Impacts of Import Tariff Reforms on Mongolia's Economy: CGE Analysis with the GTAP 8.1 Data Base

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Abstract

Foreign trade plays an essential role in Mongolia's economy and the country has been pursuing a relatively liberal foreign trade policy during the course of its transition toward a market economy. However, aiming at supporting domestic industries and encouraging manufacturing and higher value-added production in the country, Mongolia's recent trade policy favors raising its customs duty rates up to the WTO bound levels.

An analysis of the effects of Mongolia's import tariff reforms on the country's economy using the standard CGE Model and GTAP Data Base (Version 8.1) revealed that although the country's domestic production would expand as a result of the import tariff reforms, they would result in losses of the country's total welfare, as the allocative efficiency losses are greater than the terms-of-trade gains. Therefore, it is required to spend the additional import tax revenues properly in order to compensate for such losses.

In addition, the increased import tariffs had a similar effect to a real exchange rate appreciation and resulted in decreased exports. However, in the case of Mongolia raising import tariffs to its WTO bound rates, the country's industrial output would expand along with the increased exports of Mongolia's major manufacturing industries, such as leather, meat, dairy, cashmere and wool products.

1. Import Tariff Reforms in Mongolia

Foreign trade has a large presence in Mongolia's economy, and its role has especially intensified after the country's transition toward a market economy in the early 1990s and its opening-up to world markets. Mongolia has maintained an open and relatively liberal foreign trade policy since its transition toward a market economy and Mongolia currently trades with more than 150 countries. Import tariff reform is a key instrument of trade policy and the development of Mongolia's import tariff policies are discussed in this section. Prior to 1990, import tariffs or value-added tax were not imposed in Mongolia. Instead, a 10% transaction tax was imposed on all imported and domestic goods and services.

Mongolia's import tariff policy development since the early 1990s can be classified into four phases:[1]

(i)   Transitional period (1991–1996);
(ii) Period of multilateral regulations (1997–2007);
(iii) Period of enhancing the regulatory functions of custom tariffs (2008–2014);
(iv) Period of supporting domestic manufacturing industry by customs tariff policy (since 2015).

(i)   Transitional period (1991–1996)

Mongolia's trade prior to 1990 was characterized by a state monopoly on trade, a centrally-planned pricing system, and the trading partners were limited to those of the former Council for Mutual Economic Assistance (CMEA or Comecon) member countries under the dominance of the former Soviet Union (FSU). Trade liberalization was one of the immediate priorities for establishing the basis of a market economy (Enkhbayar, Sh. and Nakajima, T., 2013).

Due to the break-up of the CMEA and FSU in 1991, Mongolia needed to completely reform its trade policy, with the introduction of new customs tariff regulations an essential part thereof. The Customs General Administration, which is a state administrative authority and in charge of implementing state policy on customs, was established in October 1990 as part of the government. The Customs Law of Mongolia was adopted in January 1991 and became effective on 1 March 1991. The State Great Khural Resolution No. 45 of 21 June 1991 established a uniform customs tariff rate of 15% and the government was given authority to exempt some import goods from customs duties if necessary. This resolution is considered to have been the main document for formulating Mongolia's customs tariff policy at the beginning of the transition period and became a basis for developing the contemporary customs tariff regulations.

Mongolia acceded to the International Convention on the Harmonized Commodity Description and Coding System (HS) on 17 September 1991 and started implementing it on 1 January 1993. Mongolia submitted a request to join into the General Agreement on Tariffs and Trade (GATT) in 1991 and it became necessary to make the national tariff regulations consistent with the international rules. In line with this requirement, the Mongolian Parliament (State Great Khural) passed the Law of Mongolia on Customs Tariffs and Customs Duty on 20 May 1996, which became effective on 1 July 1996. It legalized the usage of the HS system in setting and changing customs tariffs.

(ii) Period of multilateral regulations (1997–2007)

Mongolia joined the World Trade Organization (WTO) on 29 January 1997 as its 130th member. As a member of the WTO, Mongolia had an obligation to reform its customs tariff policy in compliance with the multilateral regulations of the WTO and introduce the most-favored-nation (MFN) tariff on commodities originating from WTO member countries.

Clause 4.3 of the Law on Customs Tariffs and Customs Duty of 1996 stated that "Customs tariffs consist of general, most-favored-nation (MFN) and preferential rates" and Clause 4.4 stated that the "MFN tariff rate can be applied for commodities originating from countries which recommend the most-favored-nation status for Mongolia". Therefore, it can be considered that Mongolia was already compliant with the above-mentioned requirements.

Furthermore, in order to fully comply with the principles of multilateral trade regulations the Customs Tariff Law was amended eight times in 1998, 1999, 2000, 2004 and 2005.

According to the negotiations with the WTO on import tariffs, Mongolia had a commitment to set its bound rate at 20%, but tariffs could be 25% or over for some commodities that can be manufactured domestically. When Mongolia joined the WTO, the import tariff was 15%, and in accordance with its commitments to the WTO, Mongolia had an opportunity to decrease custom tariffs on some commodities step by step and increase tariffs on some commodities. However, a few months after becoming a WTO member, customs tariffs on all types of import commodities was set to zero unilaterally by the decision of the Mongolian Parliament.[2]

This decision was a heavy blow for local manufacturers and many factories had to cease operation. Therefore, it was a "stimulus" for turning Mongolia from a producer toward a raw-materials supplier. During the 1980s Mongolia produced more than 3 million pairs of shoes per

annum, but after setting the custom tariffs to zero, it became hard for local manufacturers to compete with cheap imports, and eventually they had to cease production.

Aiming at addressing this issue, customs tariffs were reintroduced and were set at a uniform rate of 5% in June 1999 by Resolution No. 27 of the State Great Khural. Thereafter, the rates were changed four times up to 2007:

✓ Resolution No. 51 on 17 November 2000 set the customs tariff to 7%;

✓ Resolution No. 90 on 16 November 2001 changed the customs tariff from 7% to 5% and was applied from 1 January 2002;

✓ Resolution No. 44 on 4 July 2002 changed the date for applying seasonal tariff rates on imported flour (HS-11.01; 11.02) from 1 August to 1 July, and this became effective from 5 July 2002.

Mongolia had its first trade policy review under the WTO rules in March 2005. The report indicated that Mongolia has considerable room to raise its tariffs within the existing bounds under the WTO (WTO, 2005a).

(iii) Period of enhancing the regulatory function of custom tariffs (2008–2014)

This period is characterized by the ways for developing the national economy by enhancing the regulatory functions of customs tariffs which have been included in state policy documents.

