolian economy over the coming 20 years. The Oyu Tolgoi copper deposit is the biggest known unexploited copper resource in the world today and its location in Mongolia, adjacent to some of the fastest growing economies in the world, makes it strategically important. However, it is not always the case that the exploitation of a rich natural resource such as Oyu Tolgoi has contributed significantly to the welfare of a developing country and fears of the so-called 'resources curse' are of ongoing concern to many economic development specialists.

This report was commissioned by Rio Tinto with two purposes in mind. First, the authors were asked to assess the conditions under which mineral resources in developing countries might be exploited to the benefit of countries such as Mongolia while mitigating the worst effects of 'Dutch disease', the term often used to describe the inevitable effects on other sectors in an economy when a sector such as mining grows rapidly. Second, the authors were asked to build a quantitative economic model capable of analysing the quantitative impacts on the macro-economy of Mongolia of the development of Oyu Tolgoi.

The analysis was jointly undertaken by staff of the School of Economic Studies from the National University of Mongolia and the Australian applied economics consulting firm, BAEconomics Pty Ltd. The study team developed a computable general equilibrium model of the world economy incorporating Mongolia as a separate country for the present study. This model has been made available to Mongolian government departments and other Mongolian economic agencies for their use and further development. Training in the use of the model has been offered to staff from these economic agencies.

The development and improvement of quantitative models such as the one used in this assessment is an ongoing process. Our hope is that as better data become available and modeling techniques are refined that Mongolian academics and staff from government agencies take the opportunity to further engage in the economic policy debate using updated versions of the model.

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February, 2011

acknowledgments

The authors are indebted to a large number of people who provided data and assistance throughout the study. Without the strong support of staff from Rio Tinto and Oyu Tolgoi LLC this work would not have been possible. We are particularly grateful for the assistance provided by Anita Malhotra and Baigalmaa Purevsuren from Rio Tinto who acted as the interface between the study team and the mining project staff.

Over the course of the project and during our consultations with government departments and other economic agencies we were made warmly welcome and assistance and staff time were freely given. We greatly appreciated the opportunity to discuss the preliminary findings of our work with key government advisors and ministers.

The results presented in this report are based on data and assumptions that were available to the authors in 2010. Ongoing reviews of the project as the mine is developed will inevitably lead to changes in cost and production estimates that could have a material impact on the estimates of the project's macroeconomic impact.

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abbreviations and acronyms

ABARE	Australian Bureau of Agricultural and Resource Economics
ADB	Asian Development Bank
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BAE	BAEconomics Pty Ltd
BoM	Bank of Mongolia
Bn	billion
GDP	gross domestic product
GNP	gross national product
CIA	Central Intelligence Agency
FAO	Food and Agriculture Organization of the United Nations
GTAP	Global Trade Analysis Project
g/t	grams per tonne
IMF	International Monetary Fund
I$	international dollar
ILO	International Labor Organisation
kg	kilogram
kt	thousand metric tonnes
klb	thousand pounds
lb	pound
MDGs	Millenium Development Goals
MINCGEM	Mineral commodities general equilibrium model
Mn	million
MNT	Mongolian tugrug
MRAM	Mongolian Mineral Resources Authority
Mt	million metric tonnes

NDS	the (Mongolian) National development Strategy
NRF	natural resource fund
NSO	National Statistical Office of Mongolia
PPP	purchasing power parity
OT	Oyu Tolgoi
oz	ounce
koz	thousand ounces
t	metric tonne
Tn	trillion
UN	United Nations
USGS	United States Geological Survey
USD	United States dollar

glossary

GDP

- the sum of the final uses of goods and services less the value of imported goods and services.

GNP

- GDP less primary incomes payable to non-resident units plus primary incomes receivable from non-resident units.

gross value added

- the value of output less the value of intermediate consumption.

gross savings

- GNP less total consumption, plus net transfers.

inflation

- A rise over time in the general level of prices of goods and services that a reference population acquires, uses or pays for consumption.

economic welfare

- the level of prosperity and quality of living standards in an economy.

labour force

- all persons aged 15 – 64 who are either employed or unemployed.

nominal exchange rate

- the price of one country's currency in relation to another.

real exchange rate

- the nominal exchange rate adjusted for the price differences between two given countries.

unemployment level

- all persons above 15 years of age who are without work and currently available for work and actively seeking work.

utility

- the satisfaction derived from consumption of a good or service.

executive summary

Mongolia is a vast, resource abundant country located between China and Russia. The formal economy is relatively small with GDP in 2009 of US$4.2 billion but growing quickly with an annual average real GDP growth from 2003 to 2008 of nearly 9 per cent. The country has relatively low living standards with a GDP per person of US$1,560 in 2009. Since the early 2000s, the Mongolian economy has become more dependent on the mining sector for GDP growth, exports, and fiscal revenues with copper, gold, coal, molybdenum, fluorspar and zinc being the major commodities.

In 2009, the Government of Mongolia signed an investment agreement covering the construction and operation of a copper-gold mine at Oyu Tolgoi in southeastern Mongolia near the border with China. Oyu Tolgoi is the largest known undeveloped copper deposit in the world with a mineral reserve of 1,393 Mt of ore grading 0.93 per cent copper and 0.37 g/t of gold. Its development is projected to have significant and long-term impacts in the South Gobi region and the Mongolian economy more generally.

In light of the negative historical experiences of some developing countries following the exploitation of abundant natural resources and the extensive literature on the so-called 'resources curse', Rio Tinto decided to sponsor a professionally independent economic impact assessment of the Oyu Tolgoi project on the Mongolian economy. This work was carried out by the School of Economic Studies of the National University of Mongolia in collaboration with the Australian applied economics consulting firm, BAEconomics Pty Ltd.

The impacts on key Mongolian macro economic variables arising from the development of Oyu Tolgoi are projected and discussed in this assessment. The key variables of interest include: GDP and GNP; the exchange rate; wages; fiscal revenues; exports and imports; and sectoral output. A key focus of the assessment is on alternatives uses of government revenue generated by the project.

The analytical framework used in this assessment is BAE's general equilibrium model of the world economy, MINCGEM. The impacts of Oyu Tolgoi are projected by comparing economic outcomes in the reference case (a hypothetical global economy in which Oyu Tolgoi is

not developed) to a number of alternative policy scenarios in which Oyu Tolgoi is developed. The assessment is conducted over the period 2010 to 2043, that is, covering the first 30 years of the mine's production life.

reference case

To be useful the reference case must describe the trajectory of all key economic variables in the hypothetical global economy in which Oyu Tolgoi is not developed. The main assumptions in the reference case are as follows.

The Mongolian population and labour supply are projected to record only modest growth in the future – such that, by 2043, they are projected to be 40 per cent higher relative to 2004 levels.

Mongolian GDP is projected to grow on average 5.9 per cent per year between 2004 and 2043.

The sectoral composition of the Mongolian economy is projected to remain relatively similar to that of today over the projection period with mining and services being the major contributors to total output.

Significant growth is projected for Mongolian mining production even without the development of Oyu Tolgoi. Coking and thermal coal production is assumed to increase by approximately 32 and 42 times respectively between 2004 and 2043. Non-OT production of copper concentrates is assumed to more than double while production of refined copper is assumed to increase by 54 times and non-OT gold by 1.3 times.

Consensus world price forecasts of mining commodities are assumed to 2015 with a constant real long-run copper price assumed from 2015 to 2043 of US$2.50/lb and a constant real long-run gold price of US$1000/oz (in real 2010 terms). Alternative copper price assumptions of US$3.00/lb, US$2.00/lb and US$1.00/lb are also considered.

Oyu Tolgoi policy scenarios

To assess the impacts of Oyu Tolgoi on the Mongolian economy and possible alternative ways that the Mongolian government might disburse the taxation and dividend revenue from Oyu Tolgoi, one

standard policy scenario and two hypothetical scenarios were developed.

scenario 1: Oyu Tolgoi scenario

In this scenario, the government of Mongolia, in partnership with global mining companies, invest in Oyu Tolgoi. Mine production results in a reallocation of resources throughout the Mongolian economy compared with the reference case. The development of the mine results in changes in the sectoral composition of output and macro-economic outcomes (relative to the reference case). All fiscal revenues from Oyu Tolgoi that flow to the government of Mongolia are allocated to government expenditure.

scenario 2: wealth accumulation scenario

This hypothetical policy scenario is similar to scenario 1, except that all fiscal revenues from Oyu Tolgoi to the government are placed in a national savings fund. The interest from the fund is distributed to private households and government expenditure while the capital is preserved.

scenario 3: cash distribution scenario

This hypothetical policy scenario is similar to scenario 1, except in this case all fiscal revenues paid by Oyu Tolgoi to the government are distributed to private households who spend it on private consumption or save it.

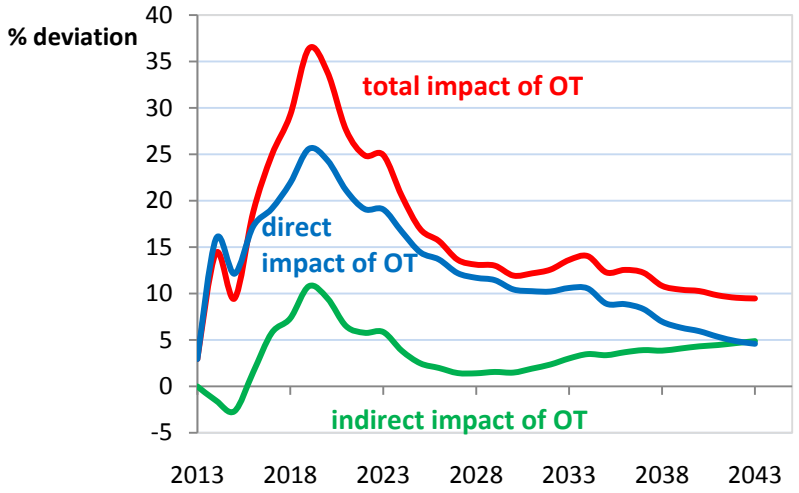
key results

gdp

By 2020, Oyu Tolgoi's direct impact is projected to increase Mongolian GDP by 25.6 per cent above reference case levels. Oyu Tolgoi's indirect impact is projected to increase GDP by a further 10.8 per cent. Thus, the mine's total impact on GDP is a 36.4 per cent increase above what would have occurred in the absence of its development.

GDP per person is projected to be 34 per cent higher under the Oyu Tolgoi scenario than the reference case by 2020, and 9 per cent higher by 2043.

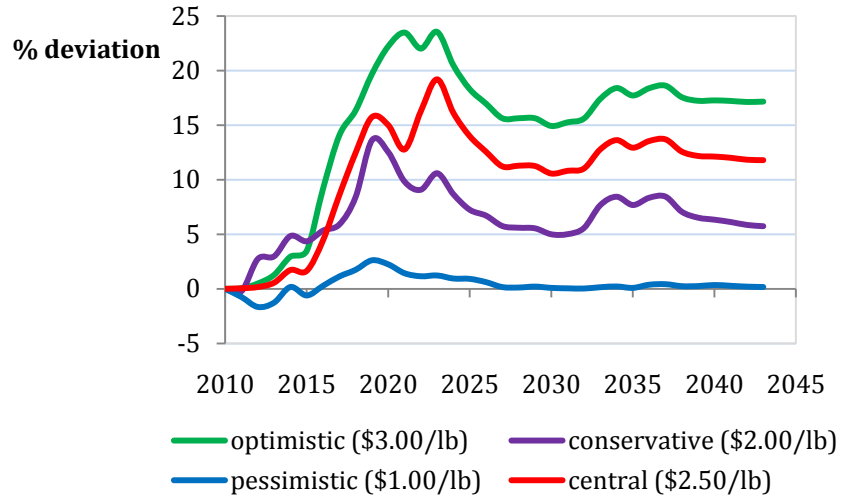
Figure A: Decomposition of percentage deviation in GDP relative to the reference case into direct and indirect effects



gnp

Given the central copper price assumption of $2.50/lb, by 2020 the development of Oyu Tolgoi is projected to increase GNP by 15 per cent above reference case levels. With a higher long-term copper price of $3.00/lb, Oyu Tolgoi is projected to raise GNP by over 22 per cent by 2020. Even with a very low long-term copper price of $1.00/lb, the mine would still make a positive contribution to Mongolian GNP compared to what it would have been without the development of the mine.

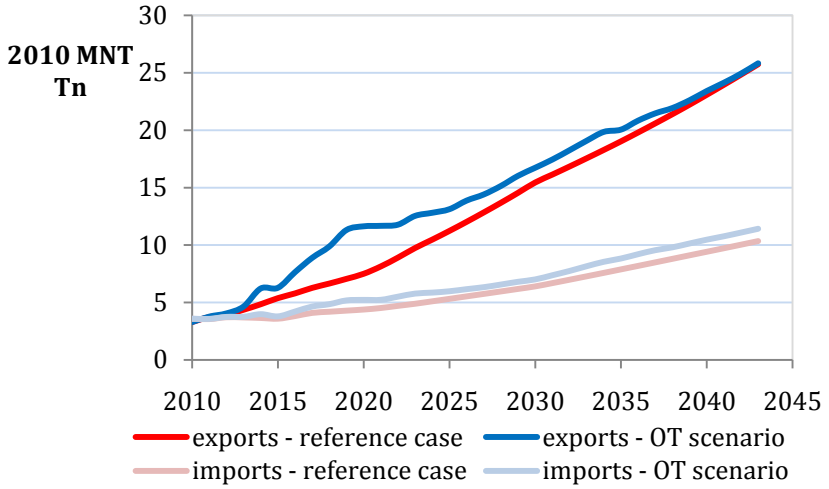
Figure B: Mongolian real GNP, percentage deviation relative to the reference case



international trade

By 2020, Oyu Tolgoi will lift the value of real exports by 55 per cent and real imports by 19 per cent relative to the reference case. In 2019, Oyu Tolgoi is projected to account for 48 per cent of Mongolian exports.

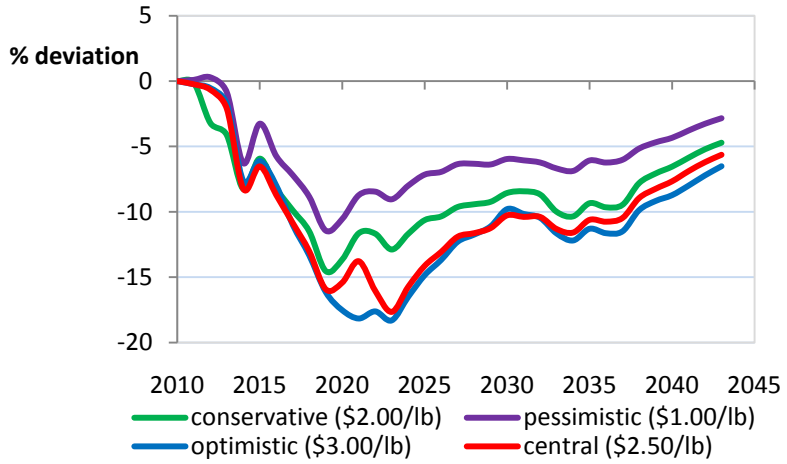
Figure C: Mongolian international trade in the reference case and the Oyu Tolgoi scenario



real exchange rate

Oyu Tolgoi is projected to result in the real exchange rate appreciating by 15 per cent relative to the reference case by 2020 (assuming a long-term copper price of $2.50/lb). Lower long-term copper prices are projected to result in relatively smaller appreciations of the tugrug.

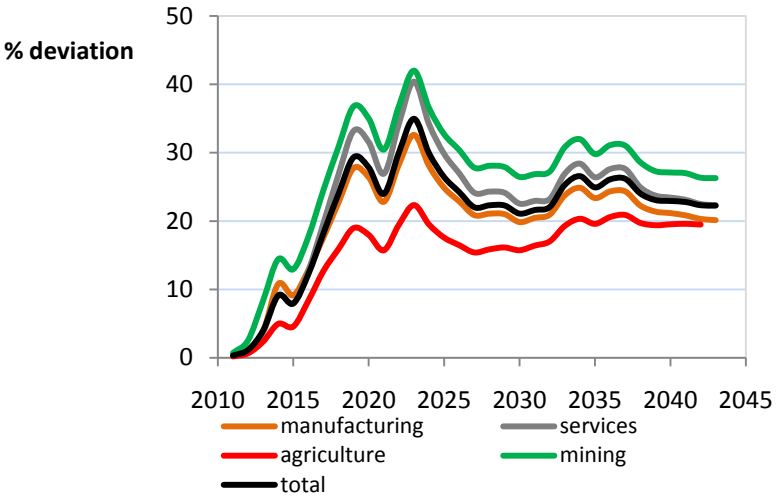
Figure D: Mongolian real exchange rate, percentage deviations relative to the reference case



real wages

By 2020, the average real wage in Mongolia is projected to be 30 per cent higher under the Oyu Tolgoi scenario compared to the reference case. The projected increase in real wages, relative to the reference case, peaks at 35 per cent in 2023 and thereafter falls to 22 per cent. The impact on real wages in the mining and services sectors is greater than the impact on the average real wage. Likewise, the impact on real wages in agriculture and manufacturing is less than on the average real wage.

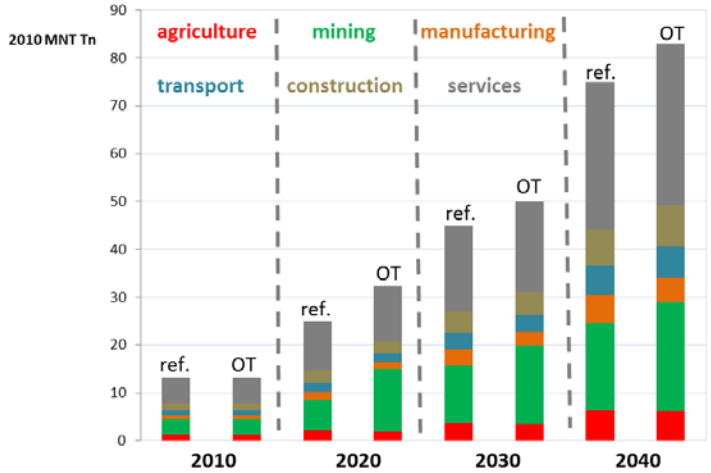
Figure E: Mongolian real wages, percentage deviation relative to the reference case



sectoral composition of output

The development of Oyu Tolgoi more than doubles the size of the Mongolian mining sector by 2020 while all other major sectors continue to grow under the Oyu Tolgoi scenario. However, relative to the reference case, the agriculture and manufacturing sectors contract under the Oyu Tolgoi scenario. This occurs because of the appreciating real exchange rate and higher real wages compared to what otherwise would have occurred.

Figure F: Mongolian sectoral output in the reference case and the Oyu Tolgoi scenario



hypothetical policy scenarios

The results show that the establishment of a wealth accumulation fund has the potential to be beneficial to Mongolia. Oyu Tolgoi is projected to have a more positive impact on the Mongolian economy under the wealth accumulation scenario than under the cash distribution scenario. When compared to the cash distribution scenario:

- GNP relative to the reference case is on average 8 per cent higher from 2020 onwards under the wealth accumulation scenario;
- the appreciation in the real exchange rate relative to the reference case is lower under the wealth accumulation scenario;
- tradable sectors are better off with agriculture expanding relative to the reference case and manufacturing contracting by relatively less under the wealth accumulation scenario;
- all sectors benefit in the long-term from increased demand in the wealth accumulation scenario; and
- government budget revenues (excluding those from Oyu Tolgoi) are 7 per cent higher in 2043 under the wealth accumulation scenario.

Given the central modeling assumptions, the wealth accumulation fund is projected to be worth more than 5 times 2010 GDP by 2043.

Figure G: Mongolian real GNP, percentage deviation from reference case

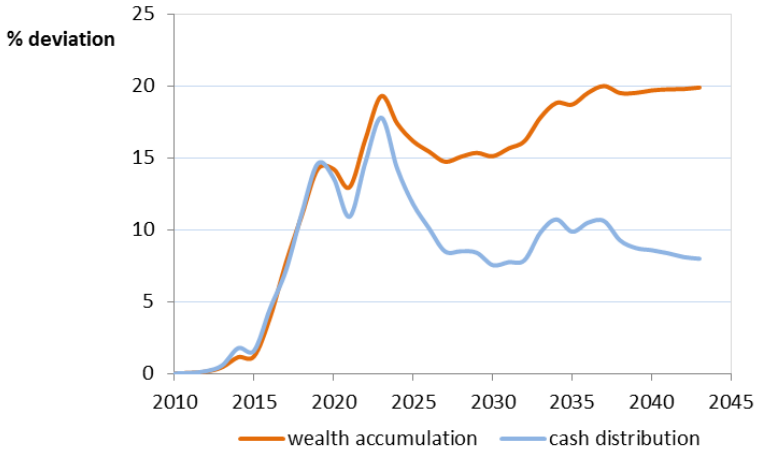
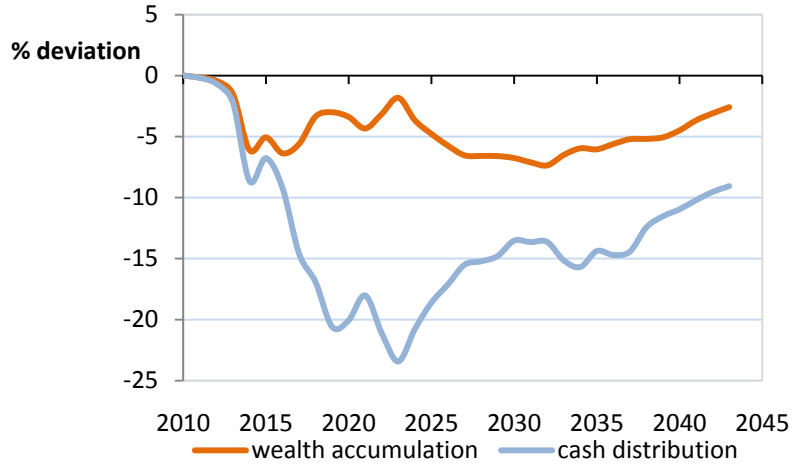


Figure H: Mongolian real exchange rate, percentage deviation relative to the reference case



conclusions and policy implications

This economic impact assessment of Oyu Tolgoi has shown that the development of the mine will have significant and long-term positive impacts on the Mongolian economy. While the non-mining tradable sectors will experience reduced competitiveness from an appreciating exchange rate and higher real labour costs (relative to what otherwise would have occurred), the overall impact of Oyu Tolgoi on both GNP and GNP per person is projected to be highly positive. In other words, the development of the mine, will, on average, make all Mongolians better off. Furthermore, even if long-term copper prices were to fall well below consensus forecasts, Mongolia is still projected to benefit from Oyu Tolgoi.

Increasing the workforce participation rate and encouraging Mongolians to return from abroad would help to ease some of structural adjustment pressures that will inevitably arise from the development of Oyu Tolgoi.

The results also suggest that accruing fiscal revenues from Oyu Tolgoi in a wealth accumulation fund would mitigate the effects of structural adjustment on the Mongolian economy. Conversely, a policy of distributing the fiscal revenues from Oyu Tolgoi directly to private households would exacerbate structural adjustment pressures and cause greater volatility in international competitiveness. Given the

historical experiences of some countries in managing natural resource wealth, the importance of the establishment of a well-designed and managed savings fund is a key finding from this assessment.

The results presented in this report are based on data and assumptions that were available to the authors in 2010. Ongoing reviews of the project as the mine is developed will inevitably lead to changes in cost and production estimates that could have a material impact on the estimates of the project's macroeconomic impact. The model used in this analysis has been made available to Mongolian government departments and key economic agencies for their use in further policy analysis. There are a wide range of possibilities for the use of government revenues flowing from Oyu Tolgoi including enhanced infrastructure development or targeted health and education spending. These possibilities have not been explicitly examined in the present study but remain for future research.

Судалгааны товчоон

Монгол улс бол БНХАУ болон ОХУ-ын хооронд байрласан өргөн уудам нутагтай, байгалийн нөөцөөр баялаг орон. Дотоодын нийт бүтээгдэхүүн 2009 онд 4.2 тэрбум ам.доллартай тэнцсэн нь албан ёсны эдийн засаг харьцангуй жижгийг нотлох ч эдийн засгийн бодит өсөлт тун өндөр буюу 2003-аас 2008 оны хооронд 9 орчим хувьтай байжээ. Нэг хүнд ноогдох ДНБ 2009 оны байдлаар 1560 ам.доллар байсныг харахад амьжиргааны түвшин харьцангуй доогуур байгаа юм. 2000-аад оны эхээс Монгол улсын эдийн засаг, тэр дундаа ДНБ-ний өсөлт, экспорт болон төсвийн орлого зэрэг нь зэс, алт, нүүрс, молибден, жонш болоод цайр зэргийг голчлон үйлдвэрлэдэг уул уурхайн салбараас ихээхэн хамааралтай болсоор байгаа билээ.

2009 онд Монгол улсын Засгийн газар Монголын өмнөд хэсэгт Монгол-Хятадын хилийн ойролцоо байрлах Оюу Толгойн зэс-алтны уурхайг байгуулах, ашиглах тухай хөрөнгө оруулалтын гэрээнд гарын үсэг зурсан билээ. Оюу Толгойн орд нь дэлхийд ашиглагдаагүй хамгийн том зэсийн орд бөгөөд 0.93 хувийн зэс ба 0.37 г/тн алтны агууламж бүхий 1393 сая тонн хүдрийн нөөцтэй аж. Энэ ордыг ашиглалтанд оруулснаар Монголын өмнөд бүсийн болоод улсын нийт эдийн засагт томоохон, урт хугацааны нөлөөлөл үзүүлэх төлөвтэй байна.

Зарим хөгжиж буй орнуудын байгалийн арвин баялгаа ашигласны дараа ихээхэн хүндрэл бэрхшээлтэй учирсан түүхэн туршлага бийгээс гадна “нөөцийн хараал” хэмээх сэдвээр олон тооны шинжлэх ухааны судалгаа бүтээлүүд хийгдсэн байдаг билээ. Үүнийг харгалзан Оюу Толгой төсөл Монгол улсын эдийн засагт чухам хэрхэн нөлөө үзүүлэх талаар хараат бус мэргэжлийн үнэлгээ судалгааг Рио Тинто компани санаачилж ивээн тэтгэсэн юм. Энэхүү судалгааг Монгол Улсын Их Сургуулийн Эдийн Засгийн Сургууль, Австралийн хэрэглээний эдийн засгийн зөвлөх компани BAEconomics Pty Ltd-тэй хамтран гүйцэтгэлээ.

Оюу Толгойн ордыг ашигласнаар Монгол улсын макро эдийн засгийн үндсэн хувьсагч хэмжүүрүүдэд гарах нөлөөллийг уг судалгаанд төсөөлж шинжиллээ. Үндсэн хэмжүүрүүдэд ДНБ, ҮНБ, валютын ханш, цалин, төсвийн орлого, гадаад худалдаа, салбарын үйлдвэрлэл зэрэг орсон. Судалгааны нэг гол хэсэг нь Оюу Толгой төслөөс орох орлогыг засгын газар хэрхэн зарцуулахаас хамааран гарах үр дүнгүүдийн шинжилгээ байлаа.

Энэ судалгаа нь “BAE”-ийн боловсруулсан MINCGEM хэмээх дэлхийн эдийн засгийн ерөнхий тэнцлийн загвар дээр суурилагдаж хийгдсэн. Оюу Толгойн нөлөөллийг судлахдаа суурь хувилбар буюу Оюу Толгой төсөл хэрэгжихгүй тохиолдол дахь дүр зураг, мөн уг төсөл хэрэгжиж

үүнтэй холбоотой байж болох бодлогын хувилбаруудаас үүдэлтэй нөхцөл байдлуудыг хооронд нь жишиж харьцуулсан юм. Хугацааны хувьд уурхайн үйлдвэрлэлтийн эхний 30 жил буюу 2010-аас 2043 оны хооронд авч үзэв.

Суурь хувилбар

Оюу Толгой ашиглалтанд ороогүй тохиолдолд эдийн засгийн үндсэн хувьсах хэмжүүрүүд хэрхэн байхыг суурь хувилбарт тусган төсөөлсөн байна. Үүнд дараах гол таамаглалууд орсон:

Монгол улсын хүн ам болон хөдөлмөрийн нийлүүлэлт цаашид огцом өсөхгүй, 2043 онд 2004 оны түвшинтэй харьцуулахад 40 хувиар илүү байх.

2004-өөс 2043 оны хооронд ДНБ дунджаар 5.9 хувийн өсөлттэй байх.

Судалгааны хугацаанд эдийн засгийн салбаруудын бүтэц өнөөгийн байдалтай төстэй байх бөгөөд уул уурхай болон үйлчилгээний салбарууд зонхилох байр суурьтай байна.

Оюу Толгой төсөл хэрэгжихгүй байсан ч Монгол улсын уул уурхайн салбарын үйлдвэрлэл хурдацтай өсөхөөр төсөөлөгдсөн. 2004-2043 оны хооронд коксждог болон эрчим хүчний нүүрсний үйлдвэрлэл тус бүр 32 ба 42 дахин нэмэгдэхээр тооцов. Харин Оюу Толгойн бус зэсийн баяжмалын үйлдвэрлэл 2, боловсруулсан зэсийн үйлдвэрлэл 54, алтны үйлдвэрлэл 1.3 дахин өсөхөөр авч үзлээ.

2015 он хүртэлх зэсийн үнийг дэлхийн шинжээчдийн нийтлэг төсөөллөөр, харин 2015 оноос 2043 оны хоорондох зэс болон алтны урт хугацааны тогтвортой бодит үнийг тус тус 5,500 ам.доллар/тонн, 1,000 ам.доллар/унц байхаар таамаглав. Зэсийн үнийг мөн 6,600 ам.доллар/тонн, 4,400 ам.доллар/тонн, 2,200 ам.доллар/тонн байх хувилбаруудыг тооцож үзсэн.

Оюу Толгой төсөл хэрэгжих бодлогын хувилбарууд

Монгол улсын эдийн засагт Оюу Толгойн үзүүлэх үр нөлөөлөл болон Оюу Толгой төслөөс орж ирэх татварын болоод ноогдол ашгийн орлогыг зарцуулахтай холбоотой Засгийн газраас хэрэгжүүлж болзошгүй бодлогуудын нөлөөллийг судлахын тулд стандарт нэг бодлогын хувилбар, мөн төсөөлсөн хоёр бодлогын хувилбар боловсруулж шинжлэн үзсэн юм.

Хувилбар 1: Оюу Толгойн хувилбар

Энэ хувилбарт Монгол улсын Засгийн газар дэлхийн хэмжээний уул уурхайн компаниудтай хамтран Оюу Толгойн ордод хөрөнгө оруулалт хийнэ. Уурхайн үйлдвэрлэлт явагдаж эхэлснээр улс орны эдийн засагт суурь хувилбартай харьцуулахад нөөцийн дахин хуваарилалт үүснэ. Уурхайг ашигласнаар эдийн засаг дахь салбаруудын гарцын бүтэц болон макро эдийн засгийн үзүүлэлтүүд өөрчлөгдөнө /суурь хувилбартай харьцуулахад/. Энд Оюу Толгойгоос орох төсвийн бүх орлого Засгийн газрын зарлагад хуваарилагдахаар тооцов.

Хувилбар 2: хөрөнгө хуримтлуулах хувилбар

Уг хувилбар нь өмнөх нэгдүгээр хувилбартай төстэй боловч Оюу Толгойгоос орох төсвийн орлогыг үндэсний хадгаламжийн санд байршуулахаар төсөөлснөөр ялгаатай. Тус сангаас хүртэх хүүгийн орлогыг айл өрх болон Засгийн газрын зарлагад хуваарилж харин үндсэн хөрөнгийг нь хуримтлуулан хадгалах юм.