In 2008, the Millennium Development Goals-Based Comprehensive National Development Strategy of Mongolia for the period 2008–2021 was adopted by the State Great Khural. It had some important sections, such as: "Promoting Small-to-Medium Entrepreneurs with Export Orientation by Customs Tariff Policy"; "Promoting Production of Some Import Substitution Products by Customs Tariff Policy"; and "Promoting Imports of High Technology and Knowledge Intensive Machinery and Equipment by Customs Tariff Policy".

Based on this Strategy, in 2009 the Mongolian government adopted the "Industrialization Program for Mongolia for 2009–2016". This program includes some important issues, such as: the possibility of postponing payments of customs duties on equipment imported for industrial purposes, raw materials which cannot be substituted for in Mongolia, and the final products made by those raw materials, until a certain period or when a plant using this kind of equipment is in normal operation; and exemption or later application of customs duties on equipment to be used for developing core technologies.

In July 2010, the State Great Khural newly adopted the National Security Concept of Mongolia. It states the reduction of foreign trade deficits and the proper use of tariff and non-tariff measures to promote domestic production.

Furthermore, several amendments have been made to legal acts in order to enhance the regulatory functions of customs tariffs. The Law on Customs Tariffs and Customs Duty was renewed in 2008 and amended eight times between 2012 and 2014. The purpose of these amendments was to enhance and implement the regulatory functions of the customs tariffs for promoting domestic industry and investment.

The second Trade Policy Review of Mongolia under the WTO rules was conducted in September 2014. Its main aim was to inform WTO members about significant developments in Mongolia's foreign trade policy between 2005 and 2014, and the country's current economic situation along with governmental policies and actions. However, these efforts to improve the regulatory functions of customs tariffs and their enforcement has not been as effective as expected.

(iv) Period of supporting domestic manufacturing industry by customs tariff policy (since 2015)

The State Great Khural of Mongolia approved the "Law on Supporting Manufacturing" on 9 July 2015. It brought new opportunities for supporting national manufacturing industry by tariff policy. The new law's aim is to promote export-oriented, import-substituting, competitive, value-added and environmentally friendly domestic production and to regulate government support.[3]

Following the new law, other laws were amended, accordingly. In particular, the Law on Customs Tariffs and Customs Duty was amended in December 2015 and the equipment and spare parts to be used for research and production of renewable energy were exempted from customs duty. In addition, several changes were made to the customs duty rates of import commodities, as follows:

✓ Tariffs on meat, edible meat offal, natural honey, canned products, cement and trolleybuses increased to the WTO bound rates in August 2015;

✓ Tariffs on vodka and wine increased to the WTO bound rates in February 2016;

✓ Tariffs on over 100 products which can be manufactured domestically were increased to the WTO bound rates in March 2016.

Moreover, according to the Mongolia–Japan Economic Partnership Agreement, the Law on Customs Tariffs and Customs Duty was amended[4] to address the issues of providing preferential tariffs for goods originating from Japan.

It was considered that imposing and raising import tariffs would encourage domestic production and reduce the import of similar commodities, increase exports, competitiveness and employment, and thereby increase the disposable income of consumers. However, accurate studies are needed to shed light on these issues. Accordingly, the effects of Mongolia's ongoing and expected import tariff reforms on the country's economy were analyzed using the general equilibrium approach.

2. The Analysis

2.1 The Model and Aggregation

In analyzing the effects of Mongolia's import tariff reforms on the country's economy, the Global Trade Analysis Project (GTAP) Data Base (Version 8.1) and the standard GTAP Model were employed. The GTAP Model is a multi-region and multi-sector Computable General Equilibrium (CGE) model[5] with perfect competition and constant returns to scale. A CGE model is a system of mathematical equations that describes an economy as a whole and the interactions among its agents. Bilateral trade is handled via the Armington assumption, which provides the possibility to distinguish imports by their origin and explains the intra-industry trade of similar products. The Data Base combines detailed bilateral trade, transport and protection data characterizing the economic linkages among regions, together with individual country input–output databases, which account for inter-sectoral linkages.

The GTAP Data Base 8.1, which was released in February 2013, has dual reference years (2004 and 2007) and this analysis used 2007 as the reference year. The data covers 134 regions and 57 commodities, and Mongolia was one of the newly added regions in the previous version of Data Base 8, which was released on 12 June 2012. The GTAP Input–Output Table (IOT) for Mongolia is based on the Mongolian IOT for 2005, which includes 55 sectors (Narayanan, B., et al, eds., 2012; Begg, Burmaa, M., et al, 2012). The standard GTAP Model has five primary

factors of production: land, skilled labor, unskilled labor, natural resources, and capital, with land and natural resources being sluggish, and labor and capital being mobile factors.

As Mongolia was the only country of interest in the analysis, the regions were aggregated from the 134 into two groupings, Mongolia and the rest of the world (ROW). The GTAP sectors were aggregated into 44 sectors from the 57 in the database. The skilled and unskilled labor factors of the original GTAP model were combined as labor in the new model. The commodity aggregations used in the models are illustrated in Appendix Table A1.

The composition of Mongolia's and the ROW's GDP (Gross Domestic Product), as reported in the GTAP Data Base 8.1 is shown in Table 1. As reported in the table, Mongolia's exports to the ROW amounted to 60.9% of GDP, while imports stood at 62.1%. At the same time, the figures for the ROW were 27.4%. This indicates that the role of foreign trade in the Mongolian economy is relatively high compared to the global average. From the source side, net factor income accounted for 62% of Mongolia's GDP, while net taxes and depreciation equaled 26.1% and 12% of the total, respectively (Table 1).

Table 1: Composition of GDP in the Model (%)

	Mongolia	Rest of the World
From the expenditure side: GDPEXP=C+G+I+X−M		
Private Consumption (C)	50.5	59.8
Government Consumption (G)	13.2	17.2
Investment (I)	37.5	23.0
Exports (X)	60.9	27.4
Imports (M)	62.1	27.4
Total	100.0	100.0
From the source side: GDPSRC=NETFACTINC+NETAXES+VDEP		
Net Factor Income (NETFACTINC)	62.0	60.2
Net Taxes (NETAXES)	26.1	29.1
Depreciation (VDEP)	12.0	10.6
Total	100.0	100.0

Source: GTAP 8.1 Data Base

2.2 Simulation

The effects of ongoing and expected import tariff reforms in Mongolia were evaluated by observing the changes in national welfare and other selected general equilibrium effects using the GTAP model. The tests were as follows.

(i)   Version A (A): Effects of the MFN applied rate changes introduced in 2015–2016 in Mongolia;

(ii) Version B (B): Effects of the MFN tariff increases up to the WTO bound rates of Mongolia.

The applied import tariff changes to the ad valorem base rates of Mongolia's import tariffs in the GTAP model are illustrated in Table 2. As these changes represent the new or target rates in the model, the variable in the GTAP model "tms", which represents the source specific change in tax on imports of a tradable commodity, was shocked simultaneously for the sectors in question by the percentage target rates. The base tariff rates in the GTAP Data Base 8.1 were

consistent with the existing MFN applied rates of Mongolia. Therefore, the shocks were applied to the base model with existing tax distortions and the GTAP's Altertax utility, which creates a distortion-free base model, was not used. Changes made to the base rates as target rates and the list of corresponding shocks applied in the simulations are illustrated in Tables 2 and 3 respectively. The updated import tax rates after the simulations were consistent with the target rates and they are provided in Table 4.

Ad valorem import tariffs are levied as a percentage of the CIF import value, which includes trade costs, such as transport and insurance. Tariffs increase the cost of imported goods and all the intermediate and final demands consuming imported commodities pay the tariff. Accordingly, a raising of import tariffs adds an additional cost to the import price and thus reduces the demand for imports (i.e. the import demand curve shifts from D1 to D2). The import tariff has three effects on the importing country as illustrated in Figure 1. These are:

a) Direct burden of the tariff (area "a + c = ABFE2"): The amount of tariff revenue paid by consumers to the government on imports. This tariff revenue is not a loss to the economy as it redistributes purchasing power from consumers to the government and can be spent for the nation's welfare;

b) Excess burden on the importer or allocative efficiency loss (area "b = BDE1"): The loss of consumer surplus that is not recouped elsewhere in the economy, as the consumers reduce their import consumption and pay higher prices. It represents consumption inefficiency because consumers who would have been willing to purchase QM1−QM2 imports at the free market price of PM1 can no longer do so;

Figure 1: Effects of an Import Tariff on the Importer
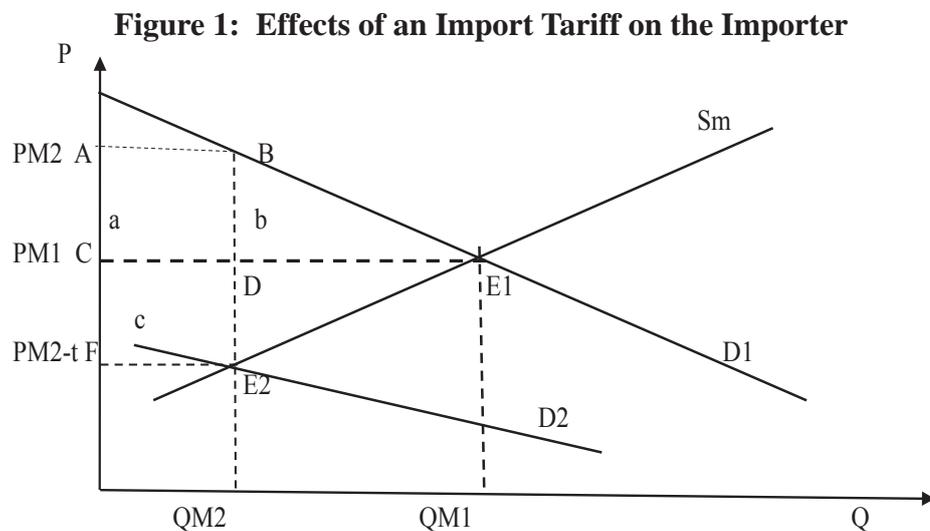
Notes: Sm = the foreign supply of the imported good. Given the Armington assumption that goods are differentiated by country of origin, there is no domestic production of the imported variety;
D1 = the compensated demand curve for imports by domestic consumers (the duty-free demand in general, at base rates in our case);
D2 = the demand curve upon introducing the import tariff (an import tariff increase in our case);
PM1, QM1 = CIF import price and import quantity at initial equilibrium;
PM2, QM2 = the domestic price of imported goods and import quantity at the new equilibrium, whereas PM2 = CIF world import price plus the tariff;
PM2-t = import price, tariff-net.

Source: Adapted from Burfisher, M., 2011

Table 2: The Mongolian Import Tax Target Rates Applied to the Simulations (rTMS)

(%)

No.	GTAP Code	GTAP Sector Description	Applied Target Rates	
			Version A	Version B
1	PDR	Paddy rice	–	15
2	WHT	Wheat	–	20
3	GRO	Cereal grains nec.	–	18
4	V_F	Vegetables, fruit, nuts	6	19
5	OSD	Oil seeds	–	20
6	C_B	Sugar cane, sugar beet	–	20
7	PFB	Plant-based fibers	–	20
8	OCR	Crops nec.	–	20
9	CTL	Cattle, sheep and goats, horses	3	12
10	OAP	Animal products nec.	–	18
11	WOL	Wool, silkworm cocoons	–	20
12	FRS	Forestry	–	20
13	FSH	Fisheries	–	20
14	COA	Coal	–	20
15	OIL	Oil	–	20
16	GAS	Gas	–	20
17	OMN	Minerals nec.	–	20
18	CMT	Bovine meat products	13	15
19	OMT	Meat products nec.	6	17
20	VOL	Vegetable oils and fats	–	19
21	MILRMK	Milk and dairy products	12	16
22	PCR	Processed rice	–	15
23	SGR	Sugar	–	20
24	OFD	Food products nec.	–	19
25	B_T	Beverages and tobacco products	17	26
26	TEX	Textiles	–	20
27	WAP	Wearing apparel	–	25
28	LEA	Leather products	–	20
29	LUM	Wood products	6	19
30	PPP	Paper products, publishing	–	20
31	P_C	Petroleum, coal products	–	20
32	CRP	Chemical, rubber, plastic products	–	7
33	NMM	Mineral products nec.	6	19
34	I_S	Ferrous metals	–	20
35	NFM	Metals nec.	–	20
36	FMP	Metal products	–	20
37	MVH	Motor vehicles and parts	–	20
38	OTN	Transport equipment nec.	–	20
39	ELE	Electronic equipment	4	16
40	OME	Machinery and equipment nec.	–	20
41	OMF	Manufacturing nec.	–	19
42	ELY	Electricity	–	20
43	GDT	Gas manufacture, distribution	–	20
44	OTH	Other goods and services:	–	–

Notes: 1. rTMS = GTAP code for % ad valorem import tax by source
      2. nec. = not elsewhere classified
      3. "–" = indicates that the base rates were not changed