Хувилбар 3: бэлэн мөнгө тараах хувилбар

Энэ хувилбар мөн эхний хувилбартай төстэй хэдий ч энэ тохиолдолд Оюу Толгойгоос төсөвт орох орлогыг айл өрхүүдэд бүрэн тарааж тэр нь улмаар хувийн хэрэглээнд зарцуулагдах буюу хадгаламжинд орох юм.

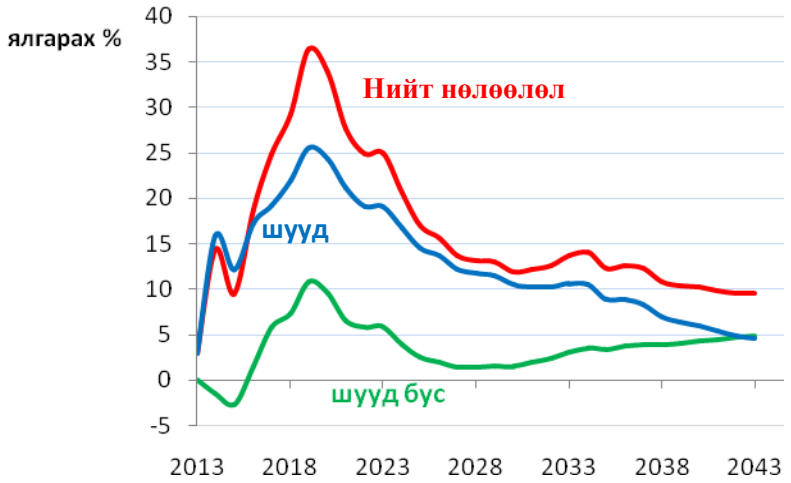
Гол үр дүнгүүд

ДНБ

2020 он гэхэд Оюу Толгойн шууд нөлөөллөөр Монгол улсын ДНБ-ний хэмжээ суурь хувилбартай харьцуулахад 25.6 хувиар илүү байна. Харин Оюу Толгойн шууд бус нөлөөллөөр ДНБ үүн дээр нэмж 10.8 хувь өссөн байхаар харагдаж байна. Иймээс уг уурхайг ашигласнаар ДНБ-д үзүүлэх нийт өөрчлөлт 36.4 хувийн өсөлт байх юм.

Нэг хүнд ноогдох ДНБ суурь хувилбартай харьцуулбал 2020 онд 34 хувиар, 2043 онд 9 хувиар илүү байна.

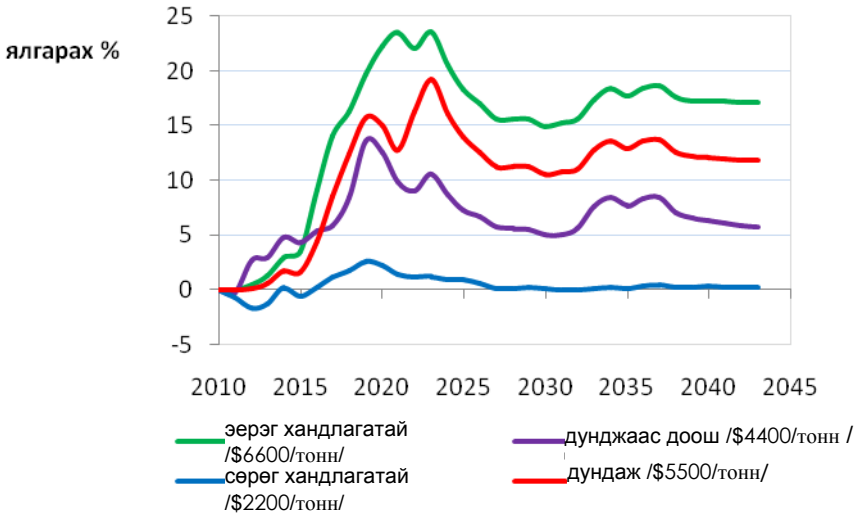
Зураг: ДНБ-д үзүүлэх нөлөөллийг суурь хувилбараас ялгарах хувиар шууд болон шууд бусаар задлан харуулсан байдал



ҮНБ

Зэсийн үнийн төсөөллийн дундаж түвшинг буюу 5,500 ам.доллар/тонн-ыг авч тооцвол 2020 он гэхэд ҮНБ суурь хувилбартай жишиж үзэхэд 15 хувь өндөр байна. Түүнээс өндөр үнээр буюу 6,600 ам.доллар/тонн-р тооцоход ҮНБ 22 хувиар илүү, хамгийн бага үнэ болох 2,200 ам.доллар/тонн-р тооцоход мөн л эерэг нөлөөтэй гарч байна

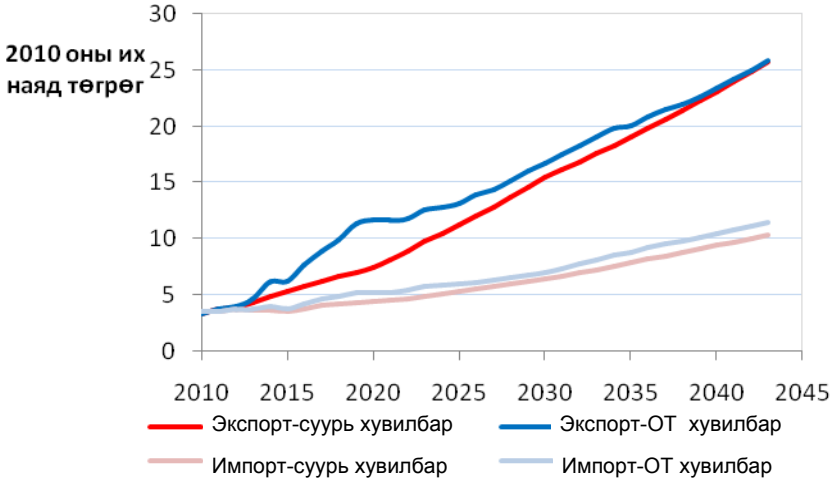
Зураг Б: Бодит ҮНБ, суурь хувилбараас ялгарах хувиар харуулсан нь



Гадаад худалдаа

Суурь хувилбартай зэрэгцүүлж үзэхэд Оюу Толгойг ашигласнаар 2020 онд бодит экспортын дүн 55 хувь, бодит импортын дүн 19 хувиар тус тус ихэссэн байна. 2019 онд Оюу Толгой улсын нийт экспортын 48 хувийг бүрдүүлэх тооцоо гарав.

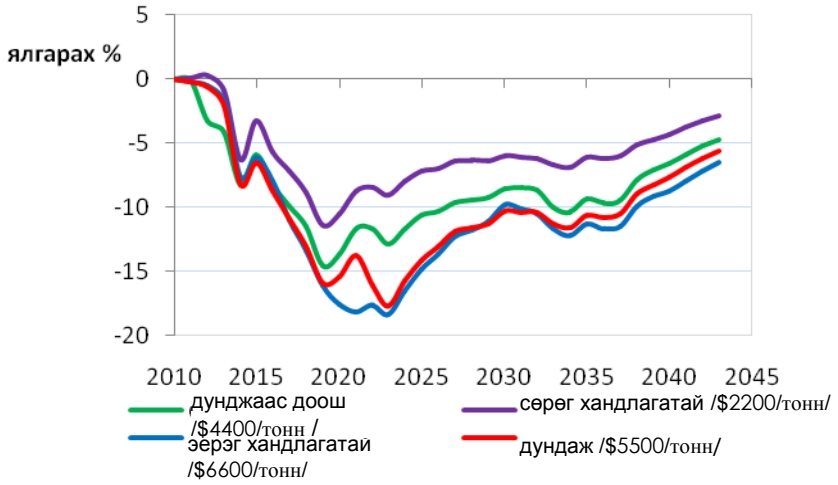
Зураг B: Гадаад худалдаа, суурь болон ОТ орсон хувилбарт



Валютын бодит ханш

Оюу Толгойгоос үүдсэн валютын бодит ханшийн өсөлт 2020 оны байдлаар 15 хувь байхаар харагдаж байна /зэсийн урт хугацааны үнийг 5,500 ам.доллар/тонн-р тооцоход/. Зэсийн үнийг үүнээс доогуур авч үзвэл ханшийн өсөлт харьцангуй бага байх болно.

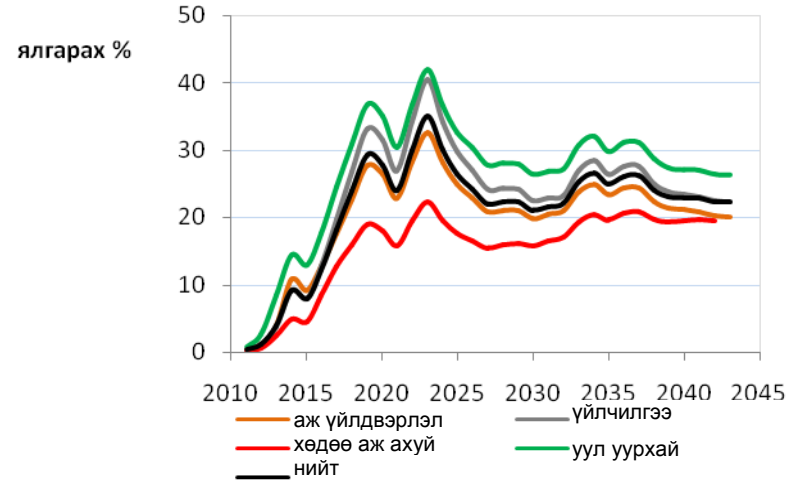
Зураг Г: Валютын бодит ханш, суурь хувилбараас ялгарах хувиар харуулсан нь



Бодит цалин

2020 он гэхэд дундаж бодит цалингийн түвшин суурь хувилбартай харьцуулбал 30 хувь өндөр байх болно. Энэ ялгаа 2023 онд хамгийн их буюу 35 хувьд хүрч улмаар 22 хувь хүртэл буурна. Уул уурхайн болон үйлчилгээний салбарын бодит цалинд үзүүлэх нөлөөлөл нь дундаж бодит цалинд үзүүлж буй нөлөөллөөс өндөр байгаа юм. Харин хөдөө аж ахуй, аж үйлдвэрийн салбаруудын бодит цалинд гарах өөрчлөлт арай бага байна .

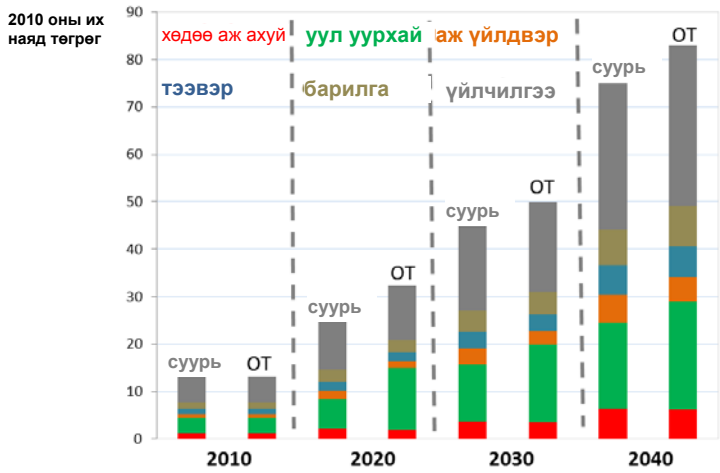
Зураг Д: Бодит цалин, суурь хувилбараас ялгарах хувиар харуулсан нь



Салбаруудын гарцын бүтэц

Оюу Толгой төсөл хэрэгжих хувилбарын хувьд уул уурхайн салбар 2020 он гэхэд 2 дахин тэлсэн, бусад үндсэн бүх салбар мөн өсөлттэй байхаар байна. Харин суурь хувилбартай харьцуулбал хөдөө аж ахуй болон аж үйлдвэрийн салбаруудын өсөлт удаашралтай байгаа нь валютын бодит ханш нэмэгдэх мөн бодит цалин өсөхтэй холбоотой юм.

Зураг E: Салбаруудын гарц, суурь болон Оюу Толгойн хувилбарт



Төсөөлсөн бодлогын хувилбар

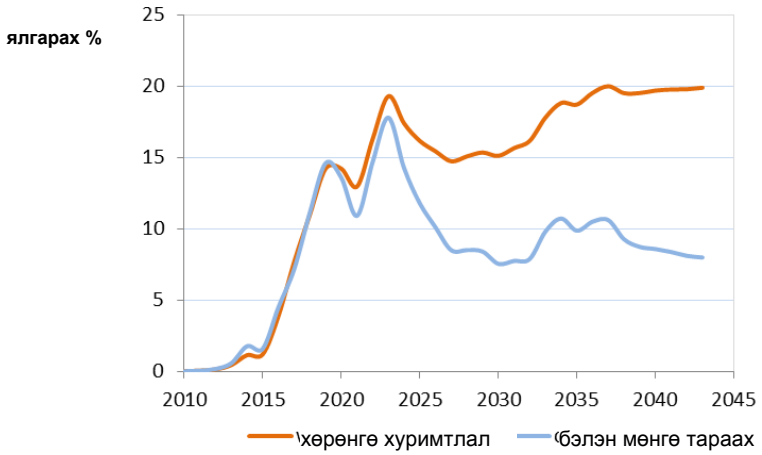
Судалгааны дүнгээс харахад хөрөнгө хуримтлалын сан байгуулах нь Монгол улсад илүү үр ашигтай байх боломжтой. Хөрөнгө хуримтлуулах хувилбарт Оюу Толгойгоос Монголын эдийн засагт үзүүлэх нөлөөлөл нь бэлэн мөнгө тараах хувилбараас илүү наштай байгаа юм. Бэлэн мөнгө тараах хувилбартай харьцуулбал:

- Хөрөнгө хуримтлуулах хувилбарт 2020 оноос хойш ҮНБ-ий суурь хувилбараас давсан хэмжээ дунджаар 8 хувиар илүү байна;
- Хөрөнгө хуримтлуулах хувилбарт валютын бодит ханшийн өсөлт арай бага байна;
- Хөрөнгө хуримтлуулах хувилбар худалдааны салбарт илүү ээлтэй байх буюу хөдөө аж ахуйн салбар суурь хувилбарыг бодвол илүү өсөж, аж үйлдвэрийн салбарын хумигдалт харьцангуй бага байна;

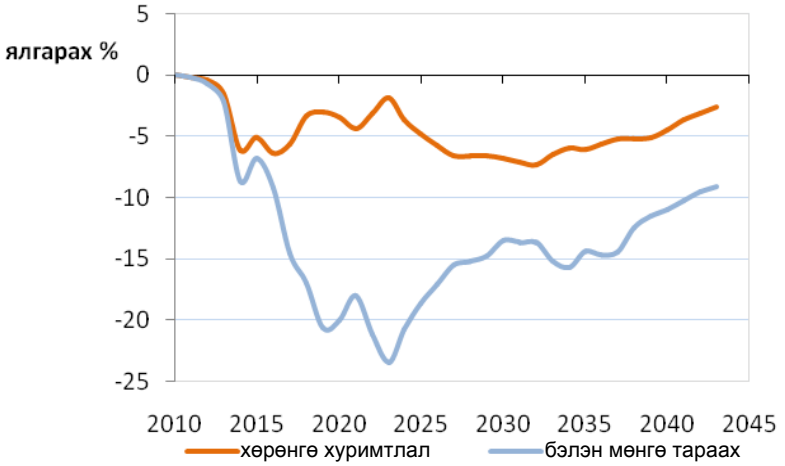
- Хөрөнгө хуримтлуулах хувилбарын хувьд урт хугацаанд нийт эрэлт ихсэх тул бүх салбарт ашигтай;
- Хөрөнгө хуримтлуулах хувилбарын хувьд Оюу Толгойн бус төсвийн орлого 2043 он гэхэд 7 хувиар илүү байна.

Дундаж төсөөллийг авч үзэхэд хөрөнгө хуримтлуулах сан нь 2043 онд 2010 оны ДНБ-ийг 5 дахин үржүүлсэнтэй дүйцэх хөрөнгөтэй болсон байх төлөв байна.

Зураг Ё: Бодит ҮНБ, суурь хувилбараас ялгарах хувиар харуулсан нь



Зураг Ж: Валютын бодит ханш, суурь хувилбараас ялгарах хувиар харуулсан нь



Дүгнэлт ба ач холбогдол

Энэхүү эдийн засгийн нөлөөллийн судалгааны дүнд Оюу Толгой уурхайг хөгжүүлснээр Монгол улсын эдийн засагт хүчтэй, урт хугацааны эерэг нөлөөлөл үүсэхийг тогтоов. Валютын ханш чангарч хөдөлмөрийн өртөг нэмэгдэх тул уул уурхайн бус худалдааны салбаруудын өрсөлдөх чадвар сулрах хэдий ч уг төслийн үзүүлэх ерөнхий нөлөөлөл буюу ҮНБ, нэг хүнд ноогдох ҮНБ зэрэгт гарах өөрчлөлт нэлээд эерэг байх юм. Өөрөөр хэлбэл, уурхайг ашигласнаар нийт монголчуудын амьжиргааны түвшин нийтдээ сайжрах төлөвтэй. Түүнчлэн, урт хугацааны зэсийн үнэ одоогийн нийтлэг төсөөллөөс доогуур байсан тохиолдолд ч Монгол улс энэ төслөөс бодит үр өгөөж авахаар харагдаж байна.

Оюу Толгойг ашиглаж эхэлснээр зайлшгүй үүсэх зарим бүтцийн өөрчлөлтийн хүндрэлийг багасгахын тулд ажиллах хүчний оролцоог нэмэгдүүлж, гадаадад буй Монголчуудыг эх орондоо эргэж ирэхийг дэмжих нь нэмэр болно.

Судалгааны дүн мөн Оюу Толгойгоос үүдэх төсвийн орлогыг хөрөнгө хуримтлуулах санд байршуулж өсгөх нь эдийн засгийн бүтцийн өөрчлөлтийн сөрөг нөлөөллөөс зайлсхийх арга болохыг харуулав. Нөгөөтэйгүүр, уг төслөөс орох төсвийн орлогыг айл өрхүүдэд бэлнээр тарааснаар бүтцийн өөрчлөлтийн дарамтыг улам хүндрүүлж олон улс дахь өрсөлдөх чадвар тогтворгүйжих магадлалтай. Байгалийн баялгаасаа олсон ашигаа хэрхэн зарцуулсан талаарх зарим улс орны түүхэн туршлагыг харгалзан үзэхэд зөв бүтэцтэй, сайн менежмент бүхий хуримтлалын сан байгуулах нь хичнээн ач холбогдолтой болох нь энэ судалгааны гол дүгнэлт байв.

Зохиогчид энэхүү судалгааг 2010 оны тоо мэдээлэл болон өөрсдийн таамаглалууд дээр үндэслэн гаргасан болно. Оюу Толгой уурхайн бүтээн байгуулалт өрнөхийн хэрээр төслийн үнэлгээнд өөрчлөлт гарч, өртөг болоод үйлдвэрлэлийн хэмжээний талаарх тооцоо таамаглал өөрчлөгдөх нь зайлшгүй. Үүнээс улбаалан уг төслийн макро эдийн засагт үзүүлэх нөлөөллийн тооцоололд мөн бодит өөрчлөлт үүсч болзошгүй юм. Энэхүү судалгаанд ашигласан загварыг Монголын яамд, эдийн засгийн салбар хариуцсан үндсэн агентлагуудад цаашид бодлогын судалгаандаа ашиглахад нь санал болгосон билээ. Оюу Толгойгоос орох орлогыг дэд бүтцийн хөгжил, эрүүл мэнд, боловсрол зэрэг олон зүйлд зарцуулах боломж бий. Энэ тухай уг судалгаанд тусгайлан авч үзээгүй хэдий ч ирээдүйн судалгаануудын сэдэв байж болно.

1 introduction

The Oyu Tolgoi copper deposit located in the South Gobi desert in south-eastern Mongolia near the Chinese border is currently the largest known undeveloped copper reserve in the world. In 2009, the Government of Mongolia signed an investment agreement with Ivanhoe Mines Mongolia Inc (now Oyu Tolgoi LLC), which holds the mining licenses and whose parent companies are Ivanhoe Mines Limited and Rio Tinto International Holdings Limited.

The investment agreement covers the construction and operation of a copper-gold mining complex at Oyu Tolgoi. The mine is currently in the construction phase with an estimated US$18.6 billion in capital expenditure required over the life of the mine. First production is expected in 2013 (with some possibility of this occurring in 2012) with full production of 450,000 tonnes of copper and significant gold by-products expected by 2017. The mine is expected to be operational for at least 59 years.

Mongolian GDP was US$4.2 billion in 2009. Given the size of the deposit and the investment and production plans, Oyu Tolgoi is expected to have significant impacts on the Mongolian economy. It is expected that the project will make a significant contribution to sustainable economic growth and social development in the South Gobi region and nationally, during construction, mine operations and after closure.

In light of this, in 2010 the School of Economic Studies at the National University of Mongolia and BAEconomics Pty Ltd were contracted by Rio Tinto to conduct an economic impact assessment of the development of Oyu Tolgoi on the Mongolian economy.

In this assessment, BAE's general equilibrium model of the world economy (MINCGEM) was used to estimate the economic impacts of Oyu Tolgoi for the period 2011-43.

The results reported in this study highlight the key macro-economic outcomes for Mongolia that arise as a

consequence of the development of Oyu Tolgoi and government policies on the use of the revenue that it receives from the mine.

The results presented in this report are based on data and assumptions available to the authors in 2010. Ongoing reviews of the project as the mine is developed will inevitably lead to changes in cost and production estimates that could have a material impact on the estimates of the project's macroeconomic impact. To assess the impact of such changes it would be necessary to re-run the modelling with the new assumptions. The model has been made available to key Mongolian economic agencies so that such work can be carried out.

This report is organised as follows. In the next chapter a detailed background to the Mongolian economy is presented. In chapter 3 the impact of rapid mining development on economic growth in developing countries is explored together with a review of the literature on the so-called 'resources curse' or Dutch disease. A description of the Oyu Tolgoi project is provided in chapter 4. In chapter 5 the analytical framework used in the present study to determine the economic impact of Oyu Tolgoi on the Mongolian economy set out. A description of MINCGEM is provided. In chapter 6 the results of the assessment are provided and in the final chapter some conclusions are drawn and policy implications are outlined.

2 background to the Mongolian economy

2.1 geographic overview

Mongolia is a landlocked country in Eastern Asia that is located between China and the Russian Federation (Figure 2-1).

Mongolia has a surface area of 155.4 million hectares making it the 19th largest country in the world and approximately 17 per cent of the size of the United States (CIA 2010). Only 0.76 per cent of the land area is considered arable with the remainder ranging from mountains in the west and north to grassy steppes to semi-desert and desert plains in the south-central (CIA 2010).

The country experiences harsh climatic conditions with short, hot summers and very cold, windy and long winters. The country has an average precipitation of approximately 251 millimetres per year (FAO 2010a). Precipitation is highest during the summer and in the north of the country.

The capital, Ulaanbaatar, is located in central Mongolia. Apart from the Ulaanbaatar municipality, Mongolia has 21 provinces, which are divided into 329 districts. Nearly half of its 2.7 million people live in the capital city.

The country is characterised by high poverty levels, exacerbated by an urban-rural divide. Poverty incidence in rural areas is nearly twice that of urban areas, primarily because herder families are extremely vulnerable to poverty and have limited employment opportunities. Around 40 per cent of the country's workforce still has a nomadic lifestyle and herd livestock.

Figure 2-1: Mongolia's position in Asia and key features

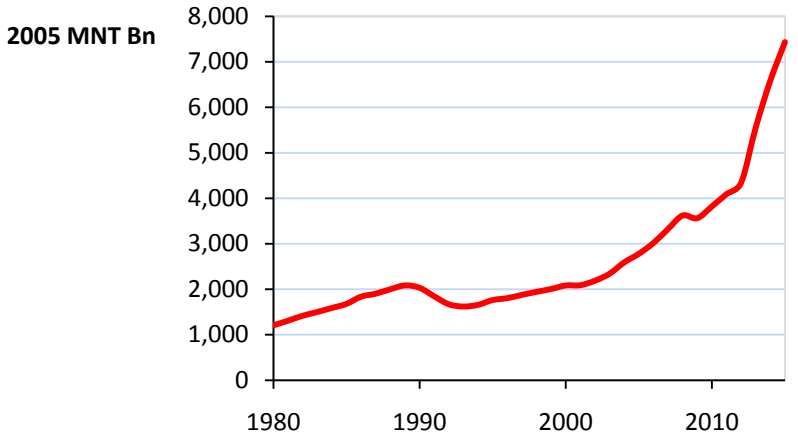
Source: CIA (2010)

2.2 economic overview

Mongolia is well endowed with natural resources and borders two major markets, namely Russia and China. These two factors go some-way to explaining the dynamics of the economy.

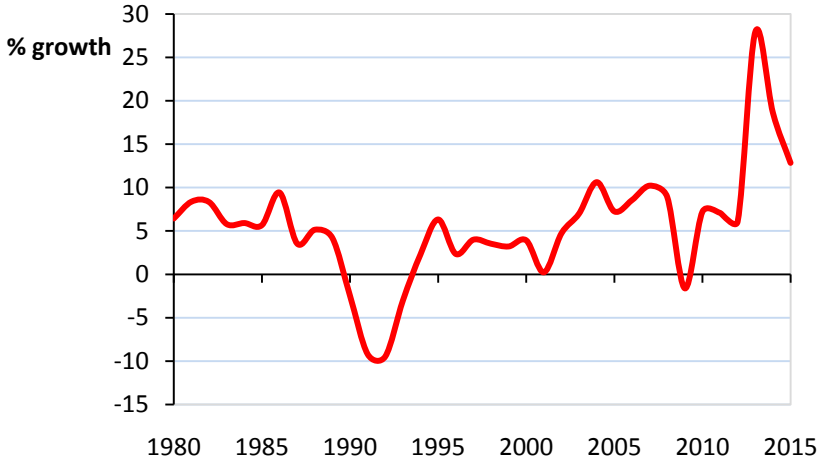
Following the collapse of the Soviet Union in the early 1990s, Mongolia embarked on its transition to a market-based economy. The transition from a centrally planned economy to a market based economic system resulted in a painful recession. Soviet assistance was, at its height, one-third of GDP and disappeared almost overnight. Real GDP contracted by over 20 per cent between 1990 and 1993 (Figure 2-2 and Figure 2-3), before the country began to realise any of the efficiency gains from market-oriented reforms. Real GDP per person also declined in the 1990s to less than 1,000,000 MNT (less than I$2,000 (PPP terms) or less than US$500) (Figure 2-4).

Figure 2-2: Mongolian annual real GDP



Source: IMF (2010d). Figures from 2010 are projections

Figure 2-3: Mongolian annual real GDP growth



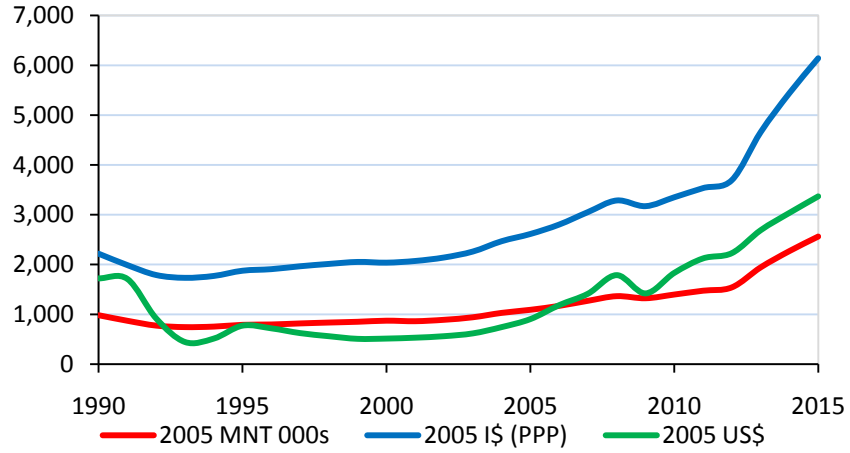
Source: IMF (2010d). Figures from 2010 are projections

Denominated in international dollars, real GDP per person did not return to 1990 levels until the early 2000s while in US currency, it took until 2008 to reach the level that had been achieved in 1990.

Mongolia's economic performance has been strong since the early 2000s, with real GDP growing at nearly 7 per cent on average to 2008 and GDP per person rising by

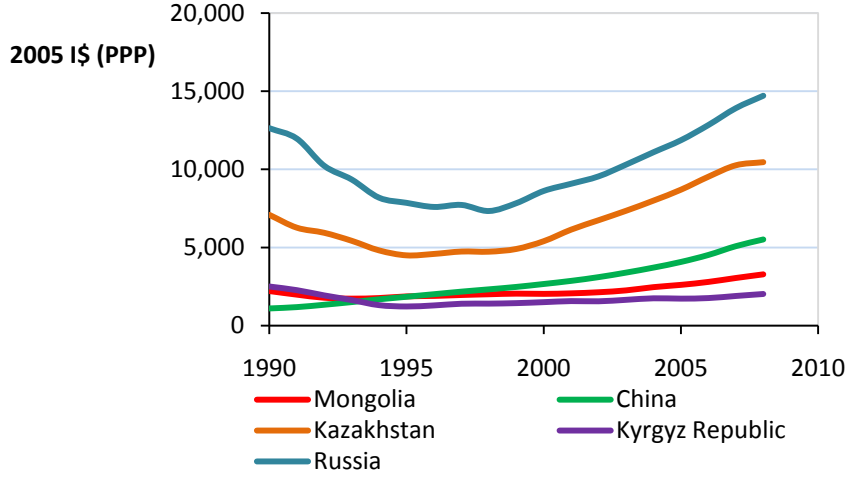
approximately 33 per cent in local currency (45 per cent in PPP terms and over 200 per cent in US currency terms). Table 2-1 provides a good snapshot of the Mongolian economy for the period 2005-10. Over that period real income per person officially grew from US$514 to US$1,788, which classifies Mongolia as a lower-middle income country. Compared to other countries in the region, Mongolia's real GDP per person has been significantly lower than Russia, Kazakhstan and China and higher than the Kyrgyz Republic since 1996 (Figure 2-5) when China overtook Mongolia. By 2008, Russia's real GDP per person was nearly 4.5 times larger than Mongolia's while Kazakhstan's was more than 3 times larger. However, the fall in real GDP per person after the breakup of the Soviet Union in 1990 was also much lower in Mongolia than it was in Russia, Kazakhstan and the Kyrgyz Republic.

Figure 2-4: Mongolian annual real GDP per person



Source: IMF (2010d) and World Bank (2010d). Figures from 2010 are projections

Figure 2-5: Annual real GDP per person



Source: World Bank (2010d)

The mining sector and the associated rise in commodity prices and Chinese import demand from 2004-08 has been the key driver of the recent growth in the Mongolian economy. However, Mongolia is also becoming increasingly reliant on its natural resources with the mining sector responsible for providing 43 per cent of fiscal revenues in 2008 and 85 per cent of exports (and thus foreign exchange, excluding donor funds) in 2009 (MRAM 2009; ADB 2010b; Hart Nurse Ltd and Ulaanbaatar Audit Corporation LLC 2010; NSO 2010a). Mongolia relies on China to purchase nearly three quarters of its exports. As a result, the economy is extremely sensitive to changes in commodity prices, the exchange rate and growth in China's economy.

In the future, Mongolia is projected to perform strongly with real GDP growth projected to average 13 per cent and real GDP per person approximately doubling in all currency terms between 2010 and 2015. The mining sector is projected to be the prominent source of growth in the future.

Table 2-1: A snapshot of the Mongolian economy

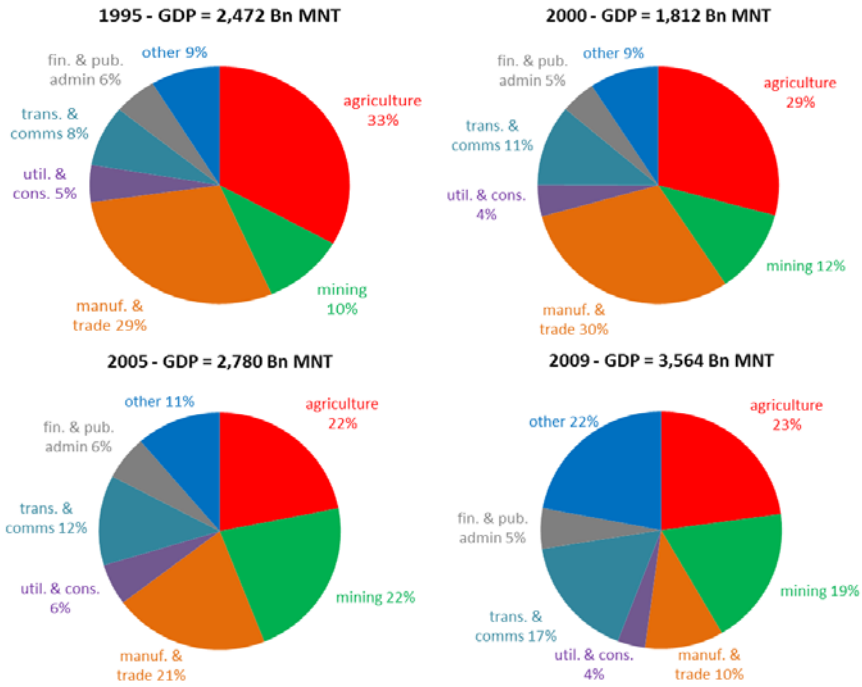
		2005	2006	2007	2008	2009	2010
real GDP	2005 MNT Bn	2780	3017	3326	3623	3564	3822[1]
real GDP growth	%	7.3	8.6	10.2	8.9	-1.6	7.2[1]
	2005 MNT 000s	1091	1170	1272	1365	1323[1]	1398[1]
real GDP per person	2005 I$ (PPP)	2615	2805	3049	3272	3171[1]	3350[1]
	2005 US$	905	1185	1415	1788	1421[1]	1834[1]
copper production	kt	127	130	130	130	127	…
copper export	2005 US$ Bn	326	615	764	…	…	…
share of mineral products in exports	%	74	75	79	84	…	…
agriculture's share of total persons employed	%	40	39	38	36	…	…
share of agricultural production							
crops	%	8	11	10	12	14	…
livestock	%	92	89	90	88	86	…
livestock numbers							
sheep	000s	12,885	14,815	16,990	18,362	…	…
goats	000s	13,267	15,452	18,348	19,969	…	…
cattle	000s	1,964	2,168	2,426	2,503	…	…
camels	000s	254	254	261	266	…	…
horses	000s	2,029	2,115	2,240	2,187	…	…
share of agricultural products in exports	%	2.1	2.4	1.7	1.4	…	…

		2005	2006	2007	2008	2009	2010
population	000s	2550	2581	2611	2641	2671[1]	2701[1]
male	000s	1262	1278	1292	1307	1321[1]	1336[1]
female	000s	1287	1303	1319	1335	1350[1]	1366[1]
number of employed	000s	968	1010	1024	1042	1006	…
rate of unemployment	%	3.3	3.2	2.8	2.8	3.6	…
government revenue	% of GDP	30	36	40	36	33	…
government expenditure	% of GDP	25	31	36	40	37	…
budgetary surplus/deficit	% of GDP	3	3	3	-5	-5	…
annual inflation	% change	12.5	4.5	8.2	26.8	6.3	13
nominal exchange rate	MNT/USD	1,205	1,180	1,170	1,166	1,438	…
real imports	2005 US$ Mn	1,177	1,390	1,941	2,991	…	…
real exports	2005 US$ Mn	1,064	1,493	1,834	2,336	…	…
trade balance	2005 US$ Mn	-113	104	-108	-654	-230	…
current account balance	2005 US$ Mn	88	360	162	-624	-348[1]	…
real interest rates	%	8.4	3.1	8.5	-1.5	…	…
deposit interest rates	%	13.0	13.0	13.5	11.2	…	…

Source: ADB (2010b), BoM (2011a), FAO (2010b), Global Insights (2010), IMF (2010d), MRAM (2008), NSO (2010a), UN (2009), USGS (1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008), World Bank (2010d, 2010e). [1] Estimate

The sectoral composition of the Mongolian economy has changed dramatically over the past two decades (Figure 2-6). Manufacturing and trade, and agriculture have experienced the largest reductions with their contribution to GDP declining by 19 and 10 percentage points respectively between 1995 and 2009. Mining, and transport and communications have enjoyed the largest growth with their contribution to GDP increasing by 9 percentage points while finance and public administration and utilities and construction have remained relatively constant. In 2009 agriculture remained the largest sector followed by mining with their share of GDP equal to 23 and 19 per cent respectively.

Figure 2-6: Real GDP by industrial origin, in 2005 constant prices



Source: ADB (2010b). Note: *manuf. & trade* = manufacturing and trade; *util. & const.* = utility and construction; *trans. & comms* = transport and communications; *fin. & pub. admin* = finance and public administration

In the past two decades, as the economy has become more market oriented, fundamental reforms such as

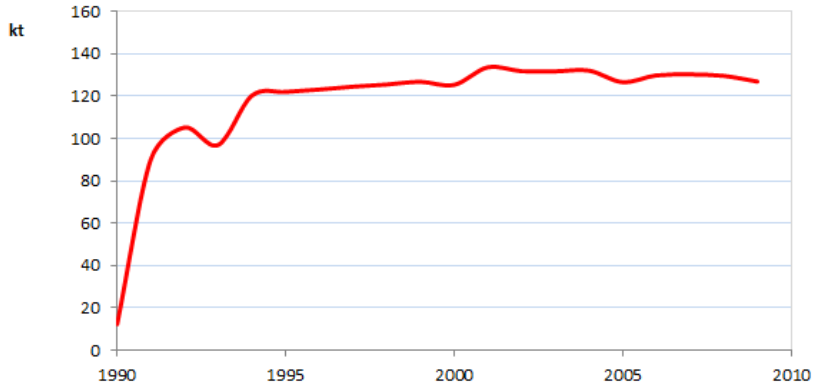
privatisation of state owned companies, price liberalisation and establishment of market based institutions have all taken place (Cheng 2003). More recently, with the commodity boom, mining has begun to dominate the economy. As a result Mongolia was hit hard by the global financial crisis, with the crisis transmitted through lower commodity prices. Mongolia's economic downturn was a result of the combination of a collapse in prices and a downturn in the economies of its major trading partners, and particularly that of China. The collapse in copper prices and trade hit Mongolia harder than the other major copper producers because of the country's dependence on the commodity, pro-cyclical fiscal and monetary policies, a fixed exchange rate and – at that time - an overheating financial sector. The economy contracted by 1.6 per cent in 2009 following growth of 8.9 per cent the previous year (Figure 2-3).

Although the economy recovered reasonably quickly and growth and fiscal receipts are positive again, the rebound in commodity prices explains much of the recovery. Mongolia's medium-term growth outlook will be determined by a combination of the large mining investments in Oyu Tolgoi and Tavan Tolgoi and macroeconomic policy.

2.3 the role of mining in the economy

Growth in the Mongolian economy since the 1990s has been driven by the mining sector, which rose from 10 per cent of output in 1995 to 22 per cent in 2005 before falling slightly to 19 per cent in 2009 following the collapse in commodity prices. Some estimates suggest up to 60 per cent of the elements in the periodic table can be found in Mongolia, however the most important mineral is copper with production averaging around 130 kt since 1994 (Figure 2-7). Other relatively minor minerals currently include molybdenum, coal, gold, zinc, and fluorspar. Coal however, is expected to become a major mineral when production from the Tavan Tolgoi coal mine commences.

Figure 2-7: Mongolian production of copper



Source: ADB (2010b), USGS (1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008) and MRAM (2008). Note: copper production is copper content of concentrates produced.

Table 2-2: Mongolian production of minerals other than copper in concentrate

	zinc[1]	molybdenum[1]	fluorspar	coal	gold[2]	refined copper
	Kt	t	Mt	Kt	Kg	t
1990	0	1,580	614	7,160	1,000	0
1995	0	1,822	133	5,019	4,504	0
2000	0	1,335	199	5,185	11,808	641
2001	0	1,514	199	5,141	13,675	1,476
2002	0	1,590	185	5,307	12,097	1,500
2003	0	1,793	275	5,666	11,119	1,341
2004	0	1,141	355	6,794	19,240	2,376
2005	11	1,188	368	8,256	24,120	2,475
2006	55	1,404	393	7,885	22,561	2,618
2007	77	1,978	381	9,560	17,473	3,007
2008	72	2,000	380	9,692	15,184	2,800

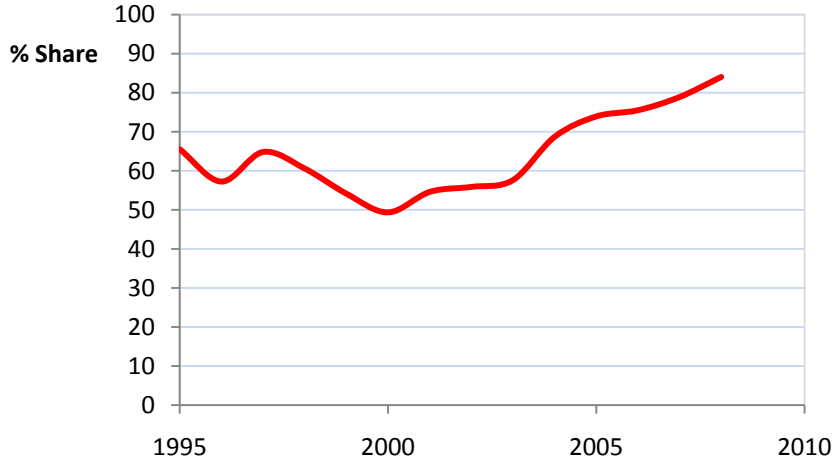
Source: ADB (2010b), USGS (1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008) and MRAM (2008). [1] mine output, contained metal

2.3.1 mining's contribution to exports

Mineral products have been Mongolia's largest export since at least the mid-1990s. Between 1995 and 2008,

mineral products contributed on average 64 per cent of the value of total exports (Figure 2-8). Between 2005 and 2008 however, the annual average share rose to over 78 per cent.

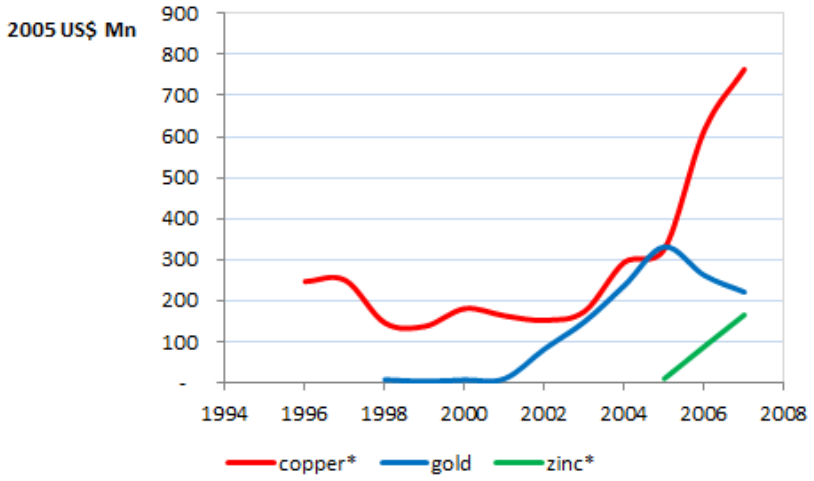
Figure 2-8: The share of mineral products in total exports



Source: NSO (2010a)

In 2007, 8 of the 10 most important exports by value were mineral products including copper ores and concentrates, gold, zinc ores and concentrates, coal, molybdenum ores and concentrates, petroleum products, fluorspar and refined copper. Copper ores and concentrates is Mongolia's most important single export accounting for on average 36 per cent of the value of total exports between 1996 and 2007. In 2007, the value of exports of copper ores and concentrates was approximately 3.5 times that of the next most important export, gold.

Figure 2-9: Major mineral exports from Mongolia



Source: IMF (2010d) and World Bank (2010e). * ores and concentrates

Table 2-3: Minor mineral exports from Mongolia

	molybdenum[a]	fluorspar	coal	refined copper
		2005 US$ 000		
1996	17,042	27,872	9	1,000
2000	6,943	21,835	102	1,386
2001	5,602	22,419	204	2,384
2002	10,983	20,525	1,631	2,530
2003	16,259	22,388	6,213	2,527
2004	20,710	22,627	17,052	7,137
2005	46,677	25,354	26,621	8,471
2006	46,285	33,961	43,654	15,691
2007	71,451	42,326	109,034	20,774

Source: IMF (2010d) and World Bank (2010e). * ores and concentrates

2.3.2 mining's contribution to fiscal receipts

In 2008, tax revenues from mining accounted for 43 per cent of government revenue and 15 per cent of GDP. Erdenet accounted for 62 per cent of mining revenue. Overall, the windfall tax accounted for over half of mining revenue, or 8 per cent of GDP. To put it another way,

windfall taxes accounted for over 20 per cent of the budget in 2008. Table 2-4 outlines the contribution to government revenue from selected mining companies. The windfall profit tax expired on 1 January 2011.

Table 2-4: Mining's contribution to government revenue in 2008

		contribution to fiscal revenues (inc. dividends)	proportion of revenue that results from windfall tax	proportion of total mining revenues
Erdenet	**copper**	26%	67%	62%
Shijir talst	**gold/silver**	6%	79%	15%
Boroo Gold	**gold**	2%	6%	5%
Petrochina	**oil**	1%	0%	3%
Tsairtmineral	**zinc**	1%	0%	2%
Anish		1%	0%	2%
Mongolrostsv etmet	**fluorspar**	1%	13%	1%
Adil och	**fluorspar**	1%	0%	2%
total (all companies)		43%	55%	100%

Source: ADB (2010b) and Hart Nurse Ltd and Ulaanbaatar Audit Corporation LLC (2010)

2.3.3 major mining operations

The sector currently is dominated by the Erdenet copper/molybdenum mine, Mongolrostsvetmet fluorspar mines, and the top two placed gold mines. Together they account for 83 per cent of current total mining revenues.

Erdenet

The Erdenet copper/molybdenum mine, operating since 1976, is a Mongolian-Russian joint venture. It has been an important economic driver, contributing nearly a quarter of government revenues and earning about half of all foreign exchange. The mine is a stockwork-type Cu-Mo deposit located within a large intrusive porphyry system. It produces

around 120-135 kt of copper concentrates and around 2000 tonnes of molybdenum concentrates annually and exports mainly to China and Russia.

Mongolrostsvetmet

Also a Mongolian-Russian joint venture, Mongolrostsvetmet is the world's 4th largest supplier of fluorspar. It operates four of the six fluorite mines in Mongolia, accounting for 92 per cent of production. Annual output is around 110 kt of chemical-grade and 80 kt of metallurgical-grade concentrates.

Boroo Gold

Boroo is owned by Canadian mining company, Centerra Gold. It is an open pit gold mine and since its start of production in March 2004, had produced approximately 1.5 million ounces of gold by the end of 2010. The mine ceased operation at the end of 2010 with the Boroo mill expected to continue processing stockpiled ore until the end of May 2011 (Centerra Gold 2011).

2.3.4 strategically important deposits

The government has targeted fifteen deposits as strategically important with the amendments to the Minerals Law passed in 2006. This also allows the government to have a right to own up to 50 per cent of mines developed on deposits discovered with State funds. Around half of these are being mined. Some of the largest of the deposits include:

Tavan Tolgoi

One of the largest undeveloped coal deposits in the world, Tavan Tolgoi has more than 4.5 billion tons of established coking and thermal coal resources. It is located approximately 150 km from Oyu Tolgoi and 240 km from the nearest border. The government currently owns 100 per cent of the resource through the state-owned company Erdenes MGL LLC, and is seeking to enter into contract mining arrangements to develop the mine. Energy Resources LLC that owns one of the four coalfields, and Tavan Tolgoi LLC, operating a small mine within one of the

coalfields, currently export around 3 million tonnes per year to China.

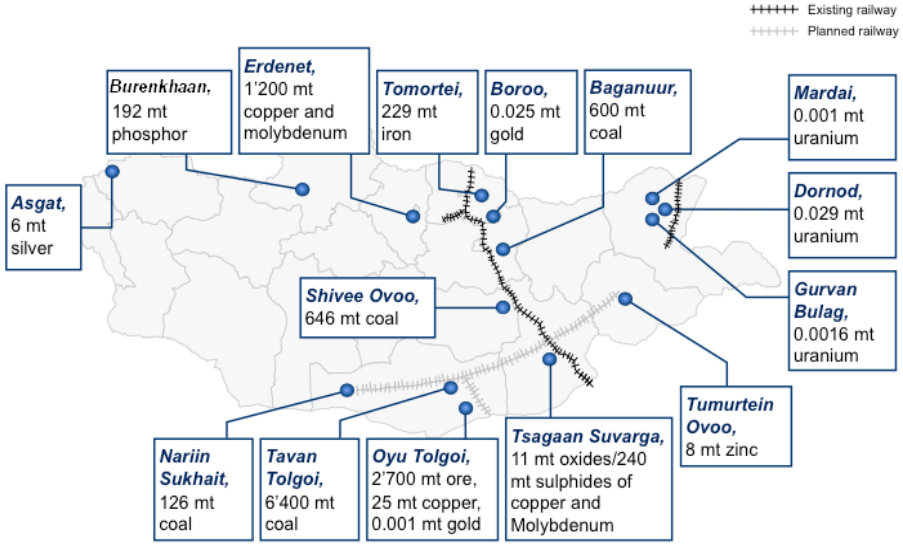
Shivee Ovoo

The Shivee Ovoo deposit is estimated to have coal resources of around 2 billion tonnes. The mine currently provides around 25 per cent of domestic coal demand with production capacity of 2 million tonnes per year. It is the second largest coal producer after the Baganuur mine.

Nariin Sukhait

The Nariin Sukhait coal deposit contains 134 million tonnes of coal resources. One of its two mines is owned by the Mongol Alt Corporation (MAK), the other by a joint venture between MAK and the Chinese company Qinghua. The mines currently produce about 2 million tonnes of coal per year.

Figure 2-10: Major mineral deposits in Mongolia



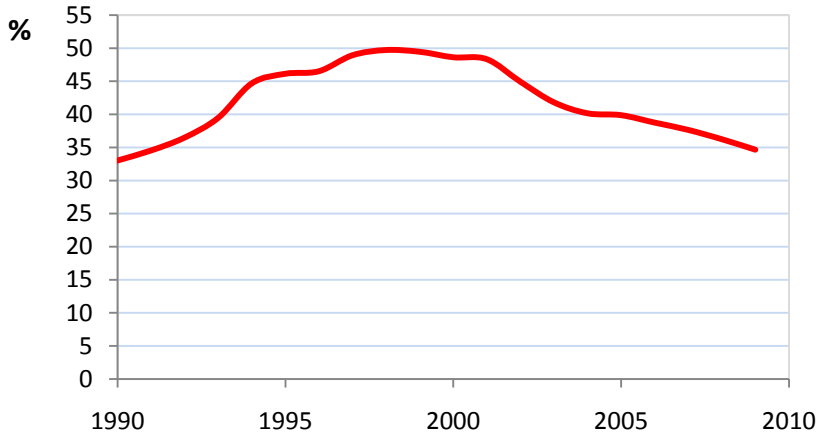
Source: Sugar (2010)

2.4 the agricultural sector

Agriculture has a significant but declining importance in the Mongolian economy with its share of GDP declining from 33 per cent in 1995 to 23 per cent in 2009 (Figure 2-6). Nevertheless, agriculture remained the largest sector in the

economy in 2009. The sector also accounted for 42 per cent on average of total persons employed annually between 1990 and 2009. The annual share has been falling since the early 2000s with the rise of the mining sector (Figure 2-11) but even in 2009, more than one-third of persons employed were employed in agriculture.

Figure 2-11: Agriculture's share of total persons employed in Mongolia

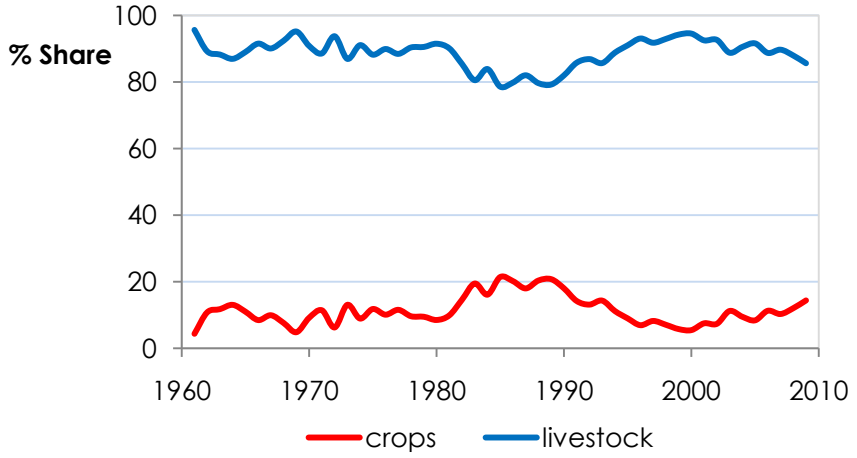


Source: ADB (2010b). The figure in 2009 is an estimate

Due to climatic and geographic factors, the Mongolian agricultural sector is primarily focused on livestock production. Between 1961 and 2009, livestock accounted for around 90 per cent of the total value of agricultural production (Figure 2-12).

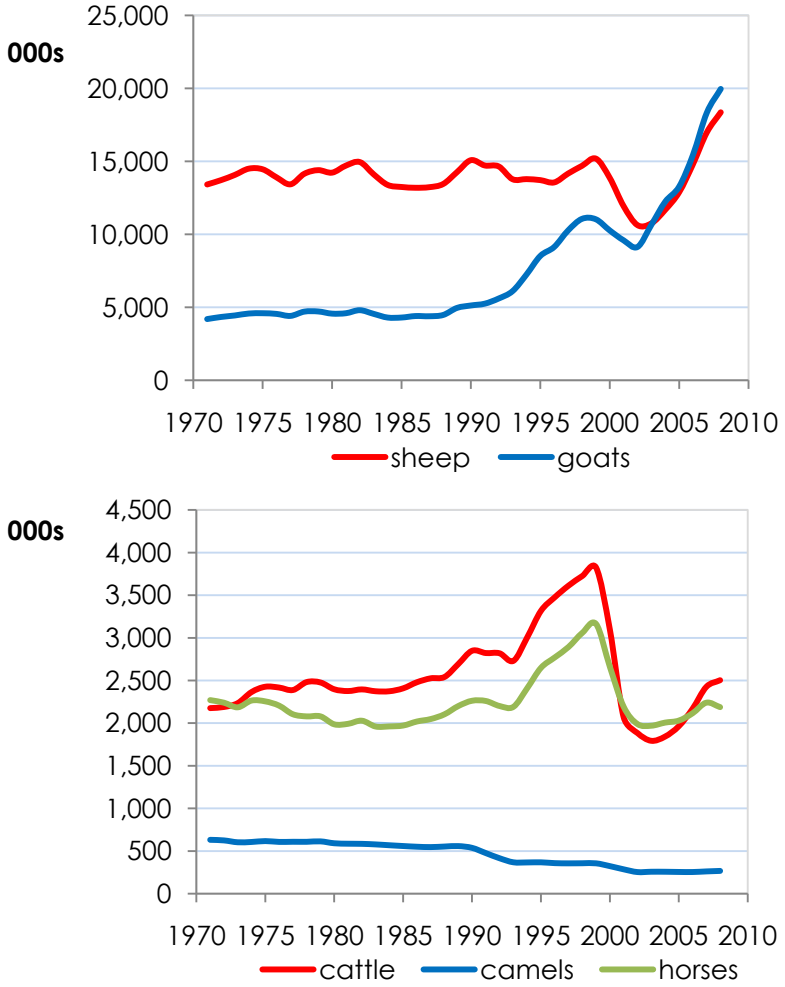
Within the livestock sector, Mongolia has relatively large numbers of sheep and goats with approximately 20 million of each in 2009, lower numbers of cattle and horses (around 2-2.5 million of each) and small numbers of chickens (about 400,000) and pigs (about 26,000) (Figure 2-13).

Figure 2-12: Share of total agricultural production in Mongolia



Source: FAO (2010b)

Figure 2-13: Mongolia livestock numbers

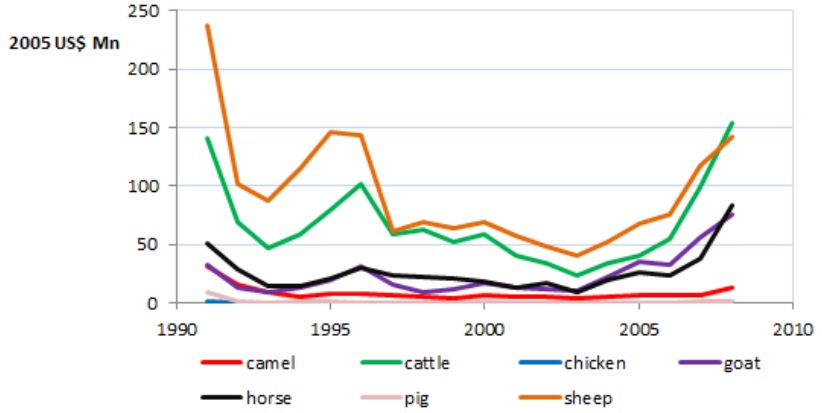


Source: NSO.

Animals are raised primarily for their meat but sheep and goats are also raised for their wool and hair respectively and sheep, camels, cattle and goats are also raised for their milk. Historically, sheep and cattle are the largest producers of meat by value followed by goats and horses, while camels, pigs and chickens produce only small amounts of meat by value (Figure 2-14). Cattle have also

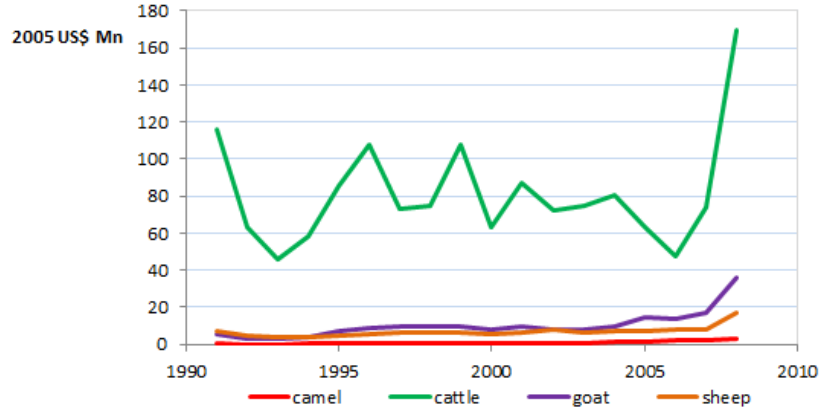
historically been the main source of milk followed by goats (Figure 2-15).

Figure 2-14: Meat production in Mongolia



Source: FAO (2010b) and IMF (2010d)

Figure 2-15: Milk production in Mongolia



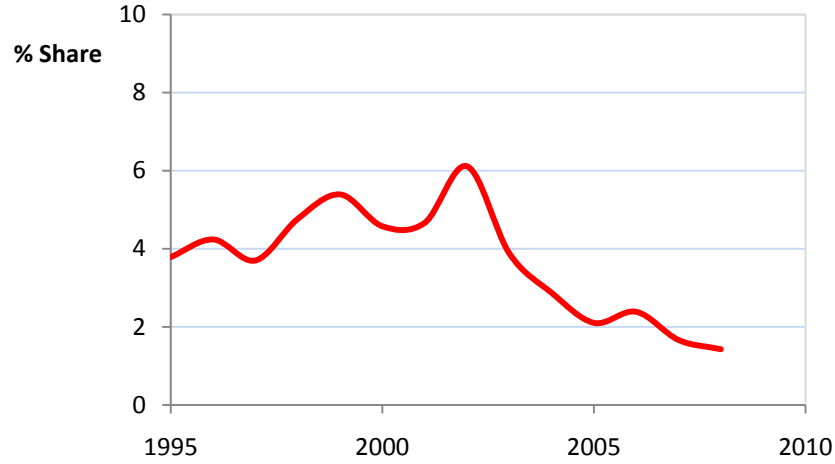
Source: FAO (2010b) and IMF (2010d)

2.4.1 agriculture's contribution to exports

Compared to mining and manufacturing, agriculture makes a very small contribution to national exports. Between 1995 and 2008 agriculture only accounted for 3.7 per cent of total exports on average. In the

recent past this share has been falling from a high of 6.1 per cent in 2002 in line with growth in the mining sector. Nevertheless, in 2010, Mongolia's fifth most important export by value was wool/hair (combed and uncombed) ranking behind only coal, copper concentrates, iron ore and gold and accounting for nearly 6 per cent of total exports (NSO 2010b). Furthermore, Mongolia's tenth and twelfth most important exports were sheep leather and horse meat respectively.

Figure 2-16: The share of agricultural products in total exports



Source: NSO (2010a)

2.5 population and labour supply

2.5.1 population

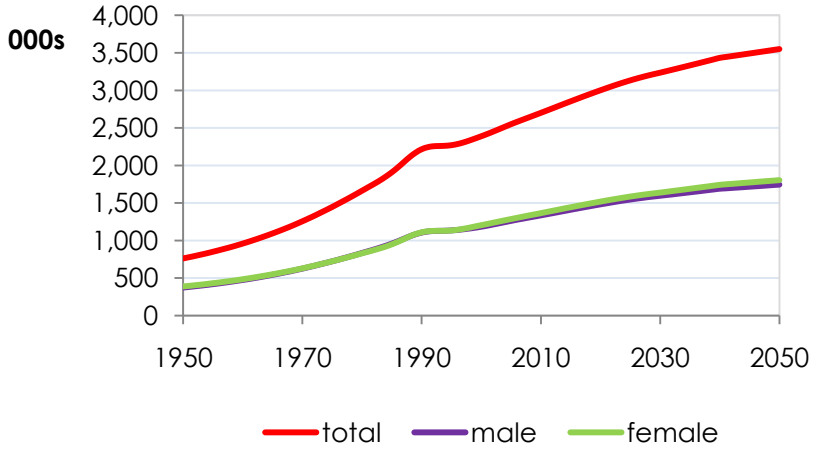
Mongolia has a very small population compared to many countries in the world with only 2.7 million persons in 2009. Mongolia has also historically had low population growth with an annual average of 2.7 per cent between 1950 and 1990 and only 1 per cent between 1990 and 2009 (Figure 2-17). Given this very small population and the large land area of the country, Mongolia has a very low population density of only 2 persons per square kilometre.

Mongolia's population growth is projected to further slow to an average annual growth of only 0.6 per cent between 2010 and 2050.

In terms of the age structure, Mongolia has a relatively young population today with a median age of only 24.2 years in 2005. The median age has increased slightly since 1990 when it was 18.8 years but between 1950 and 1990, the median age was approximately constant at around 19 years (Figure 2-18).