Table 3: List of Shocks Applied to the Model

Version A
Shock tms("v_f","RestofWorld","Mongolia") = −0.9288;
Shock tms("ctl","RestofWorld","Mongolia") = 2.1393;
Shock tms("cmt","RestofWorld","Mongolia") = 8.0996;
Shock tms("omt","RestofWorld","Mongolia") = 1.5515;
Shock tms("milrmk","RestofWorld","Mongolia") = 6.9098;
Shock tms("b_t","RestofWorld","Mongolia") = 8.3222;
Shock tms("lum","RestofWorld","Mongolia") = 0.9723;
Shock tms("nmm","RestofWorld","Mongolia") = 0.9688;
Shock tms("ele","RestofWorld","Mongolia") = 0.7974;

Version B
Shock tms("pdr","RestofWorld","Mongolia") = 11.8292;
Shock tms("wht","RestofWorld","Mongolia") = 14.3066;
Shock tms("gro","RestofWorld","Mongolia") = 13.1153;
Shock tms("v_f","RestofWorld","Mongolia") = 11.2214;
Shock tms("osd","RestofWorld","Mongolia") = 15.9416;
Shock tms("c_b","RestofWorld","Mongolia") = 20.0000;
Shock tms("pfb","RestofWorld","Mongolia") = 20.0000;
Shock tms("ocr","RestofWorld","Mongolia") = 14.3887;
Shock tms("ctl","RestofWorld","Mongolia") = 11.0641;
Shock tms("oap","RestofWorld","Mongolia") = 12.5008;
Shock tms("wol","RestofWorld","Mongolia") = 14.8892;
Shock tms("frs","RestofWorld","Mongolia") = 15.0018;
Shock tms("fsh","RestofWorld","Mongolia") = 18.5222;
Shock tms("coa","RestofWorld","Mongolia") = 16.6759;
Shock tms("oil","RestofWorld","Mongolia") = 19.4534;
Shock tms("gas","RestofWorld","Mongolia") = 20.0000;
Shock tms("omn","RestofWorld","Mongolia") = 14.3294;
Shock tms("cmt","RestofWorld","Mongolia") = 10.0129;
Shock tms("omt","RestofWorld","Mongolia") = 12.0899;
Shock tms("vol","RestofWorld","Mongolia") = 13.3433;
Shock tms("milrmk","RestofWorld","Mongolia") = 10.7280;
Shock tms("pcr","RestofWorld","Mongolia") = 9.6674;
Shock tms("sgr","RestofWorld","Mongolia") = 14.3360;
Shock tms("ofd","RestofWorld","Mongolia") = 12.0666;
Shock tms("b_t","RestofWorld","Mongolia") = 16.6547;
Shock tms("tex","RestofWorld","Mongolia") = 14.3092;
Shock tms("wap","RestofWorld","Mongolia") = 19.6295;
Shock tms("lea","RestofWorld","Mongolia") = 14.4438;
Shock tms("lum","RestofWorld","Mongolia") = 13.3557;
Shock tms("ppp","RestofWorld","Mongolia") = 14.3471;
Shock tms("p_c","RestofWorld","Mongolia") = 14.3220;
Shock tms("crp","RestofWorld","Mongolia") = 1.9134;
Shock tms("nmm","RestofWorld","Mongolia") = 13.3518;
Shock tms("i_s","RestofWorld","Mongolia") = 14.2868;
Shock tms("nfm","RestofWorld","Mongolia") = 14.3071;
Shock tms("fmp","RestofWorld","Mongolia") = 14.2903;
Shock tms("mvh","RestofWorld","Mongolia") = 14.2977;
Shock tms("otn","RestofWorld","Mongolia") = 14.2960;
Shock tms("ele","RestofWorld","Mongolia") = 12.4279;
Shock tms("ome","RestofWorld","Mongolia") = 14.4131;
Shock tms("omf","RestofWorld","Mongolia") = 13.6468;
Shock tms("ely","RestofWorld","Mongolia") = 17.5539;
Shock tms("gdt","RestofWorld","Mongolia") = 20.0000;

Source: GTAP Model

Table 4: Mongolia's Base and Updated Import Tariff Rates in the Simulations (rTMS)

(%)

No.	GTAP Code	GTAP Sector Description	Base Tax Rates	Updated Tax Rates	
				Version A	Version B
1	PDR	Paddy rice	2.835	2.835	16.648
2	WHT	Wheat	4.981	4.981	24.955
3	GRO	Cereal grains nec.	4.318	4.318	18.538
4	V_F	Vegetables, fruit, nuts	6.994	6.000	20.549
5	OSD	Oil seeds	3.500	3.500	20.92
6	C_B	Sugar cane, sugar beet	0.000	0.000	21.279
7	PFB	Plant-based fibers	0.000	0.000	20.124
8	OCR	Crops nec.	4.905	4.905	20.383
9	CTL	Cattle, sheep and goats, horses	0.843	3.000	15.894
10	OAP	Animal products nec.	4.888	4.888	21.131
11	WOL	Wool, silkworm cocoons	4.449	4.449	25.999
12	FRS	Forestry	4.346	4.346	26.464
13	FSH	Fisheries	1.247	1.247	22.119
14	COA	Coal	2.849	2.849	29.175
15	OIL	Oil	0.458	0.458	208.056
16	GAS	Gas	0.000	0.000	23.413
17	OMN	Minerals nec.	4.960	4.960	22.292
18	CMT	Bovine meat products	4.533	13.000	22.173
19	OMT	Meat products nec.	4.381	6.000	29.437
20	VOL	Vegetable oils and fats	4.991	4.991	19.369
21	MILRMK	Milk and dairy products	4.761	12.000	20.533
22	PCR	Processed rice	4.862	4.862	15.081
23	SGR	Sugar	4.954	4.954	20.203
24	OFD	Food products nec.	6.187	6.187	19.493
25	B_T	Beverages and tobacco products	8.011	17.000	27.069
26	TEX	Textiles	4.978	4.978	23.020
27	WAP	Wearing apparel	4.489	4.489	35.535
28	LEA	Leather products	4.855	4.855	21.957
29	LUM	Wood products	4.979	6.000	22.450
30	PPP	Paper products, publishing	4.944	4.944	22.705
31	P_C	Petroleum, coal products	4.967	4.967	20.231
32	CRP	Chemical, rubber, plastic products	4.991	4.991	7.003
33	NMM	Mineral products nec.	4.983	6.000	22.565
34	I_S	Ferrous metals	4.999	4.999	21.316
35	NFM	Metals nec.	4.980	4.980	35.881
36	FMP	Metal products	4.996	4.996	20.914
37	MVH	Motor vehicles and parts	4.989	4.989	21.027
38	OTN	Transport equipment nec.	4.991	4.991	21.879
39	ELE	Electronic equipment	3.177	4.000	18.058
40	OME	Machinery and equipment nec.	4.883	4.883	21.236
41	OMF	Manufacturing nec.	4.710	4.710	22.107
42	ELY	Electricity	2.081	2.081	36.807
43	GDT	Gas manufacture, distribution	0.000	0.000	38.058
44	OTH	Other goods and services:	0.000	0.000	0.000
		Total	173.245	203.583	1,164.05