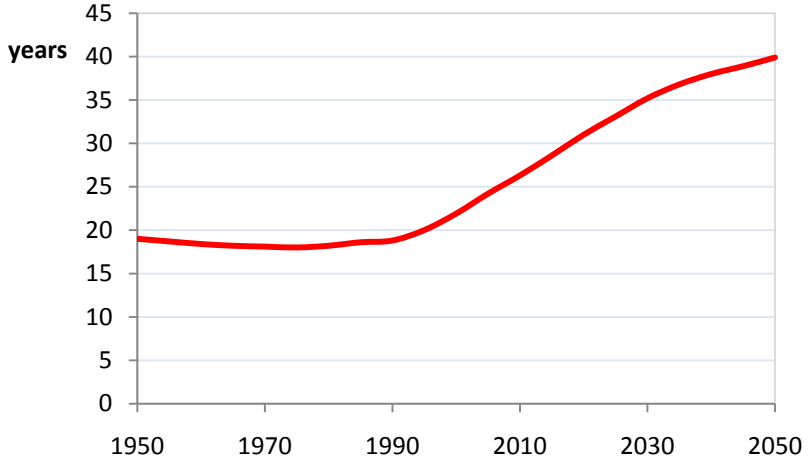
Mongolia's population is expected to age relatively quickly in coming years with the median age projected to rise to approximately 40 years by 2050. The age profile of the population is demonstrated in the population trees in Figure 2-19. In 1990, the tree had a very well defined pyramid shape. By 2000, a bulge was beginning to appear around the 10-20 age group, and by 2050, the 0-65 age group is projected to be nearly rectangular shaped. The approximately equal sex distribution in the total population can also be seen in each of the age groups.

Figure 2-17: Population of Mongolia, total and total by sex



Source: UN (2009) and Global Insights (2010). Figures from 2009 are projections

Figure 2-18: The median age in Mongolia



Source: UN (2009). Figures from 2009 are projections

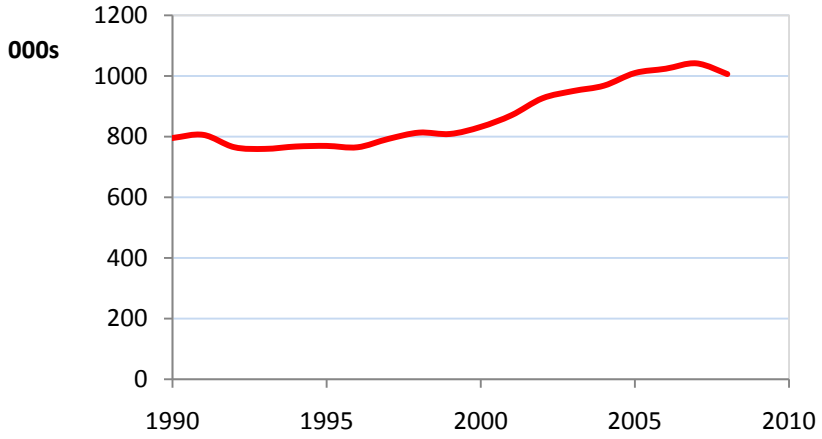
Figure 2-19: Mongolia's demographic structure

Source: UN (2009). Figures from 2009 are projections

2.5.2 labour supply

The number of persons employed in Mongolia fell in the early 1990s and then remained constant until 1997-98 in line with the contraction in the economy (Figure 2-20). Since 1997-98 employment has steadily increased until 2009 when the financial crisis caused the number of persons employed to fall again.

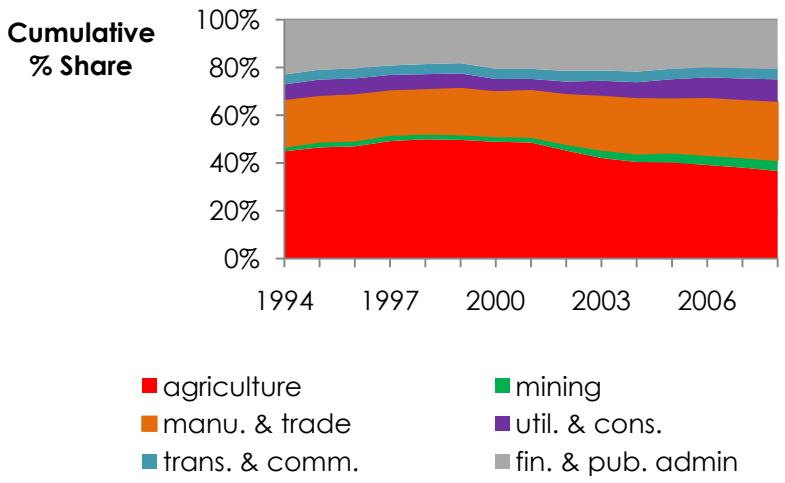
Figure 2-20: Number of employed in Mongolia



Source: ADB (2010b). The figure for 2009 is an estimate

The agriculture sector remains the largest sector for employment, and although it is declining, it still employs 36 per cent of the workforce (Figure 2-21). The next most important sector is manufacturing and trade, which steadily increased its share of total employment from 19.5 per cent in 1994 to 24.2 in 2008. Utilities and construction and mining and communications have experienced only marginal increases in their respective shares of total employment while transport and communications and finance and public administration have remained relatively constant over the period from 1994 to date.

Figure 2-21: Share of total employment by industry



Source: ILO (2010). Figures are for people aged older than 16 years. Note: *agriculture* = agriculture, hunting, forestry and fishing; *manu. & trade* = manufacturing and wholesale and retail trade and hospitality; *util. & cons.* = electricity, gas and water supply and construction; *trans. & comm.* = transport, storage and communications; *fin & pub. admin* = financial intermediation, real estate, public administration and defence, education, health and social work and other community activities

In 2010, 32,000 Mongolia people were living abroad (mainly to the Republic of Korea and Germany), representing around 1.2% of the population (World Bank 2011). Worker remittance is an important source of foreign exchange for Mongolia. Remittances grew rapidly from 1998 and rose to $203 million (nearly 13 per cent of Mongolia's GDP) in 2004. Remittances are estimated to reach $211 million in 2010 (World Bank 2011).

There are a total of 21,682 foreigners with a work permit in Mongolia, however the actual number of foreign workers is likely to be much higher due to illegal immigrants. Foreign employment is highly seasonal (mainly between the months of April and June), which reflects the seasonal nature of the sectors they are mostly employed in (construction, road works and, particularly, mining, which accounts for 60 per cent of foreign workers). China is the main source of foreign workers, followed by Russia (Mongolia Immigration Agency 2010).

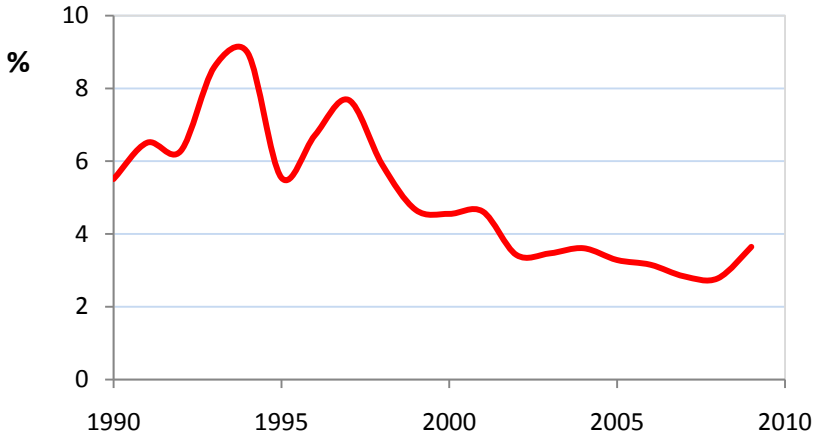
Between 2004 and 2008, just over 90,000 jobs were created, which was a 10 per cent growth in jobs. However, this was

in line with workforce growth, so the employment rate remained reasonably constant over this period. During the same period, the economy grew by 40 per cent in real terms implying that employment is sluggish in responding to output growth. This undoubtedly reflects the fact that output growth over the four year period has been driven by the mining sector, which accounted for just 4.5 per cent of total employment in 2008 because of the highly capital intensive nature of the sector.

2.5.3 unemployment

Mongolia's official unemployment rate has been reduced from a high of 9 per cent in 1994 to consistently less than 5 per cent since 1999 (Figure 2-22). The financial crisis had a relatively minor impact on the official unemployment rate with the rate rising by less than 1 percentage point in 2009 compared to 2008. However, it is widely recognised the official data underestimate the unemployment level, as it only accounts for people who are regularly registered as seeking employment. A high proportion of the active labour force in Mongolia work in the informal sector, which is estimated to be as large as 30 per cent of GDP (The IRIS Center 2005). Several labour surveys found that the true unemployment level was far above the official rate reaching as high as 13 per cent by the end of 2009 (World Bank 2010c).

Figure 2-22: Mongolia's official unemployment rate



Source: ADB (2010b). The figure for 2009 is an estimate

2.6 political overview

Mongolia's Democratic Revolution in 1990 led to a multi-party system and the (rather rough) transition from a soviet based economy to a market economy. Mongolia adopted a new constitution in 1992 that established a parliamentary republic. Legislative power is held by the parliament, which has 76 seats. Members of the parliament are elected by popular vote of the people to serve four year terms. Executive power is exercised by the government led by the prime minister who is nominated by the president but elected by the parliament. The president, who is head of state, is also elected directly to serve a four-year term.

2.6.1 the residing coalition

The current government represents a tense balance of political power between the ruling Mongolian People's Revolutionary Party[1] (MPRP) and the Democratic Party (DP). The MPP won a majority in the last election (2008) but formed a coalition government with the DP. The prime

[1] The Mongolian People's Revolutionary Party has since changed its name to the Mongolian People's Party (MPP).

minister as well as most of the cabinet are members of the MPP.

Presidential elections were held in Mongolia on 24 May 2009. The Presidential election campaign was dominated by anti-corruption rhetoric and intense populist pressure to distribute the revenues from strategic mineral deposits. Tsakhiagiin Elbegdorj (DP) was elected as the fourth President of Mongolia with a majority vote of 51 per cent.

2.6.2 international relations

The government is expected to continue its pragmatic approach to foreign policy, reflecting the influence of its larger and more powerful neighbours. The main focus of foreign policy will remain the need to balance relations with Russia and China. Mongolia is fully dependent on Russia for fuel imports, which amounted to approximately US$678 million in 2010 (NSO 2010b). However, China is Mongolia's biggest trading partner.

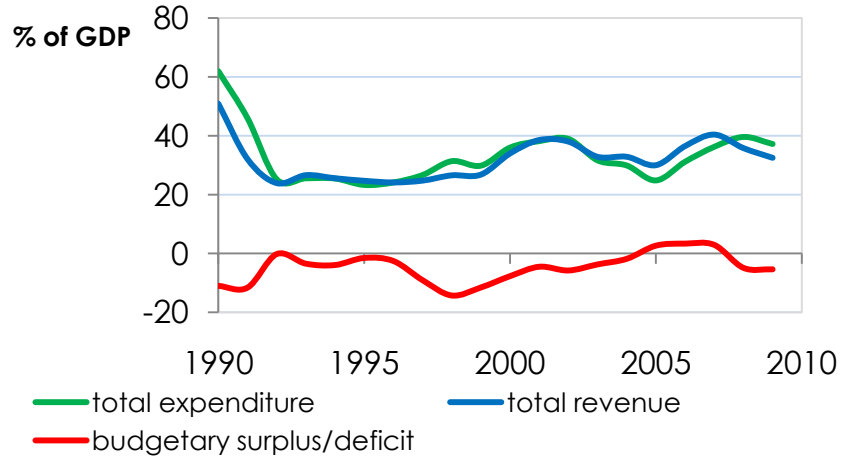
The Government is also keen to reduce it dependency on its neighbours. As such Mongolia's foreign policy attaches great importance to developing relations with what it calls 'third neighbours', or countries that are supportive of its young democracy, even if they are not close geographically. Foremost among these are the United States and Japan, who are substantial aid donors and important counterweights to Mongolia's dependence on Russia and China. The intention is also to expand relations with India, the Republic of Korea, and ASEAN countries and gain membership in the APEC group.

2.7 fiscal policy and public finances

There are three points worth noting about the Mongolian Government's fiscal policy during the boom years of the previous decade: first, the government became increasingly dependent on mining revenues; second, it used the extra revenue to fund unsustainable and inefficient projects; and third, it did not run sufficient surpluses in the boom years to fund a down turn. Each point is explained in further detail below:

- Over the boom period, the budget became increasingly dependent on revenues from mining. At its peak, mining-related revenue accounted for 43 per cent to government revenue. When prices fell, profit taxes and royalties also fell, and because the central bank pursued a de facto peg of the local currency to the dollar, there was a direct transmission of the falling international copper price to tax revenues. The revenue intake in January 2009 was 61 per cent lower than the previous year in real terms mainly reflecting the fall in mining revenues. Revenue as a percentage of GDP rose from 30 per cent in 2005 to over 40 per cent in 2007 before falling back to 36 per cent in 2008 and 33 per cent in 2009 also reflecting the fall in mining revenues (Figure 2-23).
- Rising revenues were used to fund several unsustainable and inefficient projects. For instance, social transfers proliferated: in 2008 six per cent of the budget was spent on the Child Money Program alone. Moreover, the program did not target the poor, and as a result a substantial portion of the money was received by relatively well-off households. Capital expenditures also increased sharply from eight per cent of the budget in 2004 to 20 per cent in 2008 in the hope of addressing Mongolia's urgent infrastructure requirements, but projects frequently lacked feasibility studies. As a result of years of extremely poor public investment planning the allocative and operational efficiency of these new investments was low (World Bank 2010c).
- The government ran modest fiscal surpluses during the boom years, which were insufficient to absorb the fiscal shock caused by the collapse of mineral prices. In 2008 Government expenditure outstripped revenue changing the budget surplus from two per cent of GDP in 2007 to a deficit of five per cent GDP in 2008 (Figure 2-23).

Figure 2-23: Mongolian government finance



Source: ADB (2010b)

Government action in light of falling revenues was relatively limited initially, with Figure 2-23 clearly showing that as a percentage of GDP, expenditures kept rising well after revenues had begun to fall. However, IMF intervention brought government expenditure down to 37 per cent of GDP in 2009 from 40 per cent in 2008. The largest cuts were unsurprisingly made to capital expenditure and subsidies. The recent recovery in copper prices has also helped improve fiscal balances by increasing revenues. By March, 2010, the annual growth in total revenue and grants was 61 per cent higher in real terms due to strong annual growth in corporate income tax (up 92 per cent in real terms year on year), the windfall profit tax (12 times higher), VAT (up 63 per cent), customs duties (up 39 per cent) and royalties (more than double), all reflecting the recovery in real economic activities, imports and favourable commodity prices (World Bank 2010c). As a result the fiscal balance target for 2010 is down to 3.6 per cent, from 6 per cent of GDP in 2009 (World Bank 2010c).

2.7.1 future expenditure plans

Government spending has begun to rise again in recent months. Planned increases include a 20 per cent rise in expenditure above the original 2010 budget. This is equivalent to 4.5 per cent of GDP. A further increase in spending is planned in 2011; the planned rise is equivalent to 12 per cent of GDP. The combined impact of the increases would take fiscal expenditure to almost 51 per cent of GDP in 2011. The budget amendments, which are outlined in the 2011-2013 Mid-Term Fiscal Framework, mark a rapid return to the pro-cyclical fiscal policy that was at the heart of the 2008-09 crisis.

The main driver for the increases is the execution of promises made by both coalition parties to distribute 1.5 million MNT (around US$1000) to each citizen in the form of cash and non-cash handouts and large public sector wage increases in October 2010. The government has already distributed 70,000 MNT (approximately $50) to each citizen in February 2010 and another 50,000 MNT (approximately $36) by the end of 2010. The initial distribution of 70,000 MNT in February was criticised for fuelling inflation. As a result the government recently decided to distribute MNT 10,000 (a little over $7) every month to every Mongolian citizen starting from August 2010 and has increased this amount to MNT 21,000 per month (approximately $15) starting from January 2011.

2.7.2 fiscal stability law

Mongolia's experience is in sharp contrast to that of Chile, which had a flexible exchange rate and a fiscal stabilisation policy. In contrast to Mongolia, Chile was able to self-finance a large stimulus package to support its economy by drawing on large fiscal savings made during the boom years under its structural balance rule.

A Fiscal Stability Law was recently passed by parliament, following recommendations from the IMF's technical assistance team (Ministry of Justice and Home Affairs 2010). The adoption of, and adherence to, the Fiscal Stability Law will be key in Mongolia's efforts to constrain fiscal spending to prudent and sustainable levels. The law establishes a

Stabilisation Fund: in times of economic growth the fund will grow and in times of economic slowdown the fund will be used to finance the budget deficit from the accumulated capital and to assist in keeping the budget stable. The law targets a structural budget deficit (along the lines of Chile's structural balance rule) of a maximum of 2 per cent of GDP from the 2013 fiscal year onwards.

The law also restrains expenditure growth to be no greater than (i) the non-mineral GDP growth rate of that particular year, or (ii) the average of the non-mineral growth rate of the preceding 12 years, whichever is greater. Exceptions to the Law can be made only if GDP growth is zero or less and if additional government expense due to natural disaster and other emergency situations is at least 5 per cent of GDP. The expenditure growth restraints will also be in place from the 2013 fiscal year onwards.

2.7.3 human development fund

The parliament approved a law to set up a fund (the Human Development Fund (HDF)) in November 2009, to distribute the profit from utilising strategically important mining deposits equally and fairly to all Mongolian citizens and to successfully manage the money flow in an effort to avoid inflation and Dutch disease.

The fund's revenue will comprise some combination of government dividends, royalty payments and advance payments generated from the mining sector. The proposals around how the fund will be spent remains fairly vague: the intention is that every Mongolian citizen benefits equally from the fund. Payments from the fund might be in the form of pension and health insurance premium payments, mortgage payments, cash and health fees and tuition. Part of the money can be invested abroad and the return from it will be placed back in the fund.

2.7.4 public debt

The government plans to fund the upcoming rise in public expenditure detailed above by issuing a substantial amount of debt on international capital markets later in the year. Public debt is forecast to rise to 63 per cent of GDP in 2010, up from 34 per cent in 2008 (World Bank 2010b).

However, capital flows to emerging markets have dropped sharply amidst the financial market volatility arising from the Euro area's sovereign debt troubles. As a result, sovereign debt financing on commercial terms may be costly for a low-rated country like Mongolia.

2.7.5 the national development strategy (NDS)

The NDS is the government's ambitious program, which sets an overarching vision for Mongolia to become a middle-income country (within the next decade). It is the impetus for many of the government's recent initiatives. Priorities include achieving the Millennium Development Goals (MDGs), developing export-oriented, technology-driven manufacturing and services sectors, leveraging Mongolia's mining assets to generate growth (including downstream processing) and developing regional infrastructure.

The goal of the NDS is to help Mongolia increase GDP per person to at least US$5,000 by 2015 (from US$1,960 in 2008) (World Bank 2010c), and achieve an average annual economic growth rate of no less than 12 per cent between 2016-2021. The ultimate goal is to increase GDP per person to a minimum of US$12,000 by 2021.

It is estimated that the country will need $14 billion to achieve the Millennium Development Goals by 2015 and between $21-28 billion to achieve the real sector goals by 2021. Only 10 per cent of the financing for the NDS is to come from public funds, while the bulk (80 per cent) is expected to be financed by the private sector and foreign investment. Foreign loans and aid financing was estimated at 10 per cent.

2.7.6 industrial park

In order to achieve its goal of developing a processing industry that would provide economic diversification, one of the strategic goals of the NDS is to establish industrial and technological parks and complexes. To this end, the government is planning to build an industrial park in Sainshand, to the north east of Oyu Tolgoi.

The planned industrial park is expected to comprise a coal treatment plant, a coking coal plant, copper smelting,

construction material and oil refining plants and at least one power plant. The aim is to develop the processing sector, supply cement and iron domestically, reduce import dependence and stabilise fuel price by producing oil products. Progress on the establishment of the Sainshand industrial park is limited. The Prime Minister has instructed the working group to select a chief consultant and legal advisor for the project to review the legal environment in order to attract investors. The development will cost $14 billion, including $8 billion for the Sainshand industrial park but the Government has no detailed plan on how it is going to finance the project.

2.7.7 infrastructure

The Global Competitiveness Report 2010-11 ranks Mongolia 117 out of 139 countries for quality of overall infrastructure (World Economic Forum 2010). A lack of fiscal resources and poor public investment planning has been the major reason for poor performance on infrastructure. The Mongolian Government is turning to the private sector as a partner to reduce investment gaps. USAID and other donor organisations are supporting the Mongolian Government's initiative on private and public partnerships and providing technical assistance on creating a legal environment for these partnerships.

The NDS sets out a strategy designed to improve the transport network across the country. This includes increasing the capacity and traffic safety of railways, while the roads are to be upgraded so that they become a 'bridge' that connects Asia and Europe.

The Mongolian parliament has approved a new railway policy, which proposes the construction of four new Russian broad gauge railroads in an effort to reduce the country's dependence on China. The industrial park planning and construction will be directly linked to a new railway and other infrastructure development within the region and throughout the country. The first phase of the new railway project is to build 1000 km of railroad east from Tavan Tolgoi – Sainshand - BaruunUrt – Choibalsan by 2014. By 2021, Mongolia aims to construct a railway network that covers the whole country. It is estimated that US$2.5 million per km

or US$2.7-3 billion in total would be required for the construction of a new rail line to the Tavan Tolgoi coal mine (Ganbat 2011).

Mongolia is aiming to connect its road network to the Asian Highway link and CAREC via three corridors.[2] The length of the Mongolian Asian Highway link will be over 4000 km, 1,149km of which has already been constructed. The ADB has been providing technical assistance and financial aid for the project.

2.8 inflation and monetary policy

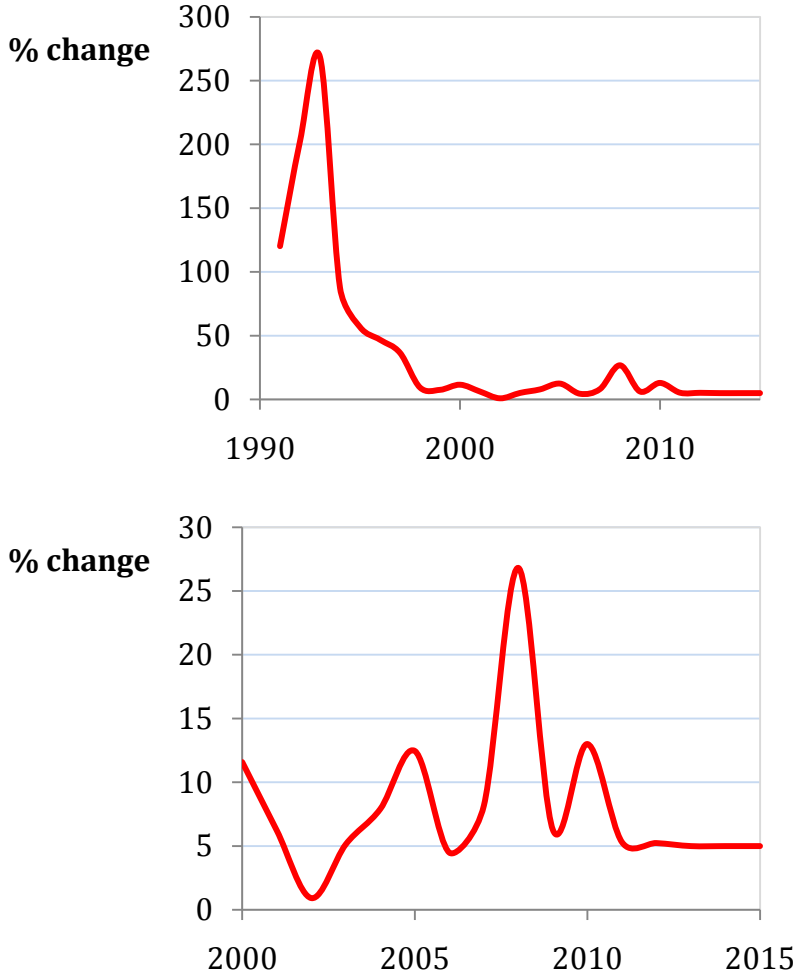
Between 2004 and 2008, the government's desire to maintain a pegged exchange rate allowed the BoM to increase its international reserves by purchasing foreign currencies. As a result inflation was quite high during the period. However, the move to twice-weekly foreign exchange auctions should help to mitigate inflation, but due to the expansionary fiscal policy being pursued by the government the benefits may be less than expected.

2.8.1 inflation

Inflation has been one of the most consistent concerns of the Mongolian economy. Mongolia had serious inflation problems after commencing market-based reforms in the early 1990s with annual inflation averaging 117 per cent between 1991 and 1997. Since 1998 however, inflation in Mongolia has been much lower with an annual average of only 8.9 per cent to 2009. Although the inflation rate was not particularly high during the boom years and authorities are tolerant of inflation around 10 per cent, the economy remains vulnerable to inflationary pressures.

[2] The Central Asia Regional Economic Cooperation (CAREC) Program is an ADB supported initiative which was established in 1997 to encourage economic cooperation among countries in the Central Asian region (ADB 2010a).

Figure 2-24: Annual inflation in Mongolia



Source: IMF (2010d) and BoM (2011a). Figures from 2011 are projections

As a result of the BoM's purchasing of foreign currencies the money supply (M2) grew more than threefold between 2004 and 2008. The inflation rate peaked at 34 per cent in August 2008 before falling to 23 per cent at the end of 2008. The BoM have consistently stated that their primary responsibility is to keep inflation at a low level. However, one of the reasons inflation remained at around 10 per cent is that monetary policy was pro-cyclical during the years of high commodity prices.

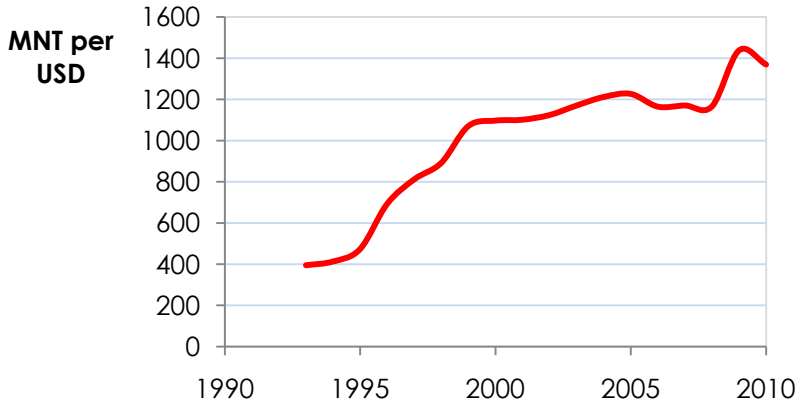
Recent data indicate that inflation is on an upward trajectory, reaching 11.7 per cent on an annual basis (BoM 2011a). Supply side factors, notably rising meat prices due to the severe winter in 2010 (meat is close to a fifth of the CPI basket) and an increase in regulated electricity prices, have contributed to inflation. Demand-pull factors have become important too, reflecting the closing of the output gap in the economy due to the rapid recovery and the February 2010 cash transfers.

High inflation severely undermines the purchasing power of poor people and savers. Furthermore, it carries the risk of a return to macro-instability and the possibility of a replay of the 2008-09 boom and bust crisis.

2.8.2 exchange rate

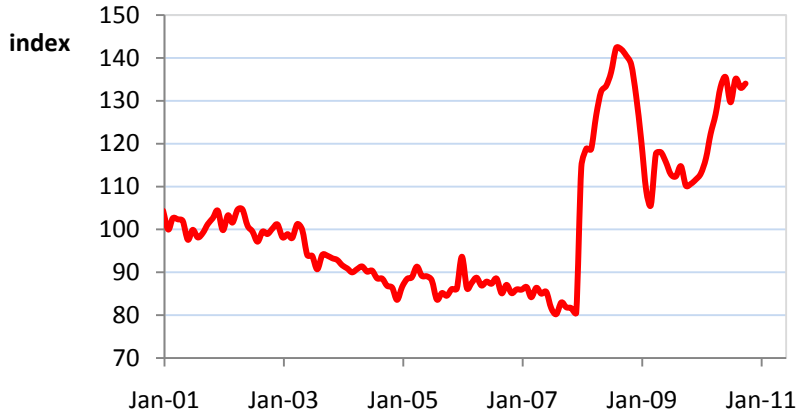
Since 1990, the Mongolian Tugrug has depreciated significantly against the US Dollar (Figure 2-25). While the depreciation stabilised somewhat throughout the first half of the 2000s, the financial crisis in the second half of 2008 caused a highly unstable foreign exchange market in Mongolia. Decreasing inflow of foreign currency, worldwide economic instability, vulnerability of the Mongolian economy and an increasing trade deficit all contributed to an increased demand for foreign currency, and put pressure on the Tugrug.

Figure 2-25: Nominal exchange rate between the Mongolian Tugrug and the US Dollar



Source: BoM (2011b). Note: 2010 is an estimate

Figure 2-26: Real effective exchange rate index of the Mongolian Tugrug



Source: BoM (2011b). 2000 = 100

Currency flight during the crisis period was further aggravated by the BoM's attempt to hold on to its de facto currency peg to the US dollar. This was in contrast to other major commodity exporters (such as Chile) who let their currencies freely depreciate as a first defence mechanism against falling international commodity prices. In the process, the BoM ran down its international reserves by US$500 million between July 2008 and February 2009 but the currency depreciated anyway, by about 38 per cent

between the end of October 2008 and the middle of March 2009.

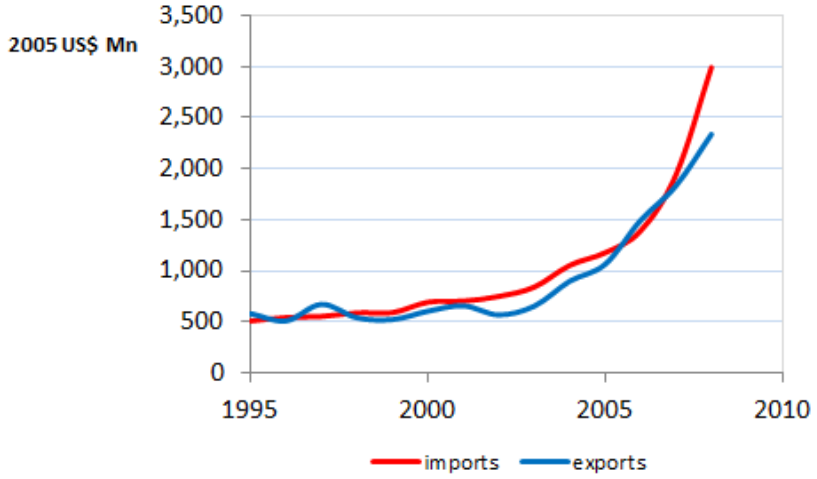
In March 2009, the BoM abandoned its de facto peg and introduced a transparent bi-weekly foreign exchange auctioning mechanism and raised interest rates to restore confidence in the local currency. These policy actions, combined with the narrowing of the trade deficit have resulted in a stabilisation of the nominal exchange rate since April 2009 and have enabled the BoM to rebuild international reserves by intervening on both sides of the market to smooth volatility and opportunistically build international reserves.

The central bank anticipates that, as the interbank market deepens, they will move away from their twice-weekly foreign currency auctions. There seems to be a consensus that a flexible exchange rate will be indispensable in the coming years to facilitate adjustment through the nominal exchange rate rather than prices (inflation). Moreover, a flexible exchange rate will help the economy absorb the large terms of trade shocks that are likely as a result of Mongolia's increased reliance on commodity exports (IMF 2010c).

2.9 international trade

International trade into and from Mongolia was relatively constant from the second half of the 1990s through to the early to mid-2000s with real annual imports and exports averaging less than US$600 million (2005 US$) throughout this period (Figure 2-27). The mining boom in the mid-2000s caused imports to grow with the fuel, materials, machinery and other equipment required to build and operate the mines being largely sourced from other countries. Growth in exports followed once the new mines commenced production.