Notes: 1. nec. = not elsewhere classified;

2. rTMS = GTAP variable of ad valorem import taxes by source

Source: GTAP 8.1 Data Base and simulation results

c) Terms-of-trade effect (area "c = CDFE2"): Like a direct burden, purchasing power is redistributed from foreign consumers to domestic consumers. The lower price accepted by foreigners compensates consumers for area "c" of their tariff payment to the government. Thus, the domestic price increases by less than the full amount of the tariff. Terms-of-trade gains to the importer is a loss of import purchasing power by the exporting country (Burfisher, M., 2011).

Because the direct burden of tax revenue simply redistributes national income, the change in national welfare includes only the excess burden of the tariff plus its terms-of-trade effect. Therefore, the importer's net effect depends on whether its consumption efficiency loss or excess burden (area "b") is greater than its terms-of-trade gain (area "c").

The GTAP model allows the quantification of these and other general equilibrium effects.

2.3 Results

2.3.1 Welfare Effects

The simulation results demonstrated that the MFN tariff reforms for 9 sectors introduced in Mongolia in 2016–2016 (Version A) would result in a direct burden of US$8.185 million of import tax revenue and an efficiency loss of US$0.752 million, while tariff changes for 43 sectors (Version B) up to Mongolia's WTO bound rates would result in a direct burden of US$256.62 million of import tax revenue and an efficiency loss of US$21.682 million (Table 5).

In terms of trade in goods and services, these tariff changes would result in a gain of US$0.623 million in Version A and a loss of US$14.251 million in Version B. In addition, in terms of trade in investment and savings, these changes would result in a gain in both cases equaling US$0.033 million and US$1.983 million, respectively (Table 5).

As the allocative efficiency (or the consumption efficiency) losses are greater than the terms-of-trade gains, the net effect of these tariff reforms would result in total welfare losses of US$0.096 million and US$33.95 million in Versions A and B, respectively. This means that for every dollar of additional import tax revenue, the Mongolian economy would incur 1.17 cents of welfare loss as a result of import tariff changes introduced in 2016–2016 and the welfare loss would increase further to 13.23 cents if the import tariffs were raised to Mongolia's WTO bound rates. Therefore, in order to compensate for these losses, it is required that the government spend the additional tax revenues on projects that will give a return of not less than 1.17% and 13.23%, respectively, in Versions A and B (Table 5).

In terms of the allocative efficiency effect by commodity or industry, almost all sectors would have efficiency losses, except the sectors of wheat, vegetables, fruit, nuts, forestry, electronic equipment and electricity in Version A, and minerals nec., coal and oil in Version B. In particular, the minerals nec. sector, representing copper, gold, zinc and other minerals, which are Mongolia's major industrial and export commodity, would have a US$0.732 million allocative efficiency gain in Version B, followed by the coal sector resulting in a gain of US$0.122 million (Table 6).

The results of the systematic sensitivity analysis (SSA) of the GTAP Model indicated that the negative sign of the welfare effect (EV) was robust with respect to the 100% variation of the source-specific import tax (tms) at a 75% confidence level (Appendix Table A2).

Table 5: Welfare Effects for Mongolia: EV Decomposition Summary

Components		Version A	Version B
Total welfare change (EV), 2007 US$ Million		−0.096	−33.95
	Allocative Efficiency	−0.752	-21.682
	Endowment	0	0
	Technology	0	0
	Population	0	0
	Terms of Trade in Goods and Services	0.623	-14.251
	Terms of Trade in Investment and Savings	0.033	1.983
Change in Government Tax Revenue (ΔT), 2007 US$ Million		8.185	256.62
Welfare Cost: Cents per US$ of Revenue {100×(EV/ΔT)}		−1.17	−13.23

Source: GTAP model, simulation results

2.3.2 Selected General Equilibrium Effects

The simulation results indicated that the import tax reforms would result in positive changes in Mongolia's GDP. The country's real GDP would see a 0.22% increase in the case of the MNF tariff raises introduced in 2015–2016 (Version A), while it would grow by 2.09% of import tariffs increased to the country's WTO bound rates (Version B) (Table 7).

From the expenditure side, private and government consumption increased by 0.27% and 0.19%, respectively, in Version A, while they went up by 2.02% and 1.52% in Version B, respectively. However, investment decreased in both versions and accounted for 0.04% and 8.36%, respectively, in Versions A and B. In addition, exports dropped in both cases, accounting for 0.10% and 0.06%, respectively, as the import tariff has a similar effect to a real exchange rate appreciation making Mongolian goods relatively expensive on foreign markets. At the same time, the aggregate imports of Mongolia decreased by 0.21% and 6.53% in Versions A and B respectively (Table 7).

On the source side, net taxes increased by 0.80% and 24.94% in Versions A and B, respectively. These increases represent the additional net increases of import tax revenues and indicate direct burdens of the import tariff reforms, as discussed earlier. Depreciation also increased in both cases as production has expanded. However, net factor income would be lower, dropping 7.99% in version B (Table 7).

Regarding foreign trade, Mongolia's terms of trade would increase by 0.026% in Version A, but decrease by 0.596% in Version B. Nevertheless, the country's trade balance had positive changes in both cases equaling US$2.8 million and US$157.5 million, respectively (Table 8).

Table 6: Version A: Welfare Decomposition of Allocative Efficiency Effect by Commodity

(2007 US$ million)

No.	GTAP Code	Produced Commodities	Contribution to EV of Allocative Effects	
			Version A	Version B
1	PDR	Paddy rice	0	0
2	WHT	Wheat	0.009	−0.775
3	GRO	Cereal grains nec	0	−0.006
4	V_F	Vegetables, fruit, nuts	0.027	−0.299
5	OSD	Oil seeds	0	0
6	C_B	Sugar cane, sugar beet	0	0
7	PFB	Plant-based fibers	0	0
8	OCR	Crops nec	0	−0.022
9	CTL	Cattle, sheep and goats, horses	−0.003	−0.234
10	OAP	Animal products nec	−0.001	−0.334
11	WOL	Wool, silkworm cocoons	−0.001	−0.043
12	FRS	Forestry	0.001	−0.034
13	FSH	Fisheries	0	−0.002
14	COA	Coal	0	0.122
15	OIL	Oil	0	0.01
16	GAS	Gas	0	0
17	OMN	Minerals nec	−0.002	0.732
18	CMT	Bovine meat products	−0.109	−0.028
19	OMT	Meat products nec	−0.017	−0.149
20	VOL	Vegetable oils and fats	−0.002	−0.167
21	MILRMK	Milk and dairy products	−0.261	−0.526
22	PCR	Processed rice	0	−0.009
23	SGR	Sugar	0	−0.042
24	OFD	Food products nec	−0.003	−1.104
25	B_T	Beverages and tobacco products	−0.187	−0.641
26	TEX	Textiles	−0.009	−0.371
27	WAP	Wearing apparel	−0.015	−2.148
28	LEA	Leather products	−0.006	−0.077
29	LUM	Wood products	−0.012	−0.213
30	PPP	Paper products, publishing	−0.001	−0.355
31	P_C	Petroleum, coal products	−0.006	−1.111
32	CRP	Chemical, rubber, plastic products	−0.001	−0.181
33	NMM	Mineral products nec	−0.042	−0.625
34	I_S	Ferrous metals	−0.001	−0.317
35	NFM	Metals nec	−0.013	−0.255
36	FMP	Metal products	−0.003	−0.351
37	MVH	Motor vehicles and parts	−0.012	−0.941
38	OTN	Transport equipment nec	−0.021	−1.389
39	ELE	Electronic equipment	0.015	−0.114
40	OME	Machinery and equipment nec	−0.026	−1.817
41	OMF	Manufacturing nec	−0.003	−0.165
42	ELY	Electricity	0.007	−4.907
43	GDT	Gas manufacture, distribution	0	−0.001
44	OTH	Other goods and services	−0.054	−2.789
		Total	−0.752	−21.682

Note: nec. = not elsewhere classified

Source: GTAP model, simulation results

Table 7: Changes in Mongolia's GDP by Expenditure and Source

Components	Values by Version, 2007 US$ Million			Pre- and Post- Simulation Changes			
				2007 US$ Million		Percentage (%)	
GDPEXP:	Base	A	B	A	B	A	B
Private Consumption (C)	1,983.9	1,989.3	2,024.0	5.39	40.1	0.27	2.02
Investment (I)	1,474.7	1,474.1	1,351.5	−0.63	−123.3	−0.04	−8.36
Government Consumption (G)	518.2	519.2	526.1	0.98	7.87	0.19	1.52
Exports (X)	2,391.9	2,389.5	2,390.4	−2.40	−1.41	−0.10	−0.06
Imports (M)	2,439.1	2,434.0	2,280.2	−5.16	−158.9	−0.21	−6.53
Total	3,929.6	3,938.1	4,011.8	8.52	82.26	0.22	2.09
GDPSRC:	Base	A	B	A	B	A	B
Net Factor Income (NETFACTINC)	2,430.7	2,430.7	2,236.6	0.01	−194.1	0.00	−7.99
Net Taxes (NETAXES)	1,028.9	1,037.1	1,285.5	8.18	256.62	0.80	24.94
Depreciation (VDEP)	470.0	470.3	489.7	0.33	19.73	0.06	4.19
Total	3,929.6	3,938.1	4,011.8	8.52	82.25	0.22	2.09

Source: GTAP model, simulation results

Table 8: Effects on Mongolia's Foreign Trade

Item	Version A	Version B
Changes in Terms of Trade (tot)[6], percentage change (%)	0.026	−0.596
Changes in Trade balance (DTBAL)[7], 2007 US$ million	2.8	157.5

Source: GTAP model, simulation results

As illustrated in Figure 1, introduction of import tariffs (or any increase of the existing tariffs) results in decreased demand for import varieties of these goods and increased demand for domestic varieties; thus, there is an expansion of the domestic production of these commodities. Accordingly, Mongolia's self-sufficiency in the test for Version A increased for all sectors upon which import tariff rises were applied. The self-sufficiency represents share of the domestic supply in total use, and for most of the commodities in question Mongolia's self-sufficiency rate was lower and their use was dependent on imports. The data indicates that Mongolia was self-sufficient in only 14 out of the 44 sectors in question. For milk and dairy products, for example, despite the abundance of domestic raw materials, only 85% of total use was supplied by domestic production and it would increase slightly to 86.4%, when the import tax on milk and dairy products increased to 12% from its base rate of 5% as the result of the import tariff reforms carried out in 2015–2016. Even if the import tariff rose to 16%, the WTO bound level, domestic production of milk and dairy products would increase to 88.4% of total use, which is still an insufficient level (Table 10).

Therefore, import tariffs effect a country's industrial structure because the expanding industries compete with other industries and services for resources for production. This competition causes wages and rents in the importing country to rise relative to those in the rest of the world, which is a similar effect to a real exchange-rate appreciation. Therefore, it makes all the importer's goods relatively expensive on world markets. Both resource competition and real exchange rate appreciation contribute to a decline in the importer's production and exports and an increase in imports. These changes in trade flows contribute to an aggregate term-of-trade gain/loss of an importer (Burfisher, M., 2011).

In our test, for example in Version A, Mongolia's import tariff raising for milk and dairy products from 5% to 12% would result in an increase of the market price of milk and dairy products by 0.59% and an output expansion of domestic milk and dairy products of 2.979%, while the domestic market price of imports of milk and dairy products would be 6.91% higher. This was consistent with the expectation that the domestic price of imports increases by less than the full amount of the tariff increase. The excess burden, or deadweight efficiency loss related to milk and dairy products equaled US$0.261 million as reported in Table 6 (Tables 6, 11, and 14).

As discussed earlier, due to expanding industries, the demands for endowments or the factors of production in Version A increased for all sectors in question, except for vegetables, fruit and nuts, while those in other goods and services decreased. For example, the demand for labor in milk and dairy products increased by 3.431%, while the demand for land and capital increased respectively by 1.832% and 3.459%. Accordingly, the market price for land and labor would rise by 0.537% and 0.016%, respectively, in version A (Tables 9 and 12).

Table 9: Effects of Market Price of Endowments

(pm, % change)

Endowment Commodities	Version A	Version B
Land	0.537	−3.804
Labor	0.016	−6.747
Capital	−0.026	−6.466
Natural Resources	−0.036	2.062

Source: GTAP model, simulation results

Similar effects were observed for all other sectors in question, except vegetables, fruit and nuts. The vegetables, fruit and nuts sector had a welfare gain of US$0.027 million in version A, while its output decreased by 0.433%. This is in fact a consistent result, because the newly introduced import tariff rate of 6% for this sector was lower than its base rate of 6.994%, i.e. it actually had a tariff reduction effect (Tables 6 and 11).