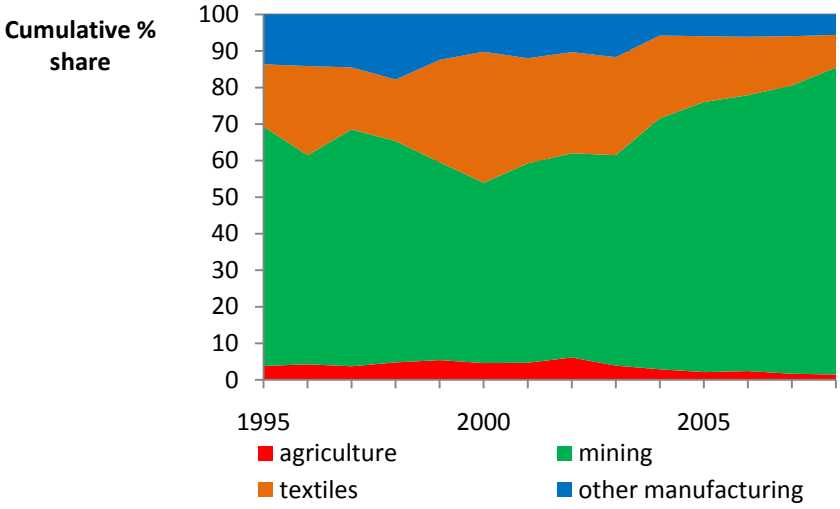
Figure 2-27: Annual real imports to and exports from Mongolia



Source: ADB (2010b) and IMF (2010d).

Minerals are Mongolia's most important export accounting for 84 per cent of total exports in 2008. Mongolia's other main export is textiles, which contributed 8.9 per cent of total exports in 2008 while, as noted earlier, agricultural output accounts for a relatively small share of exports (less than 1.5 per cent in 2008). Since 2000, the share of mineral exports has been growing while the share of other exports has been falling (Figure 2-28).

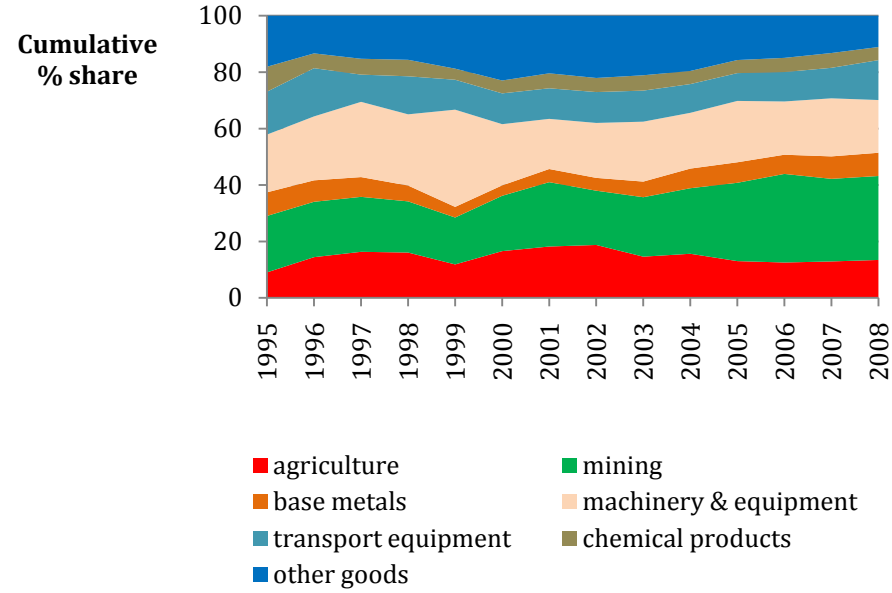
Figure 2-28: The share of total Mongolian exports by commodity group



Source: NSO (2010a)

Mongolia's major imports include agricultural products, mineral products and machinery and transport equipment. Due to the harsh climatic conditions and the associated limited scope for farming, agricultural products account for more than 10 per cent of Mongolia's total imports (Figure 2-29). Major import products in 2007 included flour, wheat, sugar, tobacco and other edible products. Mongolia's largest import is mineral products, which primarily includes petroleum. In 2007, petroleum accounted for approximately 26 per cent of total imports.

Figure 2-29: The share of total Mongolian imports by commodity group



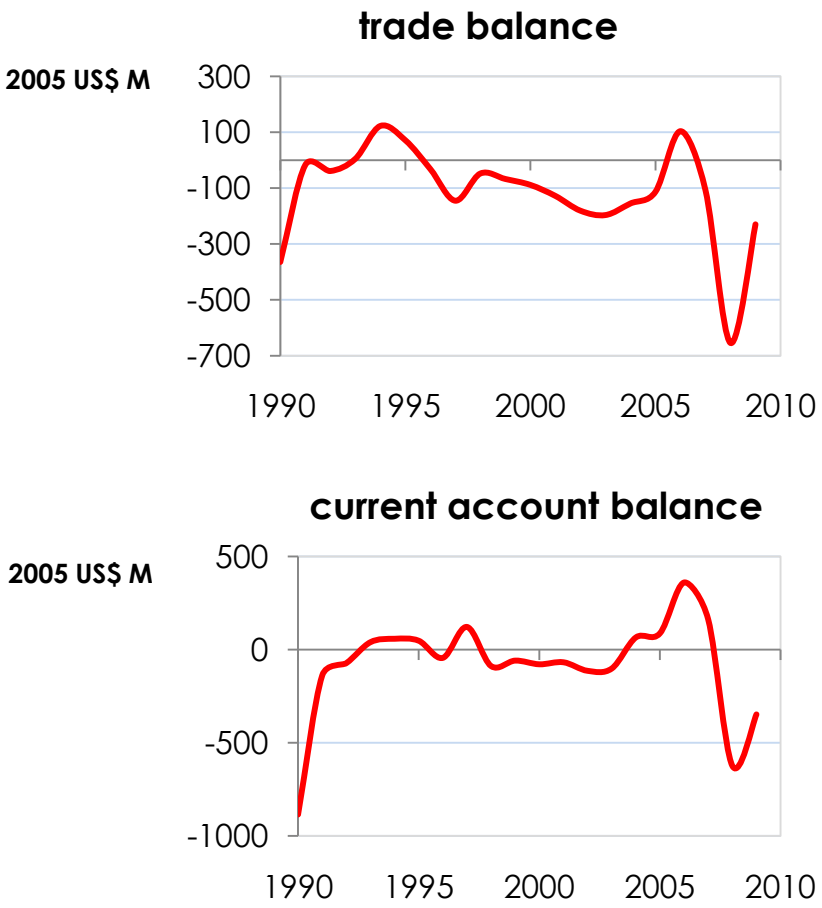
Source: NSO (2010a)

The global downturn affected Mongolia first and foremost through trade and in particular its trade in commodities. The combination of a collapse in prices and a downturn of the economies of its major trading partner, namely China had immediate consequences for Mongolia. China absorbs about 70 per cent of Mongolia's exports and China's growth slowed from 16 per cent in 2008, to 5 per cent by the first quarter of 2009. The result was a collapse in

demand for Mongolian exports. The consequences were exacerbated by the fixed exchange rate, which translated the collapse in global commodity prices directly into a collapse in domestic revenue.

The trade balance deteriorated rapidly during 2008 and early 2009 (Figure 2-30). The value of exports collapsed, and as a result the current account balance moved from a surplus of 6.7 per cent of GDP in 2007 to a current account deficit of 15 per cent by early 2009. Since then a slowdown in imports, improvements in Chinese demand and the recovery in commodity prices have contributed to a strong current account recovery. The deficit is currently 4 per cent of GDP. As the domestic economy recovered following the global financial crisis, the decline in imports also moderated. The first monthly year-on-year increase in total imports since December 2008 was achieved in January 2010.

Figure 2-30: Mongolia's trade and current account balances



Source: ADB (2010b) and IMF (2010d)

Direct investment by foreign companies, mainly in the mining sector, increased substantially over the course of 2010 but remains about 10 per cent lower than 2008 levels. Net borrowing from abroad by both government and the private sector jumped in 2009, due to the donor disbursement and loans to the commercial banks.

Forecasters expect the trade balance to worsen next year as a result of a surge in imports associated with the development of the Oyu Tolgoi mine. In coming years, the current account deficits will be largely financed by FDI

inflows and private loans. Large current account surpluses are expected after production at Oyu Tolgoi begins around the beginning of 2013.

2.10 the financial sector

Mongolia's financial sector consists mostly of a banking sector dominated by commercial banks. There are 15 commercial banks in total, two of which are under government control: Anod, the fourth largest bank collapsed in December 2008, followed by Zoos Bank the fifth largest in 2009. The commercial banks account for around 95 per cent of the financial sector, but the sector is heavily concentrated, with the four largest banks holding approximately 80 per cent of the deposit base and one business group owning three of the smaller banks.

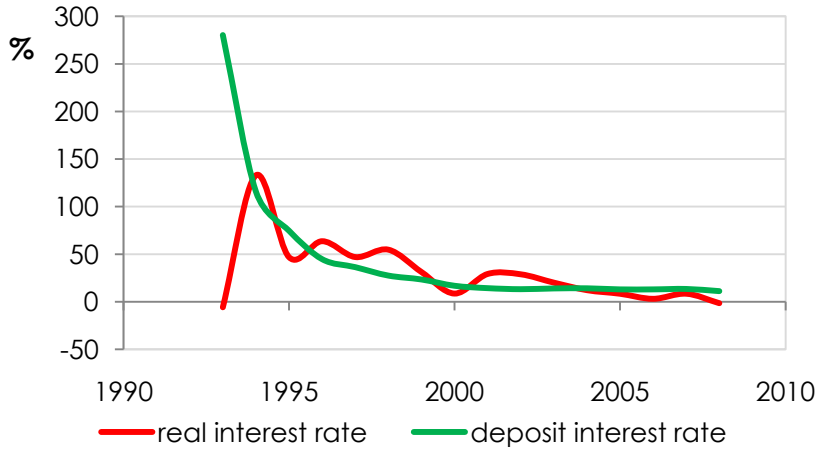
Mongolia's banking sector is relatively 'conservative' in its operation and is not set up to facilitate local entrepreneurship. Mongolian firms generally lack access to international capital markets and must rely on bank loans to finance their activities, but most of the loans are under one year maturity. In addition, the high interest rates and severe collateral requirements put Mongolian firms at great disadvantage in terms of their access to capital.

2.10.1 the financial crisis and the banking sector

In 2008 the banking sector deteriorated significantly due to the impact of the global financial crisis. The two main financial sources for banks, deposits and interbank financing, became vulnerable. High inflation and the resulting negative real interest rates (almost zero by the end of 2008) (Figure 2-31) made bank deposits unattractive and Interbank transactions shrank significantly, as the trust among banks was weakened after the collapse of the fourth largest bank (Anod) in December 2008, followed by the fifth largest (Zoos) in 2009. As a result, commercial banks started having liquidity problems and stopped issuing new and long-term loans to the private sector and consumers. Businesses suffered from lack of access to finance, the construction sector stalled, and firms stopped hiring.

Consequently, new loans fell to almost zero by the end of 2008.

Figure 2-31: Interest rates in Mongolia



Source: World Bank (2010d). The real interest rate is the rate charged by banks on loans to prime customers adjusted for inflation as measured by the GDP deflator. The deposit interest rate is the rate paid by commercial or similar banks for demand, time or savings deposits

As the economy recovers, deposits are slowly returning to the banking system. However the banking system remains under stress following an increase in non-performing assets and falling capital adequacy ratios (even after excluding Anod and Zoos Banks).

2.10.2 financial sector regulation and restructuring

Regulation of the Mongolian financial system could be significantly strengthened and there have been several measures to do so. With guidance from the IMF, the Banking Law was amended in January 2010 increasing the Central Bank's intervention powers to improve governance. A new bank restructuring strategy was drafted by the BoM and is pending discussion by parliament. The strategy focuses on three main principles including corporate governance, bank deposit insurance provided by the government, and the introduction of a transparent recapitalisation process.

2.11 poverty

It is commonly believed that the best way to combat poverty is to create economic growth. If economic growth is higher then the unemployment rate will be lower and the alleviation of poverty will be faster. In the case of Mongolia, the recent high economic growth achieved through high commodity prices and the accompanying rise in employment was effective in alleviating poverty at the national level. The proportion of the population living on less than $2 a day (PPP) fell from 49 per cent in 2005 to 14 per cent in 2008 (Table 2-5). However, this reduction was most likely not equally distributed throughout the country with the income share held by the highest 10 per cent increasing between 2005 and 2008 while that held by the lowest 10 per cent remained constant.

Table 2-5: Income-based indicators of poverty in Mongolia

	1995	1998	2002	2005	2008
Poverty headcount ratio at $2 a day (PPP) (% of population)	44	68	39	49	14
Income share held by highest 10%	25	23	25	25	28
Income share held by lowest 10%	3	3	3	3	3

Source: World Bank (2010d)

While there is insufficient data on the topic, it is likely that the poverty reduction described above was also not geographically equal. Urban areas and rural areas where mines are located would most likely account for most of the reduction at the national level. Poverty in rural areas where there is little or no mining may have remained the same or even deteriorated in recent years. Other disparities arise between the rural and urban areas in terms of employment, education, health and contribute to the widening income inequality that has occurred in recent years. Poor households tend to live in rural areas with limited employment opportunities, have fewer livestock and generally, have more children. Poverty incidence in rural areas is nearly twice that of urban areas. This is primarily because herder families, which comprise over a

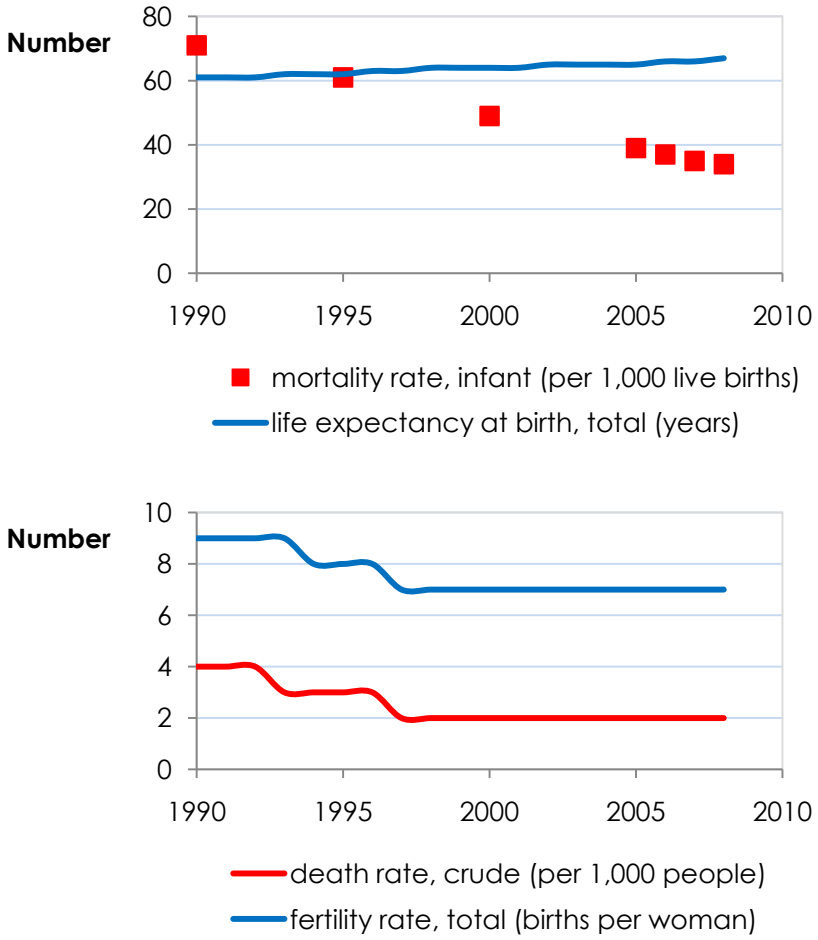
third of the workforce, are extremely vulnerable to poverty, since livestock mortality is highly dependent on external shocks such as extremely cold winters and/or drought that are both regular and unpredictable.

In urban areas heating and food costs are the largest expenditures for poor households. It is estimated that poor households spend one third of their annual budget on coal purchases for heating (World Bank 2010a). A significant proportion of their income is also spent on food and in particular on meat; total expenditure on meat is high relative to household income, due to high transportation cost, the lack of efficient and large-scale meat production, and the poor supply chain. According to the CPI measure, meat constitutes 17 per cent of household expenditure.

2.11.1 non-income based measures of poverty

Mongolia has also made significant progress in non-income based measures of poverty, however in this area, the improvements were made before the mining boom commenced (Figure 2-32). For example, the infant mortality rate fell from 71 per 1,000 live births in 1990 to 39 in 2005 and 34 in 2008. The crude death rate fell from 9 per 1,000 people in 1990 to 7 in 1997 and has remained constant since. Life expectancy at birth has also increased from 61 years in 1990 to 67 years in 2008.

Figure 2-32: Non-income based measures of poverty in Mongolia



Source: World Bank (2010d).

In April 2005, the Parliament of Mongolia passed a bill on Mongolia specific MDGs. The bill contained nine goals to combat poverty, improve education, health care and living conditions, strengthen democracy and justice, protect human rights and freedoms and promote gender equality. As mentioned above, in 2008 the parliament passed a bill endorsing a National Development Strategy (NDS) based on MDGs to be implemented through 2015.

One objective of the NDS is to reduce the number of people living under the poverty line by half. In part, this drove policy for the social assistance programs. However,

the social assistance programs such as 'Child Money' did not target the poor.

3 the impact of mining sector growth on economic development

Mining sector growth can have both positive and negative impacts on economic development. Growth in the mining sector should increase GDP and GNP as the per-unit returns to labour and capital (including that which is domestically owned) rise on average and the supply of natural resources increases. Where capital and labour have to be imported to make up for domestic shortages, the impact on GDP should be larger than otherwise.

In practice however, growth in the mining sector has historically being a major problem for some developing countries that have not successfully managed the structural adjustments that occur as a consequence of the disproportionate growth of a single sector. This has been so prevalent that much of the literature on the impact of mining sector growth on economic development focuses on the so called 'resources curse'.

The concept of a 'resources curse' refers to a paradoxical phenomenon observed in the post-war period – that countries with large endowments of natural resources often perform worse in terms of economic development than countries with fewer resources (Humphreys *et al.* 2007). For example, while the 'tigers' in mineral-poor East Asia (Hong Kong, Republic of Korea, Singapore and Taiwan) maintained very high growth rates from the early 1960s to the 1990s, the economies of mineral-rich Latin America stagnated or declined (Weinthal and Luong 2006). The literature in the 1990s and early 2000s then appeared to offer 'proof' that an abundance of natural resources acts as a drag on economic development (Sachs and Warner 1995; Gylfason *et al.* 1999; Sachs and Warner 2001; Neumayer 2004).

However, more recent literature contests this view. While many countries in sub-Saharan Africa and Latin America seemed to fit the resources curse stereotype, the existence

of notable success stories such as Chile, Botswana, Norway and Australia suggest that natural resource abundance can be a blessing rather than a curse. A more balanced assessment is that the poor economic outcomes associated with the so-called 'resources curse' can be accounted for by domestic and macroeconomic policy failures rather than natural resource abundance itself.

These economic policy failures are, in turn, associated with badly functioning institutions and governance arrangements. Countries with sufficiently good institutions that have avoided pursuing detrimental economic policies have instead benefited from natural resource abundance (Collier and Goderis 2008).

3.1 the role of economic policies

Many explanations as to why an abundance of natural resources seems to be related to low economic growth have been advanced. Although the boundaries are often blurred, one can broadly distinguish explanations that are more directly 'economic', for instance, poor macroeconomic policies, and 'politico-economic' explanations that focus on institutional failure as the central mechanism by which these poor decisions come about.

3.1.1 dutch disease

The most prevalent impact of mining sector growth on economic development is described in the literature as 'Dutch disease'. The mechanics of Dutch disease operate via the 'windfall' revenues that newly resource-exporting countries earn from export booms (Weinthal and Luong 2006). These windfalls lead to an appreciation of the real exchange rate (that is, the rate of exchange between the domestic and international currencies adjusted for inflation). Production inputs (capital and labour) are attracted to the booming resources sector and to the 'non-tradable' sector – retail trade, services, and construction. The effect of the exchange rate appreciation and the migration of labour is to reduce the competitiveness of non-booming export sectors such as agriculture and manufacturing, resulting in a contraction in these sectors.

At the same time, strong demand for capital and labour in the services and construction sectors tends to accelerate domestic inflation unless appropriate macroeconomic policies are in place.

These short-term macro-adjustments have lasting impacts on economic growth by reducing a country's economic diversity. This increases the country's reliance on the natural resources sector for export and government revenue and employment. Given the cyclical nature of commodity prices, this increased reliance on a sector can mean that key macroeconomic variables, such as government tax revenue, become highly volatile.

Explanations of why a country's economy may be damaged permanently as a result of increasing dependence on the mining sector focus on associated structural changes in the economy, in particular on the impact on the manufacturing sector. It has been postulated that a decline in the size of the manufacturing sector decreases both the demand for and the supply of skilled labour, so that a country's human capital is damaged. In addition, it has been argued that education and training seem to be crowded out by a rich endowment of natural capital.[3] A number of recent studies have found that school enrolment at all levels and public expenditure on education relative to national income are inversely related to natural resource abundance (Birdsall *et al.* 2001). However, this is not apparent in countries such as Australia where the existence of a strong mining sector has led to the rapid expansion of the export of mining technology and services and the development of human capital associated with those new industries.[4]

[3] For example, Gylfason (2001) argues that nations rich in natural resources systematically under-invest in education as a proportion of national income, and consequently pay less attention to the accumulation of human capital (i.e. the skills and knowledge of workers that are derived from education and training).

[4] For example, in Australia in 2001, 89 per cent of employed persons in the mining industry were participating in training

Other explanations centre on misguided government policies to invest in specific sectors or projects and/or to protect and subsidise non-resource sectors that are weakened by the resources boom (Stevens 2003). In the medium term, subsidies that protect a sector against international competition or aim to make it competitive aggravate the problem because they reduce the incentive to remain competitive. Furthermore, the costs of such protection on other tradable sectors are well established (Gregory 1976; Crowley and Martin 1982; Parmenter 1986; Centre for International Economics 2003; Econtech 2003; Productivity Commission 2008). The cost of such protection eventually becomes financially unsustainable when the boom ends and a country's earnings from natural resources fall. The list of countries that applied failed protectionist strategies is long and includes Bolivia, Guyana, Chile (for a time), as well as Zambia, Zaire, and Congo (Sarraf and Jiwanji 2001).

In many instances subsidies have also failed to meet their specific objectives. Some of the general trends identified are a tendency to invest in the military, in projects that offered very low rates of return, but also a tendency to invest in heavy and capital intensive industries, rather than labour intensive manufacturing industries better suited to the productive capability of a country. Examples of these misguided investments abound. In sub-Saharan Africa the 1970s resources booms created huge problems, of which extravagance, waste and expansion of the state were the most obvious (Shaxson 2005). In Nigeria, the Ajaokuta steel project, built in 1979 for several billion dollars, did not produce a steel slab in 25 years. From 1975 to 1983, capacity utilisation in the Nigerian manufacturing sector fell from 77 per cent to 50 per cent, then to 35 per cent by the mid-1980s – two thirds of investment in manufacturing – most of it financed by the government – has been wasted.

compared to 84 per cent of employed persons in Australia in total (ABS 2003).

3.1.2 revenue volatility and borrowing

As was stated above, the increased reliance of a country on the natural resources sector resulting from 'Dutch disease' can intensify the cyclical nature ('boom and bust' cycles) of economic growth and associated variables. Of particular concern here is government revenue.

Revenue volatility comes from three sources – the variation over time in rates of extraction, the variability in the timing of payments and fluctuations in the price of the natural resource produced. Income volatility may be further compounded by interruptions resulting from political instability and conflict, and is magnified by export concentration – the dependence of a country on a particular export commodity. This concentration can leave a country and the fiscal balance vulnerable to sharp and sudden declines in the terms of trade.

For example, it was noted in chapter 2 that copper ores and concentrates is Mongolia's most important export and the Erdenet mine accounted for over one quarter of Government tax revenues in the past. When copper prices declined in 2009 with the global financial crisis, the Mongolian economy contracted by 1.6 per cent compared to growth of 8.9 per cent in 2008.

Highly variable earnings can lead to fluctuating levels of government revenues and make long term planning difficult. Frequent upward or downward adjustments of fiscal expenditure ('stop and go' policies) both discourage private investment and wreak havoc on the government's budget. Moreover, once expenditures become well-established, it becomes hard for governments to make budget cuts (Weinthal and Luong 2006). Rather than reversing their spending patterns during busts, governments have often opted to borrow and incur large debts in the process.

Bolivia is an example of a country that has been caught in such a debt trap (Sarraf and Jiwanji 2001). Bolivia suffered from Dutch disease – its real exchange rate doubled between 1979 and 1983, so that non-mining activity became uncompetitive and its share of exports slumped.

The country's manufacturing sector was protected and produced uncompetitive outputs, and the efficiency of new investments was low. A large share of the mineral windfall revenues was spent on higher consumption, rather than investment. To compound these effects, the government used its hydrocarbon reserves as collateral for foreign borrowing, which increased to 78 per cent of GDP from 1975 to 1979.

Excessive borrowing is not confined to 'bust' parts of the cycle, but also occurs during booms. Many resource-rich countries have followed an ill-advised strategy of borrowing on the strength of commodities booms. When commodity prices were high in the 1970s, many developing countries were able to borrow from international capital markets. When prices fell, these countries could not service their debt, resulting in lower economic growth in the 1980s and beyond. This explains why six out of the top ten most indebted countries in Africa in 2004 were major fuel exporters (Manzano and Rigobon 2001). Zaire's external debt nearly doubled from 1979 to 1980 to over 100 per cent of GDP. In Nigeria, amid optimistic long-term revenue forecasts, external debt rose nearly tenfold to $5 billion between 1970 and 1980, and then to $10 billion by 1982. Outside of Africa, Ecuador (one of the smallest countries in South America) ranked seventh in the region for external indebtedness and had the highest debt per person.

3.1.3 other policy failures

As already noted above, other sectors of the economy can become damaged not only by Dutch disease, but also by misguided industrial policies in the form of unproductive investments, trade-barriers and rent-seeking.

Export booms can exert pressure on governments to share increased revenues with the public, often by investing in unproductive public work projects that are motivated by politics rather than profit (i.e., 'white elephants'). Alternatively, governments may adopt a policy of subsidising food, fuel, failing industries and even government jobs. Trinidad and Tobago is an example of a country where in the past public pressure to share the benefits of a natural resources boom led to large subsidies

for food, fuel, utilities, and loss making enterprises (Sarraf and Jiwanji 2001). By 1981, when GDP growth was negative, cutbacks were extremely difficult to make.

More generally, the existence of a resource boom may create a 'rentier effect' whereby sections of a country's population become dependent on the largesse of the state, in terms of employment and advancement opportunities (Dietz *et al.* 2004). As a result, existing technological and entrepreneurial talent fails to develop. Sub-Saharan Africa is notorious for bloated bureaucracies and rapidly increasing civil service salaries (Shaxson 2005). The national oil companies and associated state-owned enterprises that were built in the boom years fostered constituencies that constitute powerful groups to defend their economic interests, often to the detriment of the wider national interest.

Beside the immediate cost of failed investment and expenditure programs, the consequences of these policies have also been spiralling inflation, and the collapse of private savings and investment. There is in fact a strong statistical link between low investment and savings rates, on one hand, and resource abundance on the other (Dietz *et al.* 2004). World Bank data, for instance, show that the most resource-abundant countries of the world have also had the lowest savings ratios over the past thirty years, and that many of these countries have had persistently negative savings rates.

Neumayer (2004) concludes that resource booms allow resource-intensive economies to sustain economically harmful policies for longer than would otherwise be the case. There is considerable evidence in data across many countries that natural resource abundance allows countries to engage in excessive consumption that is not sustainable into the future, and which eventually leads to low or negative GDP growth (Gylfason and Zoega 2002; Atkinson and Hamilton 2003).

3.2 political-economic explanations

Much of the discussion of the policy failures listed above has a common theme in that the quality of a country's institutions and governance arrangements seems to have played a key role in determining development pathways. The effects of the many harmful economic policies that have been adopted over the years – excessive consumption and borrowing, a failure to invest in human capital and value-adding infrastructure, and misguided government intervention – have been well-understood for many years. Nonetheless, these policies have been frequently pursued at great economic cost to the country in question.

There is now a widespread acceptance that institutions and institutional functioning are the crucial link between resource endowments and the economic policies that have been adopted, on the one hand, and economic outcomes, on the other (Murshed 2004). Weak institutions and governance arrangements are typical in many resource-rich economies that have failed to capitalise on their natural wealth and that are usually associated with the 'resources curse'.[5] The statistical evidence suggests that countries with institutions characterised by the weak rule of law, a malfunctioning bureaucracy, and corruption fare far worse economically than countries that attract entrepreneurs into production and take full advantage of their natural resources. Conversely, good institutions are associated with better economic outcomes, in terms of savings, investment, and economic growth (Atkinson and Hamilton 2003). These results are also reflected anecdotally and in country case studies.

There are many ways in which poor institutions contribute to the resources curse, and the following lists only a subset of

[5] The types of indicators used for these analyses measure, among other things, perceptions about political risks facing overseas investors, the rule of law and the protection of property rights, the extent of political checks and balances, and the form of the political system (e.g. democracy or autocracy).

the explanations that have been advanced as follows (Boschini *et al.* 2007).[6]

- Because windfall rents from commodity booms are often concentrated and easily obtained they create pressures to engage in 'rent-seeking' (for instance, by attempting to gain control of valuable natural resources, lobbying, or other non-productive activities) and corruption, all of which harm economic growth. An example of this is Pertamina, Indonesia's state oil company that became a source of great income for actors closely aligned with the state in the late 1960s and early 1970s. These mineral rents became a source of patronage for the Indonesian military.
- A related area in institutional malfunctioning concerns the allocation of entrepreneurial talent (Murphy *et al.* 1991). The basic theory is that the existence of large profits ('rents') from natural resources makes corruption, predation and rent-seeking more attractive options. This incentive is greater in states where law and contract enforcement is weak.
- Another theme in the literature relates to the existence of conflict in resource rich economies (Stevens 2003). This line of argument suggests that valuable natural resource revenues create a 'pot' that is worth fighting for. Conflict is also linked to poverty, and its effect is to hurt the poor more than the rich, as well as wasting resources that could otherwise go into productive activities.

There is now a consensus of opinion that the framework of governance, including respect for property rights, contract and law enforcement, the rule of law and administrative capacity is crucial in determining the impact on economic development from natural resources.[7] For example,

[6] What is not clear is the direction of causality. Does resource abundance weaken institutions, or do existing weak institutions destroy the value of natural resources?

[7] In turn, this has encouraged a very substantial literature on what makes for good institutions and governance as related to natural resource endowment.

favourable politico-economic factors that have helped Australia to avoid the 'resources curse' include (Ahmed *et al.* 2008):

- a highly accountable public service and government;
- well-defined property rights, strong legal and other institutions and relatively low corruption, and
- a relatively low risk of international and domestic conflict over natural resources.

3.3 country case studies

A good way to see the positive impacts of mining sector growth on economic development is to look at case studies of countries that are considered as having benefited from natural resource abundance. Given that the focus of this impact assessment is on a developing country, it is worthwhile to consider the experiences of Botswana and Chile in managing the growth of the mining sector.