Increased tariffs on imports led to a decrease in the quantities of imports of the affected products and also a decrease for all Mongolia's exports. As reported in Table 14, the quantity of aggregate imports decreased for all 8 sectors in Version A, which were subject to an import tax rise. For example, the aggregate import quantity of milk and dairy products decreased by 14.563% and the domestic market price of imports of milk and dairy products would become 6.91% higher (Table 14).

In addition, both the resource competition and real exchange-rate appreciation effects contributed to a decline in Mongolia's exports. In version A, the aggregate export quantity of milk and dairy products decreased by 4.307%, while its aggregate export price went up 0.59%. At the same time, both the resource competition and real exchange rate appreciation effects resulted in a decline of production and exports of other goods and services, which were not subject to import tariff reform, thus leading to a rise in their import. In Version A, for example, the output of food products nec. declined by 0.403% and the aggregate export quantity of food products nec. decreased 0.699%, as the country's export price for these products became 0.188% higher compared to the price before the import tariff reform (Tables 11, 14 and 15).

Similar results were observed in Version B of the import tariff reform, but obviously their scale was much greater than in Version A. For example, as a result of the import tariff being

raised to Mongolia's WTO bound rates, the market price of milk and dairy products would decrease by 2.571% and its output would be 11.531% higher than before the tariff hikes. Accordingly, the quantities demanded for labor and capital in the milk and dairy products industry increased by 13.445% and 13.253%, respectively. Also, the quantities demanded for land and natural resources increased by 6.816% and 0.011%, respectively (Tables 11 and 13).

As expected, the import quantity of milk and dairy products decreased by 28.741% in Version B. However, despite the real exchange-rate appreciation effect, the export quantity of milk and dairy products increased by 18.761%, in contrast to Version A. This was due to the aggregate export price index of milk and dairy products decreasing by 2.571%, making Mongolian milk and dairy products cheaper than in the rest of world (Tables 14 and 15).

Table 10: Mongolia's Self-Sufficiency or Domestic Share in Total Use

No.	GTAP Code	GTAP Sector Description	Base	Updated	
				Version A	Version B
1	OIL	Oil	25,552.76	25,579.625	28,951.16
2	OMN	Minerals nec.	25.823	25.823	25.941
3	OSD	Oil seeds	16.855	16.387	15.304
4	NFM	Metals nec.	6.638	6.635	6.564
5	WAP	Wearing apparel	2.307	2.303	1.828
6	WOL	Wool, silkworm cocoons	1.869	1.865	2.030
7	COA	Coal	1.692	1.692	1.665
8	LEA	Leather products	1.357	1.333	1.497
9	TEX	Textiles	1.247	1.246	1.331
10	CMT	Bovine meat products	1.195	1.198	1.247
11	GDT	Gas manufacture, distribution	1.090	1.090	1.090
12	OAP	Animal products nec.	1.060	1.060	1.080
13	OTH	Other services	1.056	1.055	1.061
14	CTL	Cattle, sheep and goats, horses	1.011	1.011	1.015
15	ELY	Electricity	0.989	0.989	0.993
16	OMT	Meat products nec.	0.909	0.915	0.981
17	FRS	Forestry	0.904	0.904	0.923
18	MILRMK	Milk and dairy products	0.850	0.864	0.884
19	V_F	Vegetables, fruit, nuts	0.832	0.831	0.839
20	WHT	Wheat	0.716	0.715	0.774
21	GRO	Cereal grains nec.	0.627	0.628	0.609
22	FSH	Fisheries	0.623	0.623	0.614
23	NMM	Mineral products nec.	0.552	0.556	0.604
24	C_B	Sugar cane, sugar beet	0.531	0.532	0.523
25	LUM	Wood products	0.516	0.52	0.576
26	PDR	Paddy rice	0.505	0.503	0.547
27	GAS	Gas	0.461	0.461	0.502
28	OMF	Manufacturing nec.	0.443	0.442	0.47
29	PPP	Paper products, publishing	0.314	0.314	0.366
30	OCR	Crops nec.	0.294	0.284	0.275
31	I_S	Ferrous metals	0.279	0.279	0.306
32	B_T	Beverages and tobacco products	0.214	0.215	0.215
33	OFD	Food products nec.	0.179	0.178	0.191
34	PFB	Plant-based fibers	0.127	0.126	0.131
35	CRP	Chemical, rubber, plastic products	0.122	0.122	0.119
36	P_C	Petroleum, coal products	0.084	0.084	0.089
37	FMP	Metal products	0.083	0.083	0.099
38	ELE	Electronic equipment	0.058	0.059	0.079
39	OTN	Transport equipment nec.	0.029	0.029	0.035
40	MVH	Motor vehicles and parts	0.023	0.023	0.027
41	OME	Machinery and equipment nec.	0.023	0.023	0.025
42	VOL	Vegetable oils and fats	0.004	0.004	0.002
43	PCR	Processed rice	0.002	0.002	0.003
44	SGR	Sugar	0.002	0.002	0.002