3.3.1 Botswana

Botswana is regularly cited as one country that has been able to avoid the so-called 'resources curse'. In 1967, large diamond deposits were first discovered in Botswana and in 2010, approximately 22 per cent of world diamond reserves were located in the country (USGS 2010). Along with comparatively minor amounts of copper and nickel, Botswana is a natural resource abundant country.

Development of the diamond industry fuelled economic growth. Between 1960 and 2008, Botswana's GDP grew at an annual average of nearly 10 per cent (IMF 2010d) and from 1966 to 1989 it was the fastest growing economy in the world (Sarraf and Jiwanji 2001). This extraordinary growth record helped lift Botswana from being one of the 25 poorest countries in the world in 1966 to an upper middle-income economy in 1998. In the process, Botswana has achieved remarkable improvements in infrastructure, human development and basic services, for example:

- Paved roads: 23 km in 1970 (Lange and Wright 2002), increased to 8,513 km by 2005 (World Bank 2010d)
- Safe drinking water: 29 per cent of the population in 1970 (Lange and Wright 2002), increased to 95 per cent in 2008 (World Bank 2010d)
- adult literacy rate: 69 per cent in 1991, increased to 83 per cent by 2008 (World Bank 2010d)
- Real per person income: US$250 in 1960, to US$4800 in 2008 (in constant 2000 US$) (IMF 2010b).

In 1966 when Botswana declared independence, agriculture was the single largest sector. The minerals sector however, grew so rapidly that it became the largest sector by the end of the 1970s (Leith 2000). Today, the diamond-mining sector contributes more than one-third of GDP, around half of government revenues, and 70-80 per cent of exports (CIA 2010). Botswana's economic success can be attributed to the transformation of the initial source of growth (the minerals sector) into sustained economic growth and significant progress in human development. Government policies were a primary factor behind the successful transformation including prudent fiscal management policies and policies that encouraged economic diversification (Sarraf and Jiwanji 2001).

fiscal management

Prudent fiscal policy in Botswana is largely attributed to the National Development Plans. Currently in its tenth iteration, the plans determine the country's spending priorities over a five to six-year cycle by setting targets for public expenditures that are consistent with expected government revenues based on long-term forecasts of export earnings and the capacity of the economy. The evaluation process is largely driven by technical expertise and not political considerations. The legislative procedure requires parliamentary approval for any new public project after the National Development Plan is passed, ruling out the government as a source of instability in the economy. With this planning process and a strategy of savings during boom times, government expenditures have grown at a slower rate than revenues, resulting in the accumulation of

substantial savings and foreign reserves, which serve as an important shock-absorber in market downturns. At the end of 2006, Botswana's foreign currency reserves amounted to 75 per cent of GDP (Delechat and Gaertner 2008). Earnings on these reserves became the second largest source of government revenue by the 1993-94 fiscal year (Leith 2000).

This has provided an important source of stability for the economy. In the early 1980s, weakness in the diamond market resulted in no sales of diamonds for about half a year, which forced the country to utilise the foreign exchange reserves, but the government was able to avoid drastic cuts in expenditures. The recent market downturn resulting from the global financial crisis also caused a collapse in demand for diamonds and forced operators to suspend mining activities in late 2008. Debswana produced 24.6 million carats in 2009, only about half of its 2008 production (Debswana 2011). This drop in production led to substantial revenue losses for the government. However, the fiscal surpluses from previous years and the ample foreign reserves allowed the government to continue the major spending programs in the budget with only a small number of projects cut or postponed, thus avoiding a pro-cyclical policy which would have aggravated the recession (African Economic Outlook 2011).

With the high level of savings, the government's allocation of its surpluses between reserves and domestic investment becomes a significant issue. The part of recurrent surpluses not invested domestically is used to accumulate foreign reserves (Sarraf and Jiwanji 2001). Between 1976 and 2008, foreign exchange reserves increased from US$75 million to US$10 billion, which equalled 33 months of import cover (Bank of Botswana 2011). Domestic investment decisions are based on expected intermediate and long term revenue flow, taking into account recurrent expenditures and absorptive capacity of the economy and avoiding contributing to inflationary pressures. Embedded in the decision-making process is an important rule (Sustainable Budget Index) that states that all mineral revenues should be used for undertaking investment or capital expenditures and that recurrent spending must come from non-mineral

revenues (Iimi 2007). Botswana has invested its mineral revenues wisely, mostly on education, health, roads and basic infrastructure, which has promoted growth and mitigated the effects of 'dutch disease'.

exchange rate management and diversification

One of the main symptoms of 'dutch disease' is the appreciation of the real exchange rate and consequently the reduction of competitiveness for other export-based sectors in the economy. Botswana was able to avoid this largely through the accumulation of foreign reserves and management of the exchange rate. Recent IMF studies have concluded that Botswana's currency has not been significantly or consistently overvalued, and that the real exchange rate is broadly in line with economic fundamentals and external sustainability (Delechat and Gaertner 2008). Keeping the exchange rate from over appreciating helped Botswana promote diversification in the economy. Despite the disadvantages of a very small domestic market and its landlocked location, Botswana's industrial and manufacturing sectors have been growing at rates that are relatively higher than the average of upper-middle income and Sub-Saharan African countries since the early 1970s (Sarraf and Jiwanji 2001). During the recent economic downturn, when the mining sector contracted significantly, non-mining sector GDP grew by 12.4 per cent up from 7.1 per cent in 2008 (Bank of Botswana 2010).

In summary, Botswana's approach is considered to be an excellent example of resource management with a long-term perspective. With prudent economic management, it has shown that non-renewable mineral wealth can be turned into other forms of productive wealth, sustained economic growth and improvements in the quality of life of the general population.

3.3.2 Chile

A country blessed with abundant mineral resources, Chile is the world's largest copper producer, accounting for over one-third of world copper mine production in 2009 with mine output of nearly 5.4 million tonnes (International Copper Study Group 2010). Other mining products include

gold, silver, molybdenum, iron and coal. Chile's economy has performed well for the past few decades with GDP increasing almost fivefold from US$22 billion in 1973 to US$103 billion in 2009 and GDP per person rising from US$2,147 to US$6,083 over the same period(in constant 2000 US$) (World Bank 2010d). Its reputation for strong financial institutions and sound policy has made it a case study in fiscal management, economic liberalisation and structural reforms for developing countries, especially those that are mineral rich.

With copper constituting 45 per cent of exports and nearly one-third of government revenue (IMF 2010a), Chile's economy is highly vulnerable to the volatility in copper prices. Managing the volatility in copper revenues has been one of the most important fiscal challenges for the government.

In recent years, the Chilean economy has withstood two significant negative shocks – the global economic crisis and the devastating earthquake in February 2010. Favourable factors that helped the government to effectively manage the adverse effects included inflation targeting, a flexible exchange rate, adequate access to foreign financing, the copper stabilisation fund and prudent fiscal rules. Chile accumulated US$20 billion (equivalent to around 12 per cent of GDP) in its stabilisation fund over the decade to 2008 (Sinnott *et al.* 2010). This allowed the government to put in place a significant fiscal stimulus package (entirely domestically financed) in 2009 followed by an ambitious earthquake reconstruction program, while maintaining the credibility in the public finances (Frankel 2010).

The cornerstone of Chile's fiscal policy framework is its structural balance rule (World Bank 2010b). The rule serves to maintain fiscal discipline and insulate government expenditures from copper price fluctuations and business cycles. Independent panels of experts produce long-term estimates of the copper price and GDP trend to use in the calculation of the structural balance target for the budget, which is reviewed every year (Sinnott *et al.* 2010). Actual revenues above the structural revenues are saved into a Pension Reserve Fund and a Social and Economic

Stabilisation Fund, the proceeds of which are wholly invested abroad in conservative and liquid assets. The rule enabled the government to avoid spending pressures during the mining boom when it ran large fiscal surpluses. In the mid-2000s, actual fiscal surpluses grew to 9 per cent of GDP while expenditures were kept at 1 per cent (World Bank 2010b).

A secondary factor that enabled Chile to benefit from natural resource abundance was successful trade diversification policies. Export diversification became part of an overall development strategy to promote several strategic sectors (such as forestry) for export markets, and private-public partnerships were promoted.

With predictable and sustainable budgets and export diversification, Chile has been able to largely avoid the adverse effects of the boom and bust cycles that are inevitable with mineral dependence. Like Botswana, Chile provides a good example of the potential benefits that can flow from natural resource abundance.

3.4 policy recommendations

The literature on the impact of mining sector growth on economic development highlights some key factors that explain the paradoxical phenomenon that countries with abundant natural resources often fare poorly in economic terms. Bad macroeconomic and fiscal policies, as well as a pursuit of unproductive investments are generally the cause of these outcomes. In the great majority of cases, weak institutions are the 'transmission channel' via which these decisions are taken. On the other hand, the country case studies have shown that effective management of the fiscal flows from the exploitation of natural resources can mean that an abundance of natural resources is a blessing rather than a curse.

While resource rich countries all vary, in terms of the nature of their endowments, geography, history and institutions, it is possible to identify some high level recommendations that can form a basis for sustainable economic development.

3.4.1 fiscal and monetary policy

The accumulation of budget surpluses and avoidance of large-scale foreign debt enables mineral rich countries to smooth out expenditures during boom times and avoid borrowing during bust cycles (Weinthal and Luong 2006). These policies help to insulate the domestic economy from the volatility of commodity revenues and generate budget stability. Policies of this type were successfully adopted in Botswana and Chile as well as other countries such as Australia and Norway.

One mechanism that has been successfully applied to invest resource windfalls is an NRF (stabilisation or savings fund) such as that which exists in Chile, Venezuela, Norway, Oman, Iran and Alaska. Stabilisation funds aim to reduce the impact of commodity price volatility on the economy and improve budget predictability by stabilising spending patterns. When commodity prices are high, excess revenue is placed in the stabilisation fund, but when prices are low, revenue is transferred out to make up for budgetary shortfalls. Savings funds are intended to ensure that a share of the wealth will exist for future generations, even after the natural resources are depleted.

While such funds are found around the world in both developing and developed countries, their success rates have varied dramatically. The evidence to date suggests that funds fail in countries with poor institutions and governance. The Venezuelan fund, for instance, has been periodically raided by a cash-strapped government, which has also frequently altered the fund's operating rules to expand presidential discretion (Fasano 2000). A poor design is also detrimental to the fund's potential success with common features of such including (Asfaha 2007):

- inadequate expenditure rules resulting in the fund being used as collateral for loans and hence, accumulating debt as well as savings;
- a failure to ensure a minimum amount of government revenue comes from non-resource sources, and

- a poor investment strategy such as investing a large share of the fund in very risky assets or in domestic assets, or in assets that are positively correlated with the underlying fiscal risk.

Alternatively, the most enduring NRFs are located in countries such as Norway, the United States, and Canada – all of which have well-developed fiscal, regulatory, and supervisory institutions. Along with such factors, the IMF provides five suggested rules to help promote the success of an NRF (IMF 2007):

- A clear specification of operational rules and responsibilities over spending and borrowing;
- The fund revenues, expenses, and balance sheet should be presented to the legislature and the public together with the annual budget, including a consolidated account;
- Fund activities and accounts should be regularly audited by an independent auditor, and reports and results published;
- No monies should be spent directly from such funds; any use of such funds should be through the government budget and subject to normal budget appropriation processes, and
- An independent advisory board should be appointed to give assurance of good governance.

3.4.2 economic diversity

To prevent the booming natural resources sector and the non-traded goods sector (that is, retail trade, services, and construction) from crowding out non-booming export sectors such as manufacturing and agriculture, successful mineral-rich countries have invested windfalls in economic diversification (Hausmann and Rigobon 2003). Dependence on any one specific commodity can leave a country vulnerable to shocks from market volatility and sharp declines in the terms of trade. Diversification of earnings to other sectors of the economy reduces a country's reliance on revenues from a single export commodity whose price may be extremely volatile, and

which is almost certainly a finite resource. Ahmed *et al.* considers Australia as resilient to volatility arising from the resources sector because of its flexible economy and floating exchange rate. They cite these characteristics as reasons for Australia avoiding the resource curse (Ahmed *et al.* 2008).

Economic diversification is not necessarily easy to achieve for many countries. Governments have tried to achieve this through a reliance on state investment where governments have attempted to pick 'winning' projects or sectors. However, the general record of these policies has been very poor with large amounts of public money being invested in inefficient and uncompetitive industries (Weinthal and Luong 2006). State-led investment has typically led not only to inefficient investment but also to protectionism – both of which have independently contributed to stagnant growth rates.

A key area where such policies have generally failed is in governments' attempts to invest in sectors downstream of the resource-extracting sector (Asher 1999). It has sometimes been argued that industrialisation through downstream processing improves a producing country's bargaining position in international markets, opens up new 'infant industries' that may become a source of profits and employment at some time in the future and ensures a market for raw materials by creating the domestic production that will use a country's mineral or agricultural products. Instead, the reality has been chronically low productivity and net economic losses, although these are often masked by government subsidies. A temporary success of downstream industrialisation typically comes from subsidies, and even then, the sustainability of the industry is often problematic.

Specifically where metal processing projects are concerned, there are few good reasons to think that such policies would either generate economic wealth or serve to diversify a country's earnings:

- the cost of metal smelting and refining are unrelated to the mineral-exporting country's rich natural resources, and there are generally no reasons to

presume that the country in question has a competitive advantage in undertaking these activities;

- investment in downstream projects goes entirely counter to the diversification objective, since fluctuating prices for processed materials in world markets move in line with prices of the raw materials; and
- the employment benefits from these processes are generally highly questionable, since minerals processing is often even more capital intensive than mining itself. Other investments are far more likely to provide jobs.

Overall, many government development programs have a poor track record. The main conclusion that emerges from the diversification literature is, instead that, although governments can play an important facilitating role, effective diversification comes from private sector investment (Stevens 2003).

The second dimension to successful diversification is trade policy (Stevens 2003). Trade reform is a constant theme in countries that have successfully diversified their exports, although this has often required associated reforms, for instance, improved transportation infrastructure and improved local business conditions.

Along with Chile, another resource-rich country that achieved a diversified export base was Malaysia. Malaysia encouraged a high savings rate that made capital available for domestic investment (World Bank 2007). Government expenditures favoured education, housing, and health, with a substantial educational budget allocated to supply skilled workers to the rapidly expanding manufacturing sector. Although attempts to launch heavy and chemical industries by public sector companies were a failure, Malaysia successfully promoted export-oriented manufacturing from the early 1970s. Other countries that have successfully opened their economies and promoted manufacturing and agricultural exports are Botswana, Costa Rica, Indonesia, and Thailand.

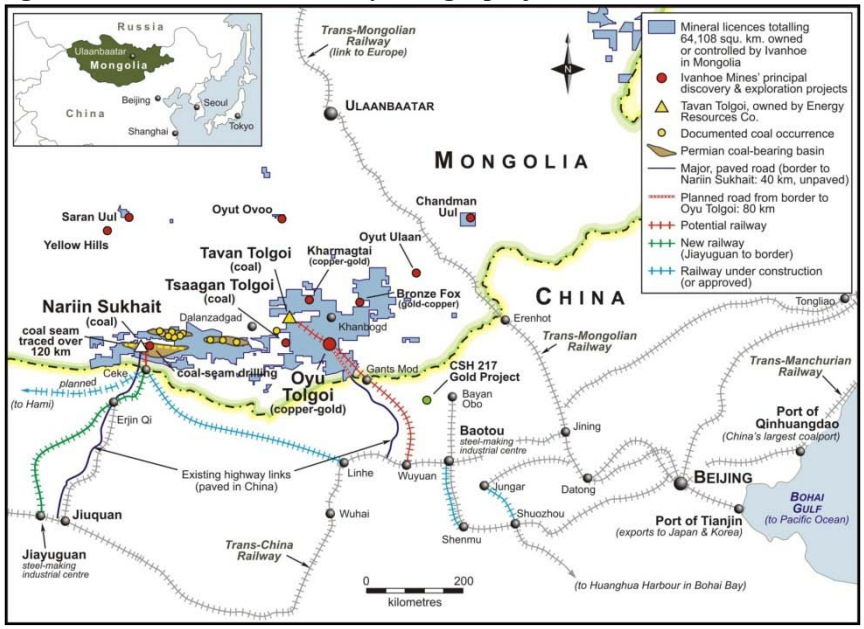
4 the Oyu Tolgoi copper project

On October 6, 2009, an Investment Agreement (IA) was signed by the Mongolian Government, Ivanhoe Mines Mongolia Inc (now Oyu Tolgoi LLC), which holds the Oyu Tolgoi mining licenses, and whose parent companies are Ivanhoe Mines Limited and Rio Tinto International Holdings Limited.

Under the terms of the Agreement, the government of Mongolia became a partner in the development of the Oyu Tolgoi project by acquiring a 34 per cent interest in Oyu Tolgoi LLC. Ivanhoe Mines will own the remaining 66 per cent interest in Oyu Tolgoi LLC.

The project includes the construction and operation of the Oyu Tolgoi copper-gold mining complex. Oyu Tolgoi is located 550km south of Ulaanbaatar, along the Mongolian Chinese border in the Province (Aimag) of Umnugovi, otherwise known as the South Gobi (Figure 4-1).

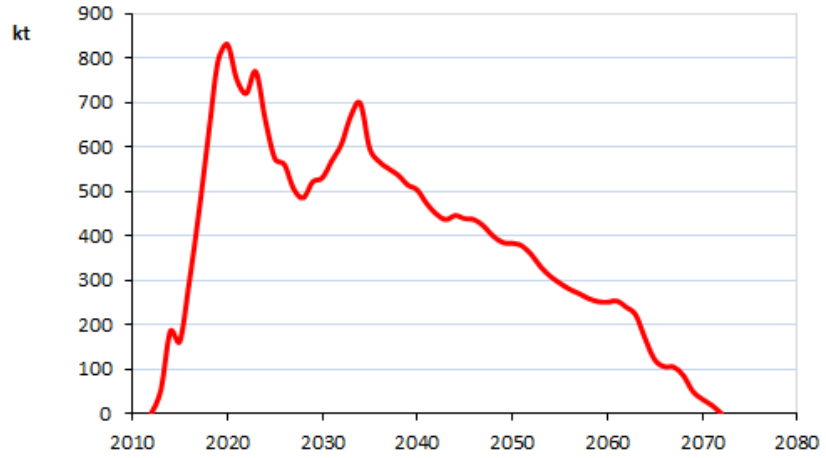
Figure 4-1: The location of the Oyu Tolgoi project



Oyu Tolgoi is the largest known undeveloped copper-gold mine in the world with an estimated mineral reserve (proven + probable) of 1,393 Mt of ore with a copper and gold grade of 0.93 per cent and 0.37 g/t respectively (AMEC Minproc Limited 2010).

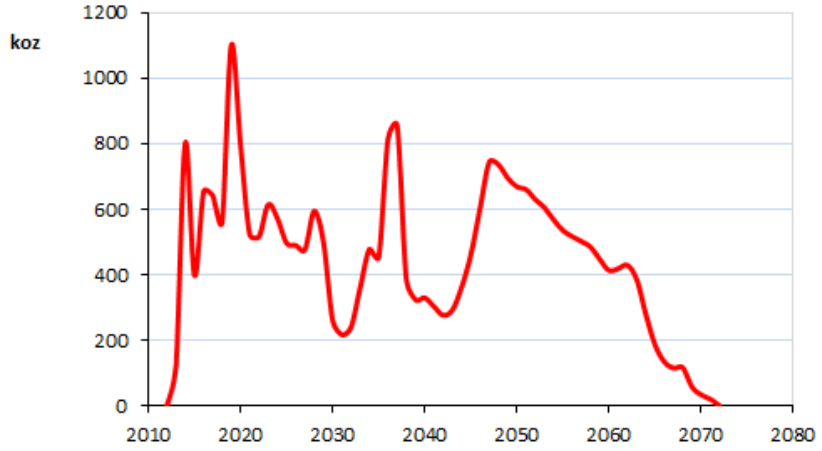
Total production is expected to be almost 24 million tonnes of copper (52.6 billion pounds), 874 tonnes of gold (27.2 million ounces) and a further 5,589 tonnes of silver (179.7 million ounces) during the mine life of 59 years. Production is expected to commence in 2013 or late in 2012, with a five-year ramp up to full production of 450,000 tonnes of copper per year with significant gold by-products. Ivanhoe Mines Limited estimates the capital cost required over the life of the mine to exceed US$18.6 billion (AMEC Minproc Limited 2010).

Figure 4-2: Projections of Oyu Tolgoi copper concentrates production, 2013-72



Source: Oyu Tolgoi LLC estimates.

Figure 4-3: Oyu Tolgoi gold production projections, 2013-72



Source: Oyu Tolgoi LLC estimates.

The Investment Agreement adheres to Mongolia's current Mineral Law, which specifies that certain deposits of strategic importance are awarded 30 years of stabilised tax rates.

Oyu Tolgoi LLC will be subject to the taxes listed in Article 7 of the Law of Mongolia on General Taxation in force on the date of the Investment Agreement and any other taxes stated in the Investment Agreement (Table 4-1). Any future taxes introduced will not be imposed on the project unless future legislation is more favourable, in which case Oyu Tolgoi LLC may request those more favourable terms apply.

Major taxes and fees stabilised during the life of the mine under the investment agreement include (Table 4-1):

- corporate income tax;
- customs duty;
- value added tax;
- excise tax;
- payment for use of mineral resources (royalty);
- payments for exploration and mining licenses; and
- immovable property and/or real estate tax.

Table 4-1: Taxes applicable to Oyu Tolgoi LLC

taxes	rates	basis	comment
corporate income tax rate loss carry forward	 25% 8 years	corporate income tax law of Mongolia	stabilised for the duration of IA. If annual taxable income exceeds 3.0 billion tugrugs (about US$2.2 million), the taxes will be 300 million tugrugs (about US$220,000) plus 25% of taxable income exceeding 3.0 billion tugrugs.
mineral royalties copper gold	5% of gross revenue	as per article 7 of law on general taxation of Mongolia	stabilised for the duration of IA.
value-added tax (VAT) refund for production of concentrate	10% No	value-added tax law of Mongolia	stabilised for the duration of IA.
mining license fee	US$15 per hectare	mining law of Mongolia	Stabilised for the duration of IA.
immovable property tax and/or real estate tax	0.6%[8]	law of immovable property tax of Mongolia	stabilised for the duration of IA.
investment tax credit % of future investment eligible rate years to ITC carry forward	 100% 10% 3	IA, Mongolian Government resolution #83 dated March 5, 2008 and #288 dated September 16, 2009	investments into strategic sectors are entitled to a tax credit equal to 10% of investment into fixed asset. This Clause was cancelled from the Law on November 25, 2009.
withholding tax rates dividends interest sale of rights	 0% 10% 30%	IA, corporate income tax law of Mongolia	clause 17.2.1 of corporate income tax law. Convention between government of Canada and government of Mongolia to eliminate double taxation mean that every Canadian company pays withholding tax on dividend at a rate of 5% in

[8] In section 2.7.3 of IA, it says 2 per cent but the MFS states it is 0.6 per cent according to legislation

taxes	rates	basis	comment
			Canada instead of 10% in Mongolia. Therefore the government of Mongolia will not receive withholding tax on dividends.
customs duty	law on customs tariffs and duties of Mongolia		stabilised for the duration of the IA
excise tax	law on excise tax of Mongolia		stabilised for the duration of the IA (except in respect to gasoline and diesel fuel imported or purchased from the domestic market)
windfall profits tax	not applicable		not applicable from 1 Jan 2011

5 analytical framework

The size of a project such as OT in a relatively small economy such as Mongolia would be expected to have significant impacts on the economy. It is expected that the project will make a significant contribution to sustainable economic growth and social development in the South Gobi region and nationally, during construction, mine operations and after closure. The objective of this assessment is to quantify the impacts of the OT project on the Mongolian economy and, in particular, its impact on, national output and income, international trade, employment, government revenue and the exchange rate.

5.1 economic assessment methodology

In this assessment, the impacts of the Oyu Tolgoi project on the Mongolian economy are estimated using the computable general equilibrium model, MINCGEM. General equilibrium models such as MINCGEM are a widely used and accepted tool for estimating the impacts of changes in economic conditions, such as a large mine coming on-line in a relatively small economy. A description of the MINCGEM modeling framework is provided in section 5.2.

The methodology involves comparing the results from the MINCGEM reference case to MINCGEM policy scenarios over the projection period 2011-43 (see chapter 6).

The MINCGEM reference case aims to reflect the Mongolian economy progressing along its expected pathway in the absence of Oyu Tolgoi. A description of MINCGEM reference case is provided in section 5.3.

In the MINCGEM policy scenarios, the Mongolian economy including Oyu Tolgoi, progresses along its expected pathway. Thus, differences in the economy and key variables between the reference case and policy scenarios can be attributed to the presence of Oyu Tolgoi. A

description of MINCGEM policy scenarios is provided in section 5.4.

5.2 the assessment model – MINCGEM

The analytical framework used in this assessment is BAEconomics' general equilibrium model of the world economy, MINCGEM. Models such as MINCGEM are able to depict the dynamics of large numbers of economic variables, such as prices and output, trade flows between regions, and the use of labour and other primary factors.

MINCGEM is a recursively dynamic multi-region, multi-sector, general equilibrium model developed by BAEconomics. It is based around the GTAP model (Hertel 1997).

MINCGEM was developed to analyse the impacts of changes such as the Oyu Tolgoi mine commencing production and as such, significant model development over and above the GTAP model has been undertaken. In particular, a representation of the Mongolian economy has been incorporated into the version of the GTAP database used for this assessment. Emphasis has been placed on significantly improving the model in a number of key areas to allow Oyu Tolgoi to be modeled separately and the incorporation of appropriate mining production and factor use projections within Mongolia.

The MINCGEM database is based on the GTAP 7 database (Narayanan and Walmsley 2008). Version 7 has a 2004 base year covering 113 regions across the world and 57 commodity groups and five primary factors. For the purposes of this project the GTAP database was initially aggregated into 10 regions, 15 commodity groups and four primary factors.

To estimate the economic impacts of the Oyu Tolgoi mine on the Mongolian economy, this aggregation of the GTAP database was modified in the following ways:

- Mongolia was separated from the composite Rest of East Asia region with the remaining Rest of East Asia region included in the Rest of World region;

- the coal commodity group was separated into coking and thermal coal;
- copper ores and concentrates, gold and copper refining were separated from the aggregated mining and metal refining commodity group;
- the copper ores and concentrates, gold, copper refining and other mining and refining groups were split into Oyu Tolgoi production and non-OT production; and
- the capital primary factor and the capital goods sector were each separated into mining and non-mining.

The final aggregation therefore contained 10 regions, 25 sectors, and five primary factors (Table 5-1) and provides detailed analysis of the major mining sectors in Mongolia.

5.2.1 factors of production

Land, labour, natural resources, mining capital and other capital are the five primary factors of production. Land is employed only in agriculture (livestock and other agriculture) and is fixed in each region. Labour is imperfectly mobile between sectors within each region. The labour supply and underlying population for each region are determined exogenously. It is also assumed that there is a fixed unemployment rate in each region with real wages adjusting to offset changes in the demand for labour.

Mining capital is imperfectly mobile between the mining industries (oil, gas, coking coal, thermal coal, Oyu Tolgoi copper ores and concentrates, non-OT copper ores and concentrates, Oyu Tolgoi gold, non-OT gold, copper refining, Oyu Tolgoi other mining and refining and non-OT other mining and refining) within regions and similarly non-mining capital is imperfectly mobile between non-mining industries within regions.

In each period capital in each region accumulates through net investment, which is determined by changes in rates of return on capital. An exception is made in the case of mining capital in Mongolia. Mongolian mining capital

Table 5-1: Regional, sectoral and primary factor coverage

regions	sectors
China	livestock
Russia	other agriculture
United States of America	forestry & fishing
Japan	oil
Korea, Rep. of	gas
European Union 27[a]	coking coal
India	thermal coal
Rest of World	Oyu Tolgoi copper ores & concentrates
Mongolia	non-OT copper ores & concentrates
primary factors	Oyu Tolgoi gold
land	non-OT gold
labour	copper refining
mining capital	Oyu Tolgoi other mining & refining
non-mining capital	non-OT other mining & refining
natural resources	petroleum & coal products
	electricity
	manufacturing
	transport
	construction
	health
	education
	public administration & defence
	other services
	mining capital goods
	non-mining capital goods

[a] European Union 27 comprises Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Hungary, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom

growth is determined exogenously based on assumed mining production growth in each scenario.

Natural resources are employed solely in the extractive industries (mining plus forestry and fishing) and are not

mobile between industries or regions. Supplies of natural resources change with exogenous assumptions about mining growth while returns to natural resources change with exogenous assumptions about mining prices.

5.2.2 income, savings and consumption

In MINCGEM, a single 'representative' household is assumed to own all primary factors in each region, receive all tax revenues and make all transfer payments to the rest of the world. Each regional household is assumed to maximise current period utility by consuming a mix of domestic and imported goods with the difference between current household income and savings.

Household savings are pooled in a global bank in MINCGEM and regional investors issue bonds to savers at a risk free global average rate of return. Regional rates of return relative to the global average and regional growth influence the demand for investment.

5.2.3 producer behaviour

Industries are assumed to operate in perfectly competitive markets and utilise constant returns to scale production technologies to minimise costs. Under equilibrium prices, firms earn normal profits with all returns paid to primary factors. In the case of mining, earnings of primary factors are either returned to the representative domestic household or to foreigners if the mine is foreign owned. Thus, changes in taxes and subsidies and input prices drive changes in output prices.

The production technology of each industry in MINCGEM has the commonly used nested structure. At the top-level, firms combine the 18 non-fuel intermediate inputs and a fuel-factor composite in fixed proportions to produce a homogenous good. The fuel-factor composite commodity is the least-cost combination of a fuel composite and a factor composite. The fuel composite is a least-cost combination of the five fuels (coking coal, thermal coal, gas, petroleum and coal products and electricity) and likewise, the factor composite is a least-cost combination of the five primary factors. Industries consume a combination of domestically and foreign sourced inputs.

5.2.4 international trade

MINCGEM models international trade between all regions and in equilibrium global exports of each commodity equals global imports. An international transport sector is responsible for moving commodities between regions and the cost of doing so is added to the cost of imports to each region.

5.2.5 prices

Each commodity in MINCGEM is modelled to have separate production taxes, sales, imports and exports. Therefore, in the producing region, each commodity has a separate supply, market, domestic user's and fob (free on board) price. Likewise, in the importing region, each commodity has a separate cif (cost, insurance and freight), duty paid and user price.

5.2.6 exchange rates

The exchange rate of a region in MINCGEM is the price of a global currency unit in terms of local currency. The global numeraire is the global average price of capital goods while the regional numeraire is the average price of a bundle of consumer goods. In this way the exchange rate is a measure of the barter terms of trade between the global and regional numeraire in question.

5.3 the characteristics of the reference case

The MINCGEM reference case is a set of projections of population, labour force and economic growth for each region, as well as Mongolian sectoral composition of output, savings rates and mining production between 2004 and 2043. Assumptions are also made about world commodity prices. The reference case is a business-as-usual scenario where the Mongolia economy progresses along its expected path with the exception that there is no Oyu Tolgoi production.

5.3.1 population and labour supply

In the reference case, world population is projected to grow from 6,350 million in 2004 to 8,150 in 2030 and 8,760 in

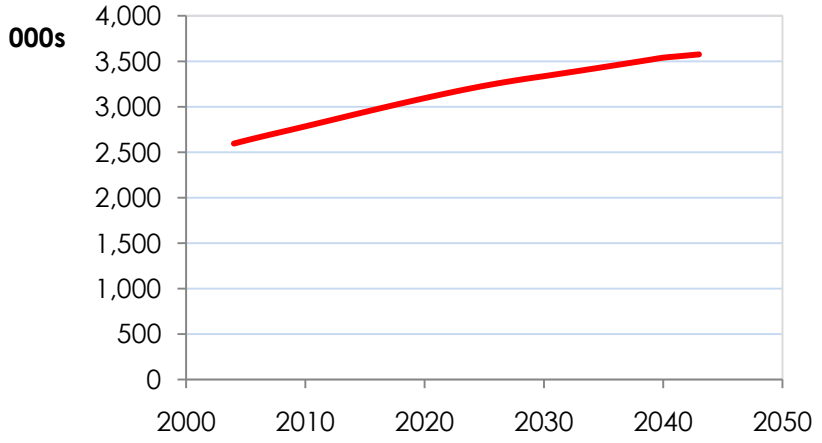
2043 (Table 5-2). Growth in the world population is the result of growth in developing countries/regions including China, India and the rest of Asia, Africa and Latin America. Mongolia's population is projected to record only modest growth from 2.6 million in 2004 to 3.6 in 2043 (Figure 5-1).

Table 5-2: Population projections in the reference case

	million people			
	2004	**2015**	**2030**	**2043**
Mongolia	2.6	2.9	3.3	3.6
China	1,297.9	1,384.0	1,449.9	1,465.7
United States	292.9	325.3	373.1	381.2
Korea, Rep. of	47.9	49.7	49.7	48.0
Japan	127.5	126.1	118.7	112.4
India	1,074.2	1,248.7	1,432.4	1,540.6
Russia	143.5	138.0	128.9	116.0
Indonesia	226.0	255.0	283.5	298.8
EU27	462.1	475.3	478.8	465.4
Rest of World	2,675.3	3,175.7	3,831.3	4,327.9
World	6,349.8	7,180.8	8,149.6	8,759.6

Source: Global Insights (2010). Note: Figures from 2015 are projections

Figure 5-1: Projection of Mongolia's population in the reference case



Source: Global Insights (2010). Note: Figures from 2010 are projections

The labour supply in each country/region is assumed to grow at the same rate as the total population. Hence, the

world working population is projected to grow from 4,088 million in 2004 to 5,247 in 2030 and 5,639 in 2043 (Table 5-3).

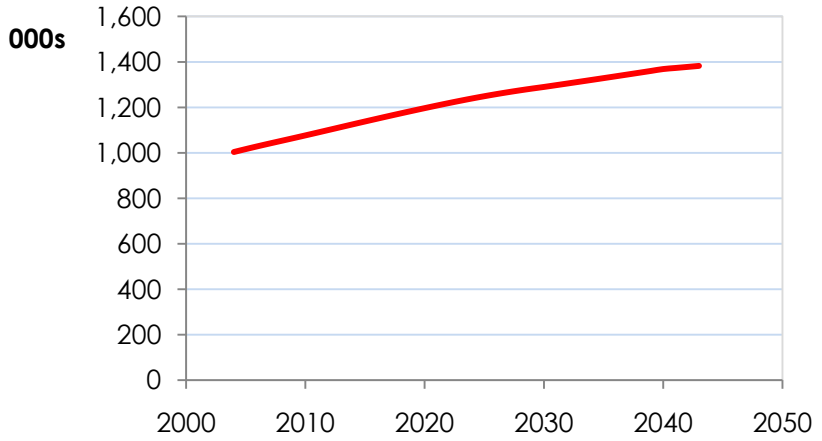
Growth in the world's labour supply is projected to come from the same regions as growth in the world's population. Mongolia's labour supply is projected to increase from less than 1 million persons in 2004 to 1.4 million in 2043 (Figure 5-2).

Table 5-3: Labour supply projections in the reference case

	Million people			
	2004	**2015**	**2030**	**2043**
Mongolia	1.0	1.1	1.3	1.4
China	920.2	981.3	1,028.0	1,039.2
United States	195.9	217.5	249.5	254.9
Korea, Rep. of	34.2	35.5	35.5	34.3
Japan	84.9	84.0	79.1	74.9
India	676.6	786.6	902.3	970.4
Russia	102.1	98.2	91.7	82.5
Indonesia	147.1	165.9	184.5	194.4
EU27	310.6	319.4	321.8	312.8
Rest of World	1,615.5	1,917.7	2,313.6	2,613.4
World	4,088.0	4,623.1	5,246.8	5,639.5

Source: Global Insights (2010). Note: Figures from 2015 are projections

Figure 5-2: Projection of Mongolia's labour supply in the reference case



Source: Global Insights (2010). Note: Figures from 2010 are projections

5.3.2 economic growth

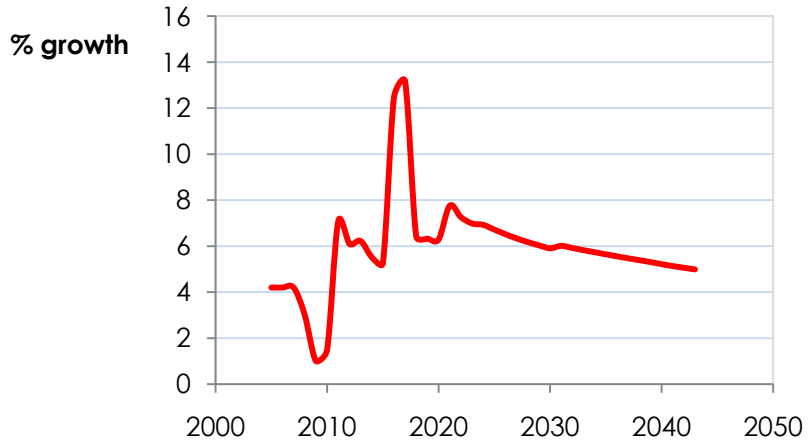
In the reference case, real GDP growth rates are set exogenously for all countries/regions except Mongolia (Table 5-4 and Figure 5-3). The world economy is projected to grow at 4.3 per cent between 2010 and 2030 and 3.6 per cent between 2031 and 2043. The Mongolian economy is projected to grow at 7.1 per cent between 2010 and 2030 and 5.4 per cent between 2031 and 2043. The Mongolian reference case projections of growth are affected by assumptions about the construction and commissioning of specific pieces of infrastructure. For example, the spike in reference case growth that occurs around the middle of the current decade is due to the assumed commissioning of a new power station and a copper refinery.

Table 5-4: Real GDP growth projections in the reference case

	constant annual growth rates (CAGRs) (%)			
	2004-09	**2010-30**	**2031-43**	**2010-43**
Mongolia	2.47	7.05	5.44	6.43
China	8.60	7.47	5.04	6.52
United States	1.09	2.56	2.52	2.54
Korea, Rep. of	2.97	3.29	2.43	2.94
Japan	0.25	0.85	0.25	0.62
India	6.68	6.31	4.91	5.76
Russia	3.24	3.13	2.20	2.77
Indonesia	4.55	4.71	3.95	4.41
EU27	0.99	1.97	1.70	1.87
Rest of World	4.10	4.72	3.43	4.21
World	3.09	4.27	3.56	3.99

Source: Global Insights (2010) and authors' simulations. Note: Figures from 2010 are projections

Figure 5-3: Mongolian real GDP growth projection in the reference case

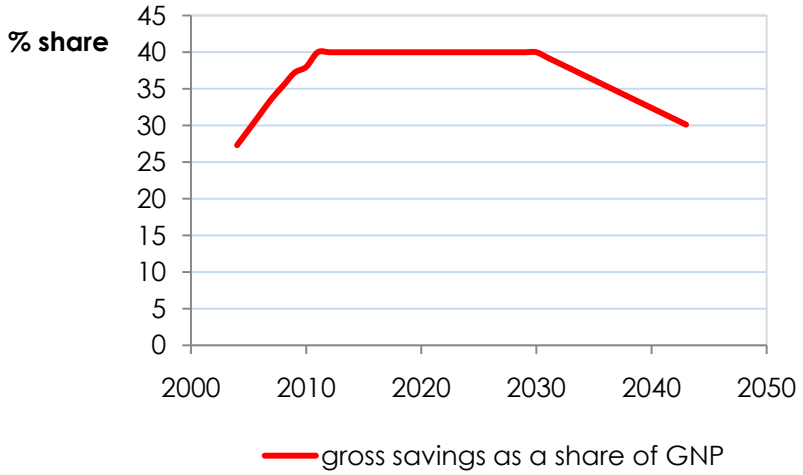


Source: Authors' simulations. Note: Figures from 2010 are projections

5.3.3 Mongolian savings rate

The Mongolian savings rate in the reference case is projected to increase from 27 per cent in 2004 to 40 per cent by 2011. It is projected to remain at 40 per cent until 2030, after which, it is projected to fall steadily to 30 per cent by 2043.

Figure 5-4: Mongolian savings rate projection in the reference case

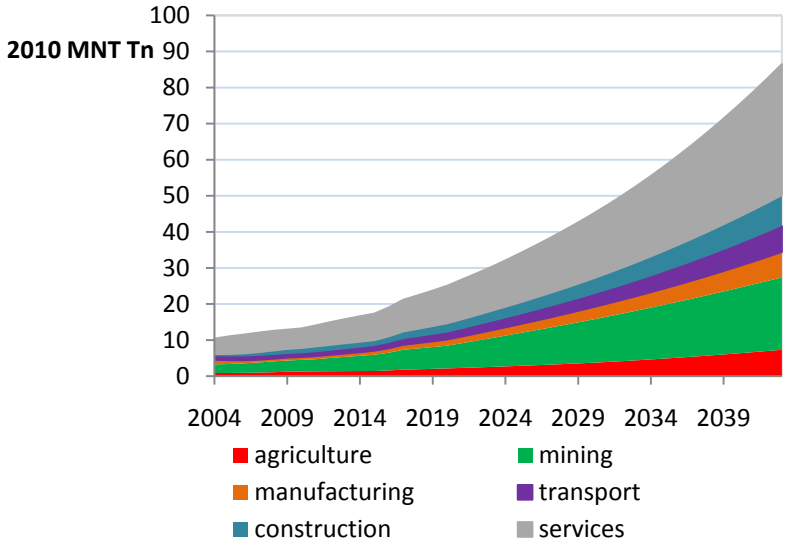


Note: Figures from 2010 are projections

5.3.4 Mongolian sectoral output

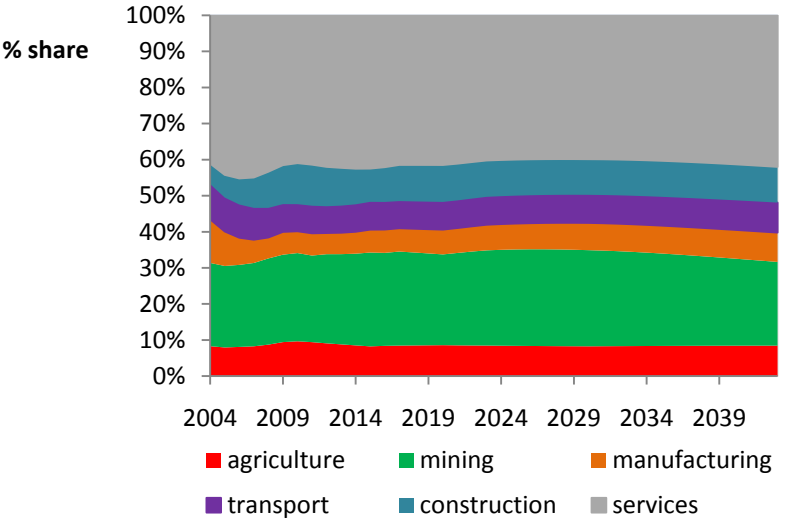
In the reference case, the total Mongolian output is projected to grow from over 10 trillion MNT in 2004 to over 86 trillion MNT in 2043 (Figure 5-5). Even though all major sectors are projected to grow, mining and services will continue to contribute approximately 23 and 42 per cent of total output to 2043 (Figure 5-6). Agriculture, manufacturing, transport and construction will each contribute less than 10 per cent to total output by 2043.

Figure 5-5: Mongolian output by sector



Source: NSO and authors' simulations

Figure 5-6: Mongolian sectoral share of total output

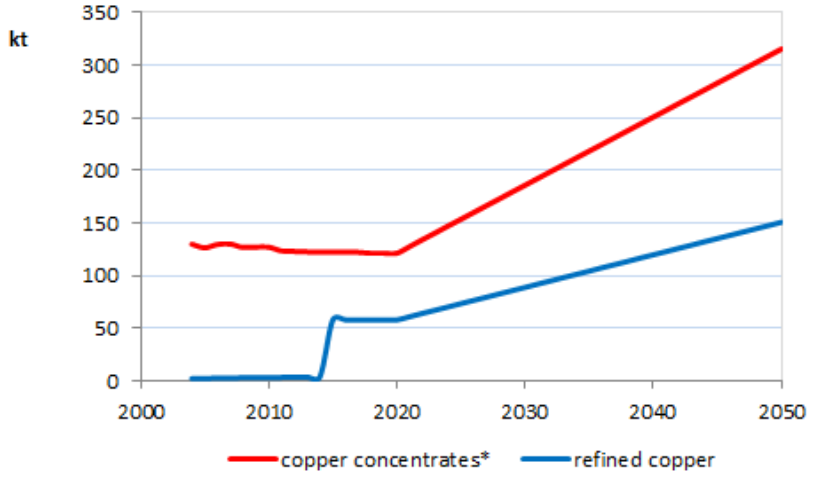


Source: NSO and authors' simulations

5.3.5 Mongolian mining production

In the reference case, Mongolian annual copper concentrates production is projected to decline slightly to 121 kt (contained metal) in 2020 (Figure 5-7). This decline is caused by falling grades at the Erdenet mine. After 2020, it is projected that satellite deposits around Erdenet and/or other deposits throughout Mongolia will lift annual production to 250 kt by 2050. Silver and molybdenum production are projected to grow at similar rates to copper concentrates. A copper refinery is also assumed to commence production in 2017 at 60 kt per year and increase to 150 kt per year by 2040.

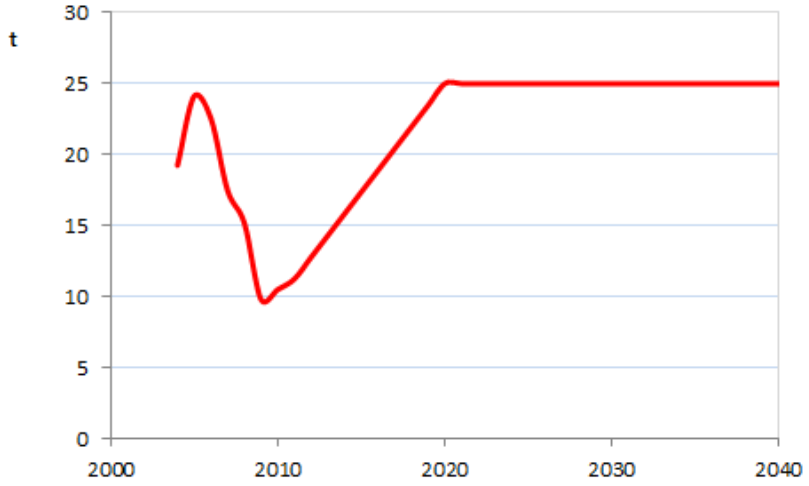
Figure 5-7: Projections of Mongolian copper production in the reference case



Source: USGS (2008) and Erdenet data. Note: The figures from 2009 are the authors' projections. * contained metal

Mongolian gold production in the reference case is projected to increase to 25 tonnes a year by 2020 and then remain constant at this level to 2040 (Figure 5-8).

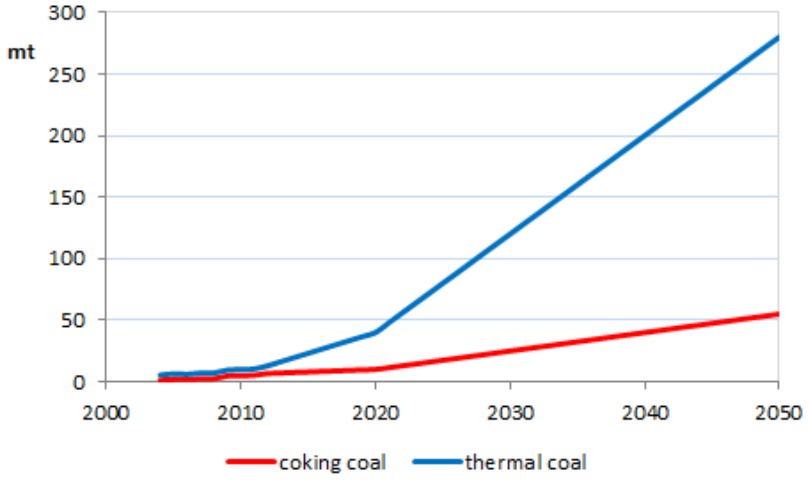
Figure 5-8: Projections of Mongolian gold production in the reference case



Source: USGS (2008). Note: The figures from 2009 are author's projections

Coking coal production in the reference case is projected to increase to 10 Mt per year by 2020 and 40 Mt by 2040 (Figure 5-9). Thermal coal production is projected to increase to 40 Mt per year by 2020 and 200 Mt by 2040.

Figure 5-9: Projections of Mongolian coal production in the reference case



Source: USGS (2008) and Wood Mackenzie data. Note: figures from 2009 are authors' projections

Mongolian fluorspar production in the reference case is projected to remain at 2006 production levels from 2010 till 2050. Production of other commodities including gypsum, iron ore, lime, salt, stone, tin, tungsten and zinc are assumed to grow at similar rates to Mongolian GDP.

5.3.6 world commodity prices

In the reference case, the world copper price is projected to fall from US$3.22/lb in 2010 to $2.50/lb in 2015 while the world gold price is projected to fall from US$1171/oz to $1000/oz over the same time period (Table 5-5). The coking coal price received by Mongolian exporters is projected to fall from US$96/t in 2010 to $56/t in 2015 while the thermal coal price is projected to fall from US$40/t to US$30/t over the same time period. All prices are projected to remain constant at 2015 levels (in real 2010 $) between 2015 and 2043.

To consider the impact of different copper price assumptions on key variables such as the real exchange rate, three alternative copper prices from 2015 onwards are considered along with the central case of US$2.50/lb:[9]

- optimistic – US$3.00/lb;
- conservative – US$2.00/lb; and
- pessimistic – US$1.00/lb.

Table 5-5: World commodity price central assumptions

	copper	gold	coking coal	thermal coal
	2010 US$/lb	2010 US$/oz	2010 US$/t	
2010	3.22	1171	96	40
2011	3.08	1137	89	38
2012	2.93	1103	81	37
2013	2.79	1068	73	36
2014	2.64	1034	64	33
2015	2.50	1000	56	30

[9] Unless otherwise mentioned, the prevailing copper price will be the central case of US $2.50/lb

5.3.7 other key assumptions

Other key assumptions made in the reference case include:

- A 500 MW power plant commences production in 2017;
- the government royalty rate remains at 5 per cent of the value of output of each mine; and
- foreign workers account for 10 per cent of labour in the mining sector and 50 per cent of labour in the construction sector falling to 15 per cent by 2035.

5.4 the characteristics of the policy scenarios

The policy scenarios include a standard Oyu Tolgoi scenario (the Oyu Tolgoi scenario) and two hypothetical policy scenarios. The policy scenarios are the same as the reference case with the exception that the government of Mongolia, with the help of the Oyu Tolgoi operating companies, invests in Oyu Tolgoi. As a result of the development of Oyu Tolgoi, additional investment is also made in a 300MW electricity plant by 2017 and it is assumed that the copper refinery doubles in size.

Production from Oyu Tolgoi results in a reallocation of labour and other resources throughout the economy compared with the reference case, which will change the structure of the economy. Mining production from non-OT sectors however, are assumed to be unchanged from the reference case levels.

Along with the standard Oyu Tolgoi scenario, two other hypothetical policy scenarios are considered:[10]

1. a wealth accumulation scenario where total government earnings from Oyu Tolgoi (including dividends, taxes and royalty payments) are placed in a savings fund instead of being allocated to government expenditure. The interest from the fund

[10] Unless otherwise mentioned, the prevailing Oyu Tolgoi scenario will be the standard Oyu Tolgoi scenario

is allocated to households and government expenditure while the capital is preserved.

2. a cash distribution scenario where total government earnings from Oyu Tolgoi are distributed to private households instead of being allocated directly to government expenditure.

6 assessment of the economic impacts of Oyu Tolgoi

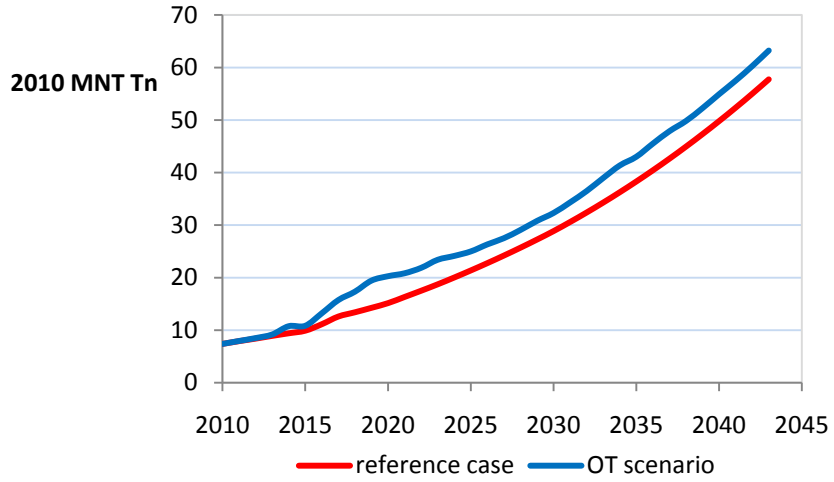
In this chapter, Mongolian economic outcomes in the policy scenarios are compared with the reference case over the projection period.

6.1 gross domestic product

In the reference case, Mongolian real GDP is projected to increase by 682 per cent from MNT 7.38 trillion in 2010 to MNT 57.76 trillion in 2043, increasing on average by 6.3 per cent a year.

In the Oyu Tolgoi scenario, Mongolian real GDP is projected to increase to MNT 63.23 trillion in 2043 or 9.48 per cent above the reference case level (Figure 6-1). By 2020 however, Oyu Tolgoi's impact is projected to increase GDP by just under 34 per cent above the reference case level.

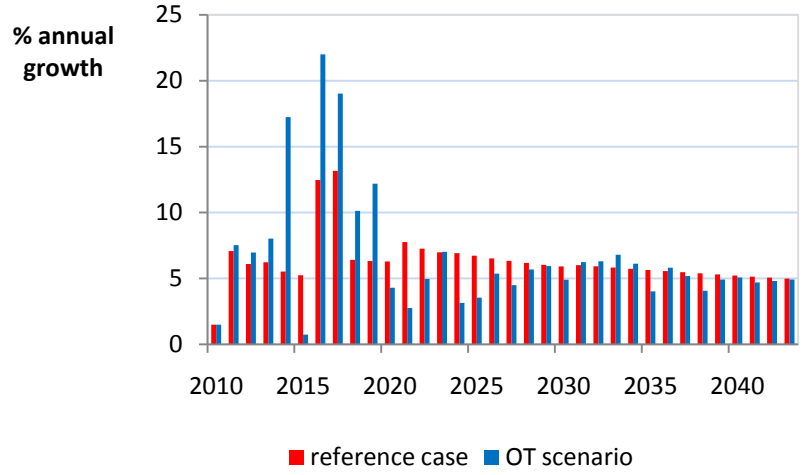
Figure 6-1: Mongolian real GDP in the reference case and the Oyu Tolgoi scenario



Source: IMF (2010d) and authors' simulations

In the reference case, Mongolian real annual GDP growth is projected to average 7.7 per cent between 2013 and 2020 compared to 11.7 per cent in the Oyu Tolgoi scenario. Real annual GDP growth is projected to peak at 22.0 per cent in 2016 in the Oyu Tolgoi scenario compared to only 13.2 per cent in 2017 in the reference case.

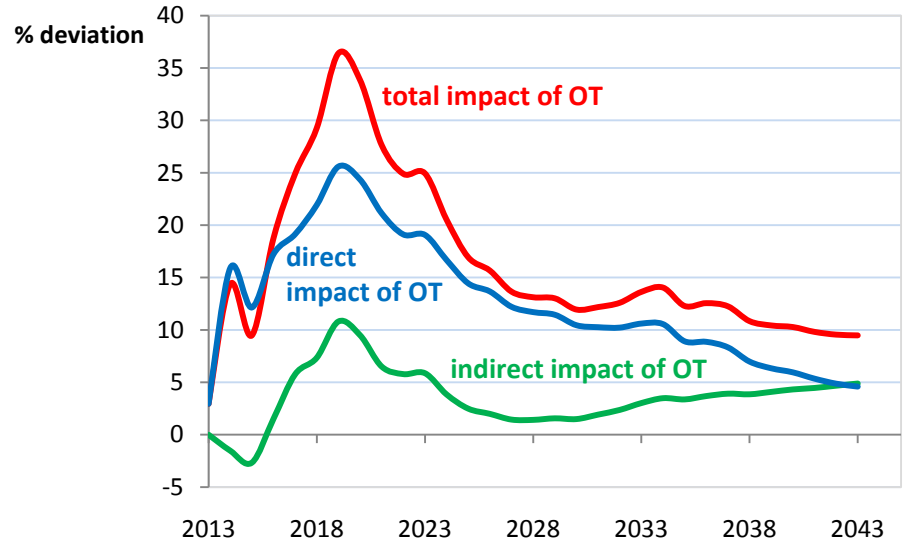
Figure 6-2: Mongolian real GDP growth in the reference case and the Oyu Tolgoi scenario



Source: IMF (2010d) and authors' simulations

The impact of Oyu Tolgoi on GDP can be further decomposed into direct and indirect impacts (Figure 6-3). GDP is projected to be 36.4 per cent greater in 2019 because of Oyu Tolgoi. Oyu Tolgoi's direct impact accounts for a 25 per cent increase in the size of the Mongolian economy in 2020. However, Oyu Tolgoi's direct impact is projected to decline after 2020 as the rest of the economy grows strongly. Oyu Tolgoi's indirect impact, that is the economic activity indirectly generated by the income and expenditure arising from Oyu Tolgoi activity, is also projected to peak in 2019. Over time, the indirect impact of Oyu Tolgoi will rise as a share of the total impact becoming equally as important around 2040.

Figure 6-3: Decomposition of percentage deviation in GDP relative to the reference case into direct and indirect effects



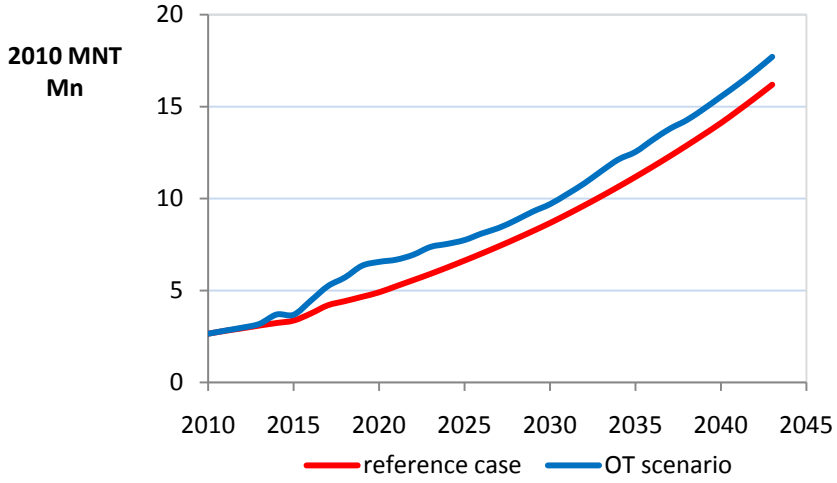
Source: Authors' simulations

As previously discussed in chapter 3, GDP growth is directly influenced by the growth in supply of primary factors and increases in the returns that they can accrue. The expansion of the Mongolian mining sector in the Oyu Tolgoi scenario resulting from Oyu Tolgoi commencing production in 2013 has a positive impact on GDP because it:

- increases the per-unit returns to labour in the Mongolian economy on average;
- increases the supply of capital through the direct importation of capital for mining and the increased foreign investment into capital production for mining;
- increases the labour supply through foreign workers relocating to Mongolia and Mongolians returning home; and
- increases the supply of the natural resource stock.

Oyu Tolgoi is projected to lift Mongolian real GDP per person by MNT 1.68 million (US$ 1,263) by 2020 and MNT 4.67 million (US$ 3,510) by 2043 (Figure 6-4).

Figure 6-4: Mongolian real GDP per person in the reference case and the Oyu Tolgoi scenario



Source: IMF (2010d) and authors' simulations

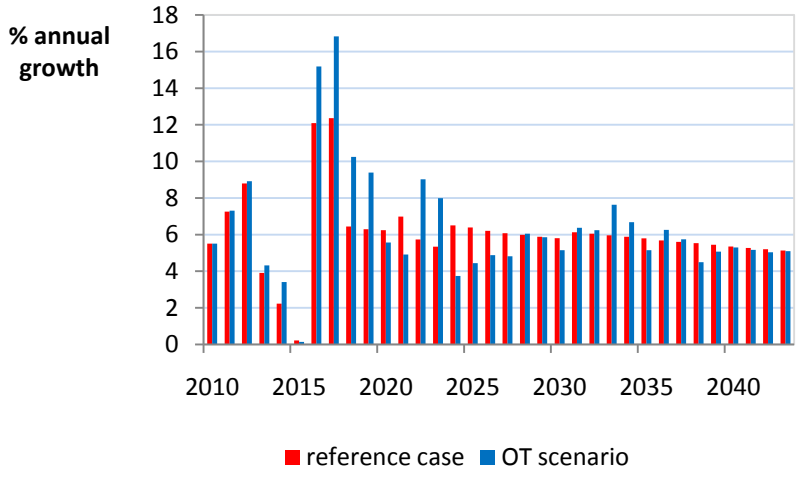
6.2 gross national product

In the reference case, annual Mongolian real GNP is projected to increase by 6.0 per cent on average between 2010 and 2043 and 6.2 per cent on average between 2013 and 2020 (Figure 6-5).

In the Oyu Tolgoi scenario, annual Mongolian real GNP is projected to increase by 6.4 per cent on average between 2010 and 2043 and 8.1 per cent on average between 2013 and 2020 (Figure 6-5).

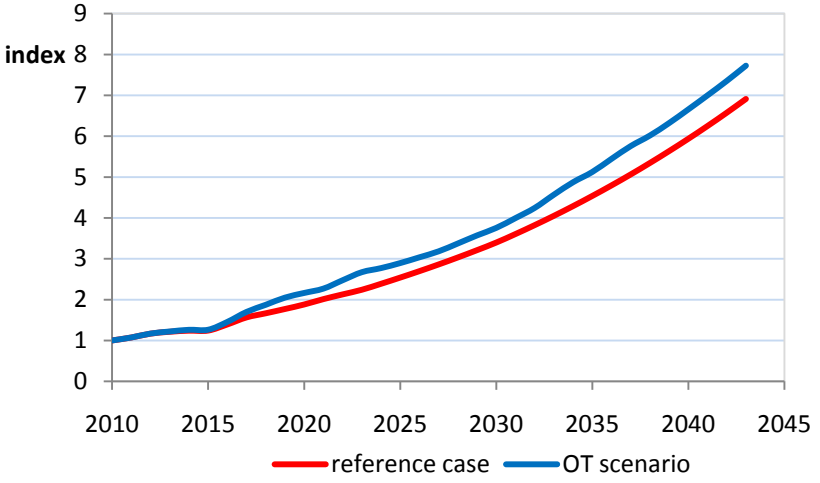
By 2020, real GNP is projected to be 15 per cent higher with Oyu Tolgoi than without, and 11.8 per cent higher by 2043 (Figure 6-6). That is, Mongolia is projected to be significantly better off as a consequence of the development of Oyu Tolgoi.

Figure 6-5: Mongolian real GNP growth in the reference case and the Oyu Tolgoi scenario



Source: Authors' simulations

Figure 6-6: Mongolian real GNP index in the reference case and the Oyu Tolgoi scenario

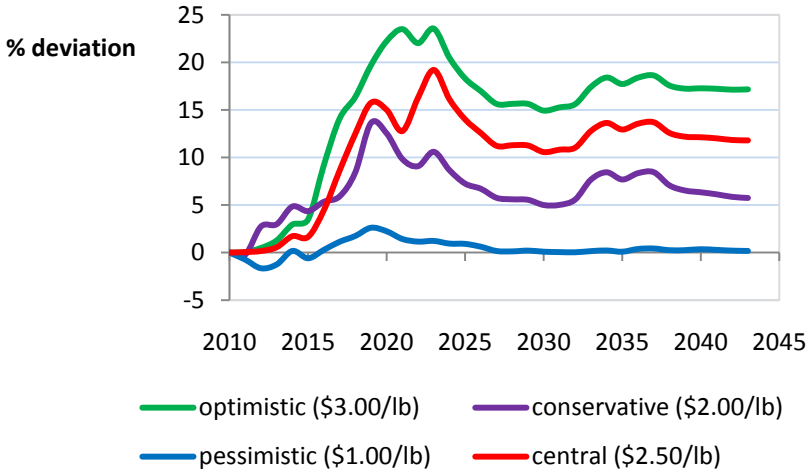


Source: Authors' simulations. Note: 2010 = 1 for both the reference case and the OT scenario

Under the optimistic long run copper price assumption (US$ 3.00), the benefits to Mongolia of Oyu Tolgoi are much larger with real GNP growth 22 per cent higher than the reference case by 2020 and 17 per cent higher by 2043

(Figure 6-7). Under the pessimistic long run copper price assumption (US$ 1.00/lb), Oyu Tolgoi still delivers small positive benefits to Mongolia in terms of real GNP growth. This suggests that Mongolia has a very high probability of receiving positive benefits from Oyu Tolgoi over a very wide range of copper prices.

Figure 6-7: Mongolian real GNP, percentage deviation relative to the reference case



Source: Authors' simulations.

6.3 international trade

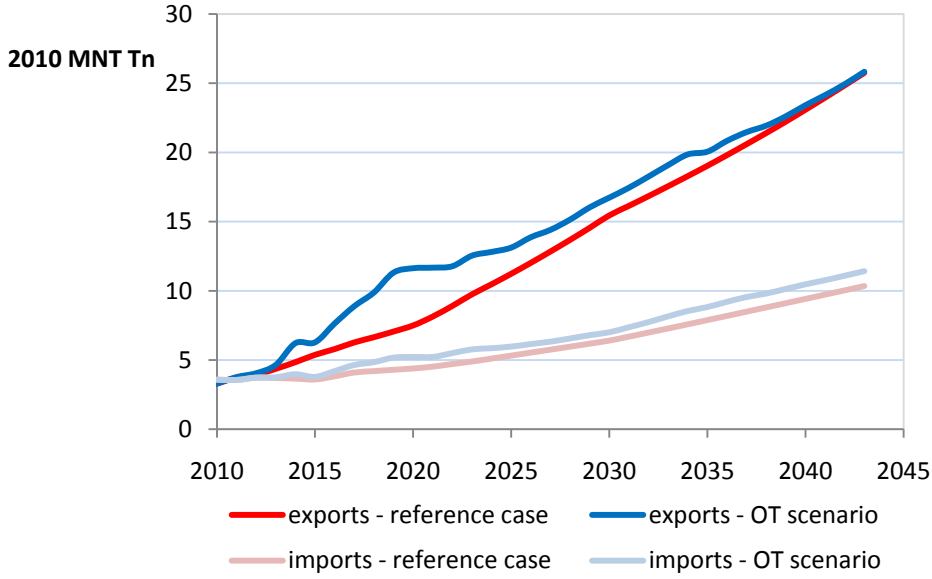
In the reference case, Mongolian real exports are projected to increase by 681 per cent from MNT 3,292 trillion in 2010 to MNT 25,714 trillion in 2043. Real imports are projected to increase by 189 per cent from MNT 3,579 trillion in 2010 to MNT 10,328 trillion in 2043.

By 2020, Oyu Tolgoi is projected to lift the value of real exports by 55 per cent and real imports by 19 per cent relative to what they otherwise would have been (Figure 6-8). In 2019, Oyu Tolgoi accounts for 48 per cent of Mongolian exports, which is the highest contribution it makes throughout the projection period given the

assumptions on the Oyu Tolgoi copper production trajectory used in the study.

The relative impact of Oyu Tolgoi on exports declines after 2020 because other sectors in the economy grow. The impact of Oyu Tolgoi on imports declines between 2020 and 2030 as the mine is fully built by this time. Between 2030 and 2043, the impact of Oyu Tolgoi on imports rises again because of the positive impact the mine has on incomes in Mongolia. In other words, as the indirect impact of the mine on the economy grows so do imports.

Figure 6-8: Mongolian international trade in the reference case and the Oyu Tolgoi scenario



Source: Authors' simulations

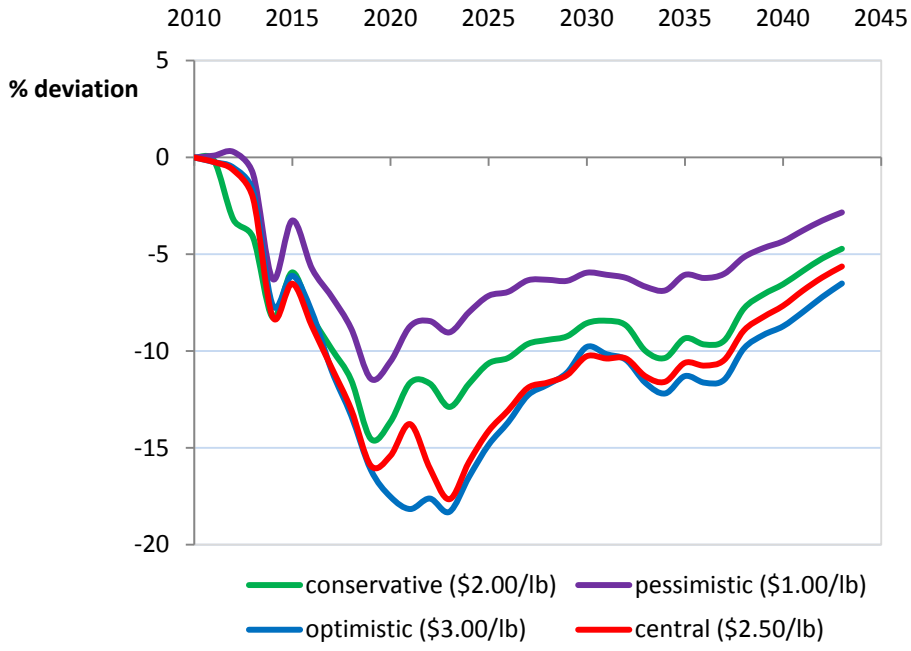
6.4 real exchange rate

In the Oyu Tolgoi scenario, the Mongolian real exchange rate is projected to appreciate throughout period 2011 to 2043. Under the long run central copper price assumption of US $2.50/lb, by 2020, the real exchange rate is projected to strengthen by around 15 per cent compared to what it

would have been without Oyu Tolgoi (Figure 6-9). The projected appreciation is considered to be relatively gradual, especially when compared with that which occurred throughout 2007-08 when the real exchange rate appreciated by over 75 per cent between December 2007 and September 2008 (Figure 2-26).

The extent of the appreciation depends on the copper price and government policy with lower copper prices causing the real exchange rate to strengthen relatively less. However, when the pessimistic copper price of US $1.00/lb is assumed, the real exchange rate is still more than 10 per cent stronger in the Oyu Tolgoi scenario compared with the reference case by 2020 (Figure 6-9). When the optimistic copper price of US $3.00/lb is assumed, the real exchange rate is projected to be more than 17 per cent stronger by 2020 as a consequence of the development of Oyu Tolgoi.

Figure 6-9: Mongolian real exchange rate, percentage deviations relative to the reference case



Source: Authors' simulations. Note: A decrease is an appreciation relative to the reference case

The impact of Oyu Tolgoi on the real exchange rate declines after 2023 when the government loan is repaid. If the government repays the loan in shorter time than expected, then the impact of Oyu Tolgoi on the real exchange will also decline sooner than projected here.

The stronger real exchange rate will have negative consequences for the competitiveness of trade-exposed industries such as agriculture and manufacturing. This effect is discussed further below.

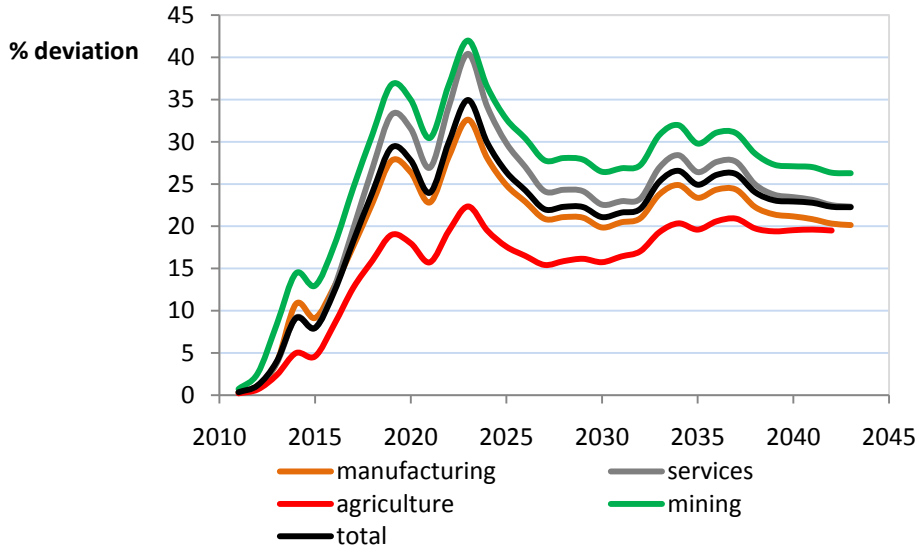
6.5 real wages

Recall from chapter 5.2.1 that a key assumption of MINCGEM is a fixed unemployment rate and that real wages adjust to clear the labour market. The presence of Oyu Tolgoi will increase the demand for labour compared to the reference case, and thus, real wages would be expected to rise. In reality, growth in real wages may be less than what is projected if there is an increase in total employment assumed in the reference case as a consequence of Mongolians returning from abroad, migration, and movement from the informal sector.

By 2020, the average real wage in Mongolia is projected to be 30 per cent higher under the Oyu Tolgoi scenario compared to the reference case (Figure 6-10). In 2023, the deviation peaks at 35 per cent and thereafter falls to 22 per cent by 2043.

On a sectoral basis, the percentage deviations in real wages are relatively higher in the mining and services sectors and relatively lower in the agriculture and manufacturing sectors when compared to the whole economy (Figure 6-10).

Figure 6-10: Mongolian real wages, percentage deviation relative to the reference case, 2011-2043



Source: Authors' simulations. Note: Each line represents the percentage deviation in real wages in the Oyu Tolgoi scenario from the reference case

6.6 sectoral contribution to output

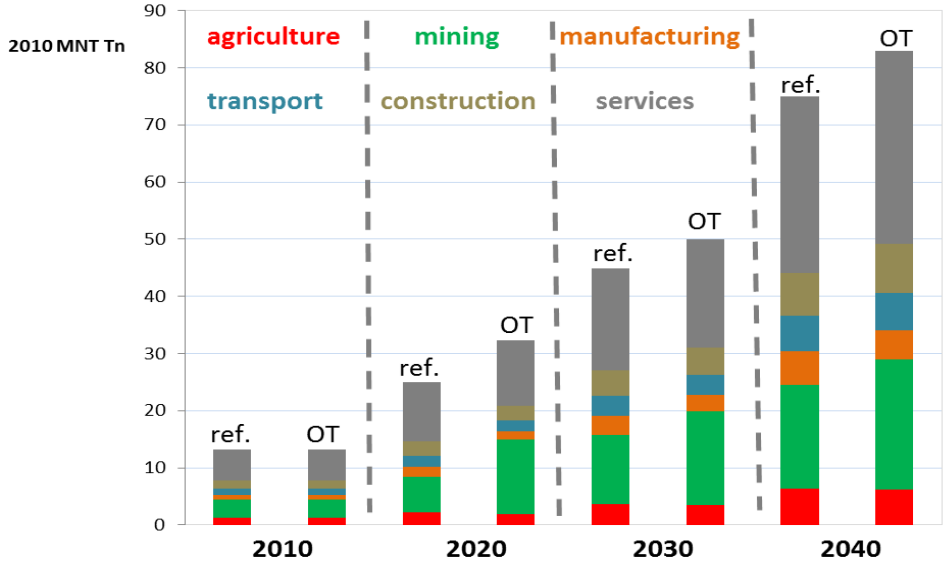
In both the reference case and the Oyu Tolgoi scenario, all major sectors in the Mongolian economy are projected to continue to grow to 2043 (Figure 6-11).

Oyu Tolgoi more than doubles the size of the mining sector by 2020. After 2020, the impact of Oyu Tolgoi on output from the mining sector declines as other mines are projected to grow strongly and output from Oyu Tolgoi begins to decline.

Output from the transport, construction and services sectors is relatively higher under the Oyu Tolgoi scenario than the reference case (Figure 6-12). The transport sector expands relative to the reference case due to increased household incomes while the construction sector expands due to increased foreign investment. The services sector (including government services such as health and education) expands in the presence of Oyu Tolgoi in line with increases in government revenues and household incomes.

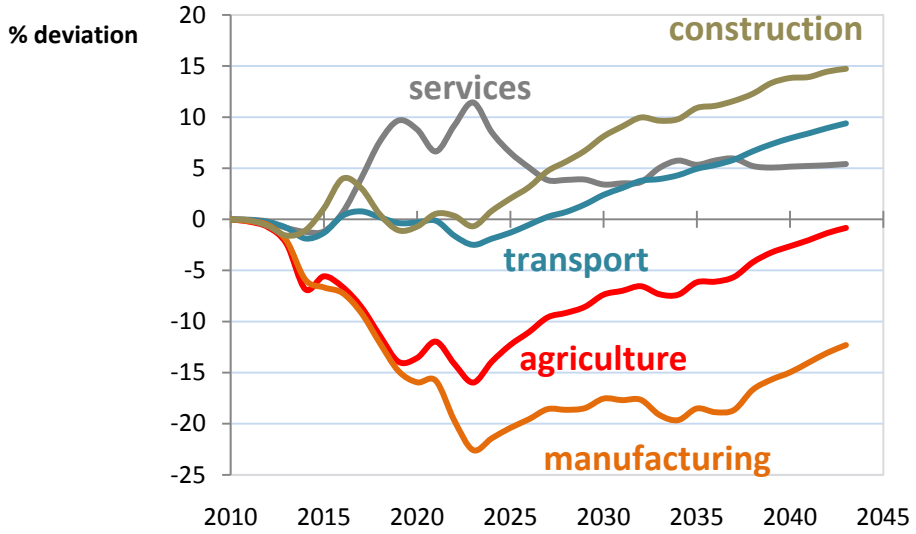
The agriculture and manufacturing sectors are projected to contract relative to the reference case (Figure 6-12). This contraction is caused by reduced competitiveness due to the rising real wage and rising real exchange rate that were discussed above. The contraction in these sectors, relative to what otherwise would have occurred, reaches a maximum in the early 2020s and then begins to reverse when real wages growth and the appreciation in the real exchange rates slows. By 2043, output from the agriculture sector in the Oyu Tolgoi scenario is less than 1 per cent lower than in the reference case.

Figure 6-11: Sectoral contribution to output in Mongolia



Source: Authors' simulations. Note: ref. = reference case, OT = Oyu Tolgoi scenario, services include government services such as health and education

Figure 6-12: Mongolian sectoral output, percentage deviation relative to the reference case



Source: Authors' simulations. Note: services include government services such as health and education

6.7 hypothetical policy scenarios

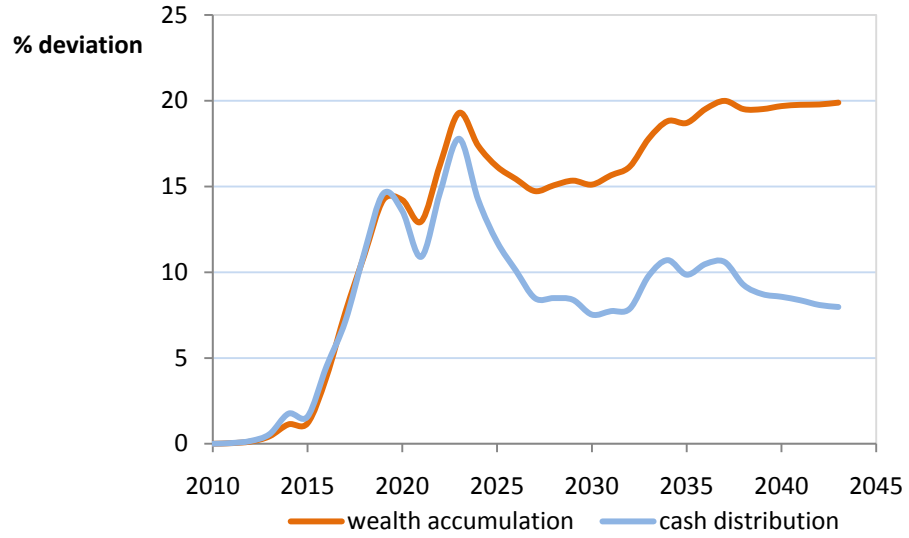
In this section, results of key variables including real GNP, the real exchange rate, sectoral output and revenue to the government of Mongolia from the wealth accumulation scenario are compared with those from the cash distribution scenario. In both hypothetical policy scenarios, only the central copper price assumption (US$2.50/lb) is considered.

6.7.1 real GNP

Until 2021, both hypothetical policy scenarios have a similar impact on Mongolian real GNP (Figure 6-13). Increases in GNP resulting from Oyu Tolgoi reach around 14 per cent relative to the reference case scenario. However, from 2020 onwards, increases in the deviation in GNP in the wealth accumulation scenario exceeds that of the cash distribution scenario as interest payments from the wealth accumulation fund start to fund growth. The impact on GNP in both scenarios peaks in 2023. Between 2023 and 2043, the impact of Oyu Tolgoi on GNP in the wealth

accumulation scenario is on average 8 percentage points higher compared to that of the cash distribution scenario.

Figure 6-13: Mongolian real GNP, percentage deviation from reference case



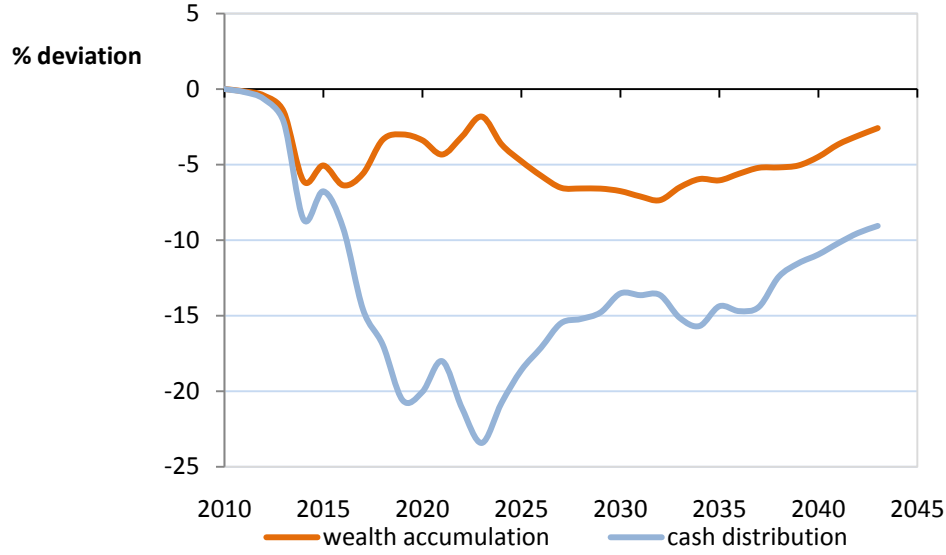
Source: Authors' simulations.

6.7.2 real exchange rate

The real exchange rate strengthens in both hypothetical policy scenarios (Figure 6-14). However, between 2013 and 2043, the average exchange rate appreciation relative to the reference case in the wealth accumulation scenario is 4.9 per cent, compared to 14 per cent in the cash distribution scenario. Variations in the exchange rates are considerably smaller in the wealth accumulation scenario, with a maximum of 7 per cent in 2032. This is smaller than in the other policy scenarios because government revenue from OT accrues in the fund instead of being allocated directly to government expenditure. The size of the fund and therefore, the interest payments, grow over time and this goes part of the way to explaining why the maximum deviation occurs much later in the wealth accumulation scenario than the other scenarios. The other reason is that Oyu Tolgoi copper production and hence, government

revenues from Oyu Tolgoi begin to decline after 2032. This decline in Oyu Tolgoi output is mitigated in the wealth accumulation scenario because the fund continues to generate income even after copper output begins to fall. Effectively, the fund slowly replaces the mine as the country's income generation vehicle.

Figure 6-14: Mongolian real exchange rate, percentage deviation relative to the reference case



Source: Authors' simulations

6.7.3 sectoral output

Trade exposed sectors including manufacturing and agriculture benefit significantly under the wealth accumulation scenario compared to the cash distribution scenario.

In the wealth accumulation scenario, agriculture expands relative to the reference case from 2030 onwards and the maximum deviation in manufacturing output is less than 10 per cent (Figure 6-15).

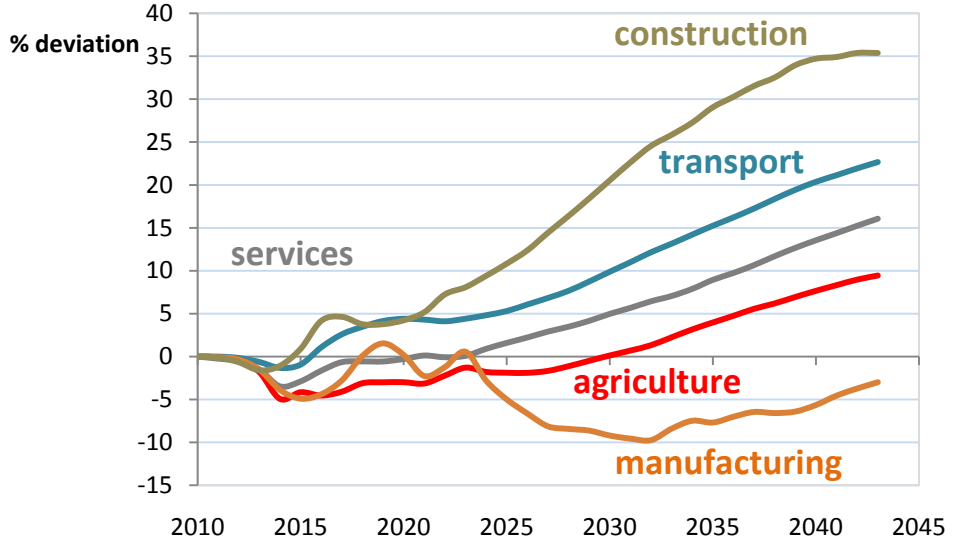
In the cash distribution scenario however, output from the agricultural sector remains less than in the reference case to 2043 while output from the manufacturing sector is 26

per cent less than in the reference case in 2023 and 18 per cent less in 2043 (Figure 6-16).

These differences between the hypothetical policy scenarios are due to improved competitiveness as a result of the relatively smaller real exchange rate appreciation under the wealth accumulation scenario.

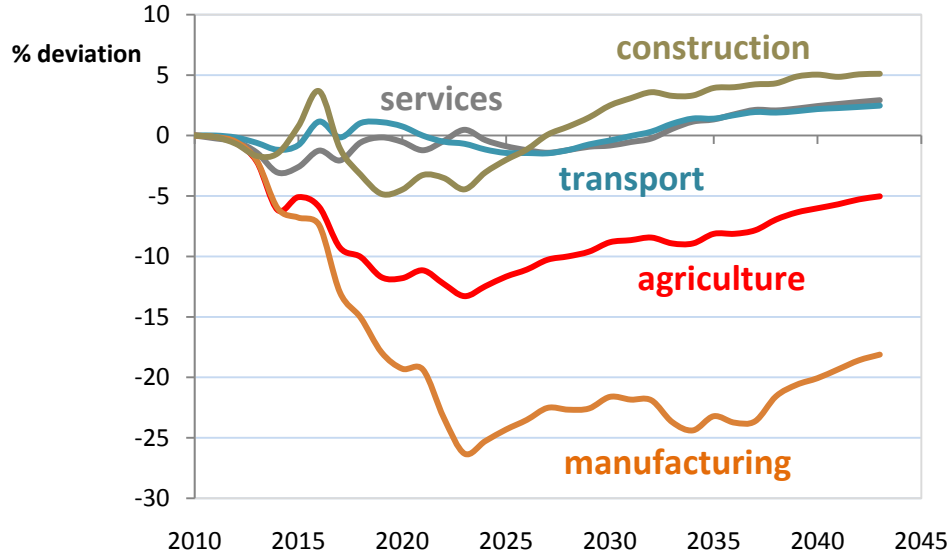
In the long run, all sectors benefit under the wealth accumulation scenario compared to the cash distribution scenario as a result of the increased domestic demand. A wealth accumulation fund will thus ease structural adjustment consequences of Oyu Tolgoi through the relatively lower appreciation of the exchange rate and more manageable real wage increases.

Figure 6-15: Mongolian sectoral output, percentage deviation of wealth accumulation scenario relative to the reference case



Source: Authors' simulations

Figure 6-16: Mongolian sectoral output, percentage deviation of cash distribution scenario relative to the reference case

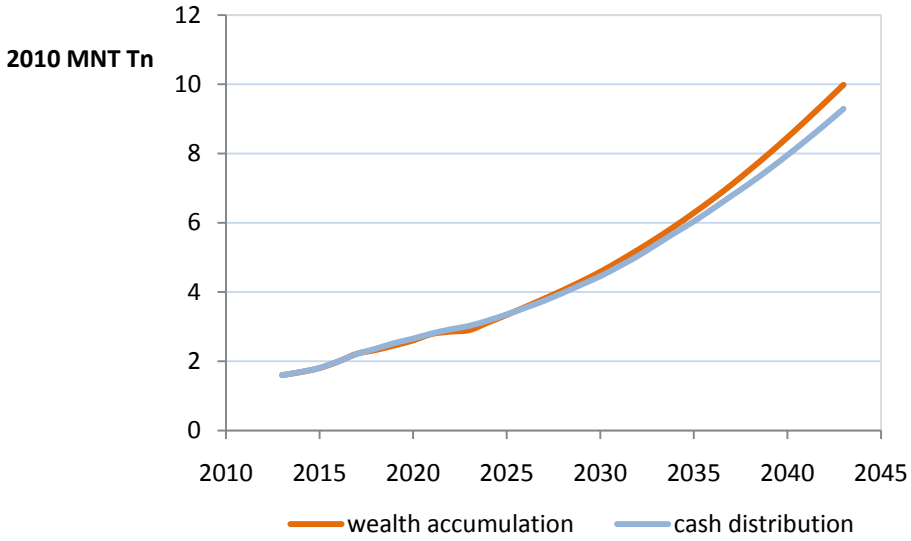


Source: Authors' simulations.

6.7.4 government budget revenue

In 2043, the government of Mongolia's budget revenue is projected to be approximately MNT 10 trillion (≈ US$ 7.5 billion) under the wealth accumulation scenario and MNT 9.3 trillion under the cash distribution scenario (≈ US$ 7.0 billion) (Figure 6-17) (real 2010 terms). This difference occurs because of the interest payments from the wealth fund, higher corporate income tax in domestic currency from mining because of exchange rate differences, and higher corporate income tax in the long run from non-mining sectors resulting from higher production under the wealth accumulation fund scenario.

Figure 6-17: Government of Mongolia budget revenues

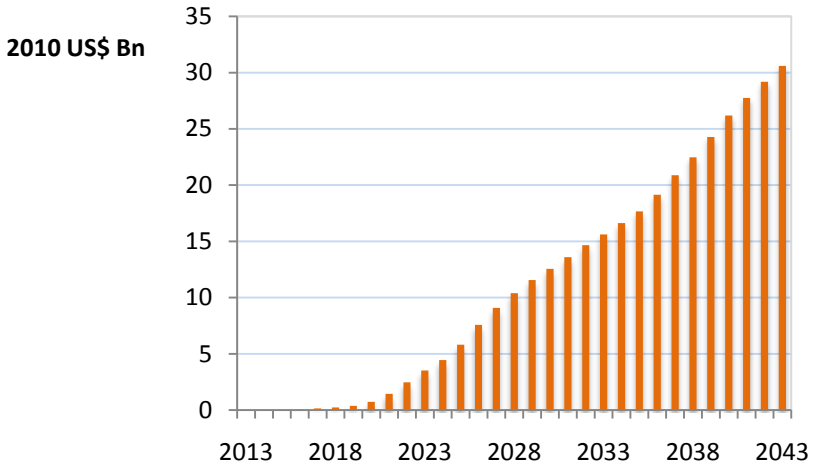


Source: Authors' simulations.

6.7.5 wealth accumulation fund

In the wealth accumulation scenario, the projected value of the wealth fund reaches over US$30 billion (MNT 40 trillion) in 2043 (Figure 6-18) (real 2010 terms). This is around two thirds of the annual GDP in that year and around six times the annual GDP in 2010.

Figure 6-18: Projected value of Mongolian wealth accumulation fund



Source: Authors' simulations.

7 policy implications and conclusions

This economic impact assessment of Oyu Tolgoi has found that the development of the mine will have significant and long-term positive impacts on the Mongolian economy. While the non-mining tradable sectors will experience reduced competitiveness from an appreciating exchange rate and higher labour costs (relative to what otherwise would have occurred), the overall impact of Oyu Tolgoi on both GNP and GNP per person is projected to be highly positive. In other words, the development of the mine, will, on average, make all Mongolians better off. Furthermore, even if long-term copper prices were to fall well below consensus forecasts, Mongolia is still projected to benefit from Oyu Tolgoi.

Increasing the workforce participation rate and encouraging Mongolians to return from abroad would help to ease some of structural adjustment pressures that will inevitably arise from the development of Oyu Tolgoi.

The results also suggest that accruing fiscal revenues from Oyu Tolgoi in a wealth accumulation fund would mitigate the effects of structural adjustment on the Mongolian economy. Conversely, a policy of distributing the fiscal revenues from Oyu Tolgoi directly to private households would exacerbate structural adjustment pressures and cause greater volatility in international competitiveness. Given the historical experiences of some countries in managing natural resource wealth, the importance of the establishment of a well-designed and managed savings fund is a key finding from this assessment.

The results presented in this report are based on data and assumptions that were available to the authors in 2010. Ongoing reviews of the project as the mine is developed will inevitably lead to changes in cost and production estimates that could have a material impact on the estimates of the project's macroeconomic impact. The model used in this analysis has been made available to

Mongolian government departments and key economic agencies for their use in further policy analysis.

There are a wide range of possibilities for the use of government revenues flowing from Oyu Tolgoi including enhanced infrastructure development or targeted health and education spending. These possibilities have not been explicitly examined in the present study but remain for future research.

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