Note: nec. = not elsewhere classified
Source: GTAP model, simulation results

Table 11: Effects on Market Price and Industry Output

Produced Commodities (i)	Market Price Changes (pm, % change)		Industry Output Changes (qo, % change)	
	Version A	Version B	Version A	Version B
Paddy rice	0.730	-0.806	−1.072	18.626
Wheat	0.126	3.738	−0.141	18.482
Cereal grains nec.	0.400	-0.901	−0.061	2.336
Vegetables, fruit, nuts	0.086	0.388	−0.433	4.882
Oil seeds	0.725	-0.831	−3.279	4.045
Sugar cane, sugar beet	0.732	-0.844	−0.359	11.447
Plant-based fibers	0.731	-0.813	−0.894	24.865
Crops nec.	0.723	-0.829	−4.099	5.850
Cattle, sheep and goats, horses	0.135	-6.282	0.009	-4.131
Animal products nec.	0.070	-3.927	−0.053	-1.769
Wool, silkworm cocoons	0.047	-1.389	−0.343	7.871
Forestry	0.181	0.514	0.199	6.885
Fisheries	−0.028	4.133	−0.024	3.915
Coal	0.004	0.223	−0.005	1.191
Oil	0.000	-0.128	0.001	1.284
Gas	−0.019	15.993	−0.008	8.460
Minerals nec.	0.003	-1.261	−0.002	1.223
Bovine meat products	0.132	-2.610	0.657	5.628
Meat products nec.	0.119	-2.301	0.921	13.726
Vegetable oils and fats	2.011	6.268	−12.217	-35.944
Milk and dairy products	0.590	-2.571	2.979	11.531
Processed rice	1.895	6.574	−3.899	8.725
Sugar	1.986	6.439	−5.549	19.543
Food products nec.	0.188	2.517	−0.403	15.740
Beverages and tobacco products	0.915	5.034	5.080	6.952
Textiles	0.032	-1.157	−0.231	12.339
Wearing apparel	0.036	4.382	−0.206	-16.912
Leather products	0.282	-2.550	−2.098	23.472
Wood products	0.107	0.953	1.332	18.112
Paper products, publishing	0.027	0.290	−0.075	24.899
Petroleum, coal products	0.215	5.284	−0.450	15.513
Chemical, rubber, plastic products	0.026	1.509	−0.103	-2.538
Mineral products nec.	0.057	1.519	1.168	13.844
Ferrous metals	0.024	4.510	−0.089	17.228
Metals nec.	0.028	0.282	−0.229	-1.303
Metal products	0.024	3.143	−0.132	28.306
Motor vehicles and parts	0.025	2.115	−0.118	23.829
Transport equipment nec.	0.028	-0.497	−0.222	28.250
Electronic equipment	0.028	0.042	2.721	36.959
Machinery and equipment nec.	0.026	2.529	−0.184	15.427
Manufacturing nec.	0.026	2.500	−0.160	8.429
Electricity	0.028	-0.823	0.003	2.482
Gas manufacture, distribution	0.037	0.892	−0.025	1.291
Other services	0.059	-0.025	−0.062	-2.450
Capital goods	0.069	4.197	−0.112	-12.554

Notes: 1. nec. = not elsewhere classified;
      2. pm = GTAP variable for market price of commodity i in region r: "Mongolia" column;
      3. qo = GTAP variable for industry output of commodity i in region r: "Mongolia" column
Source: GTAP model, simulation results

Table 12: Effects on Production Factors in Version A, % change (qfe[Mongolia])**

Produced Commodities (i)	Land	Labor	Capital	Natural Resources
Paddy rice	−0.988	−1.107	−1.097	−0.004
Wheat	−0.201	−0.119	−0.108	0
Cereal grains nec.	−0.133	−0.034	−0.023	0
Vegetables, fruit, nuts	−0.447	−0.428	−0.418	−0.002
Oil seeds	−2.857	−3.453	−3.443	−0.013
Sugar cane, sugar beet	−0.385	−0.35	−0.339	−0.001
Plant-based fibers	−0.837	−0.918	−0.908	−0.004
Crops nec.	−3.551	−4.324	−4.314	−0.017
Cattle, sheep and goats, horses	−0.074	0.041	0.051	0
Animal products nec.	−0.126	−0.025	−0.015	0
Wool, silkworm cocoons	−0.371	−0.333	−0.323	−0.001
Forestry	0.101	0.225	0.233	0.001
Fisheries	−0.122	−0.042	−0.034	0
Coal	−0.100	−0.016	−0.007	0
Oil	−0.093	−0.007	0.001	0
Gas	−0.105	−0.022	−0.014	0
Minerals nec.	−0.095	−0.010	−0.002	0
Bovine meat products	0.014	0.614	0.660	0.001
Meat products nec.	0.143	0.887	0.934	0.001
Vegetable oils and fats	−6.058	−12.259	−12.212	−0.011
Milk and dairy products	1.832	3.431	3.459	0.005
Processed rice	−2.134	−3.941	−3.894	−0.003
Sugar	−2.912	−5.59	−5.543	−0.005
Food products nec.	−0.482	−0.438	−0.391	0
Beverages and tobacco products	2.106	5.049	5.095	0.005
Textiles	−0.414	−0.279	−0.227	0
Wearing apparel	−0.390	−0.224	−0.172	0
Leather products	−1.222	−2.105	−2.053	−0.002
Wood products	0.281	1.292	1.344	0.001
Paper products, publishing	−0.324	−0.076	−0.024	0
Petroleum, coal products	−0.505	−0.485	−0.433	0
Chemical, rubber, plastic products	−0.336	−0.103	−0.051	0
Mineral products nec.	0.207	1.125	1.177	0.001
Ferrous metals	−0.330	−0.089	−0.037	0
Metals nec.	−0.411	−0.273	−0.221	0
Metal products	−0.349	−0.132	−0.079	0
Motor vehicles and parts	−0.361	−0.160	−0.108	0
Transport equipment nec.	−0.392	−0.230	−0.178	0
Electronic equipment	0.913	2.721	2.773	0.002
Machinery and equipment nec.	−0.372	−0.184	−0.132	0
Manufacturing nec.	−0.361	−0.160	−0.108	0
Electricity	−0.300	−0.021	0.032	0
Gas manufacture, distribution	−0.310	−0.045	0.007	0
Other services	−0.342	−0.097	−0.040	0
Capital goods	−0.325	−0.128	−0.087	0

Notes: 1. nec. = not elsewhere classified;
     2. qfe[**Mongolia] = GTAP variable of demand for endowment i for use in industry j in region r: "Mongolia"
Source: GTAP model, simulation results

Table 13: Effects on Production Factors in Version B, % change (qfe[Mongolia])**

Produced Commodities (i)	Land	Labor	Capital	Natural Resources
Paddy rice	15.318	19.982	19.910	0.069
Wheat	15.201	19.835	19.763	0.069
Cereal grains nec.	1.533	2.676	2.604	0.002
Vegetables, fruit, nuts	3.688	5.382	5.310	0.012
Oil seeds	2.980	4.492	4.420	0.009
Sugar cane, sugar beet	9.237	12.348	12.276	0.039
Plant based fibers	20.592	26.601	26.530	0.095
Crops nec.	4.507	6.410	6.338	0.016
Cattle, sheep and goats, horses	−3.941	−4.196	−4.268	−0.025
Animal products nec.	−1.942	−1.686	−1.758	−0.015
Wool, silkworm cocoons	6.219	8.558	8.486	0.025
Forestry	6.229	8.063	8.007	0.031
Fisheries	4.467	5.950	5.893	0.021
Coal	1.241	2.077	2.021	0.002
Oil	1.277	2.121	2.064	0.002
Gas	11.231	14.066	14.009	0.061
Minerals nec.	0.696	1.423	1.367	−0.002
Bovine meat products	1.237	5.920	5.604	−0.004
Meat products nec.	5.027	13.953	13.638	0.004
Vegetable oils and fats	−18.376	−35.660	−35.976	−0.041
Milk and dairy products	6.816	13.445	13.253	0.011
Processed rice	2.692	9.003	8.688	−0.001
Sugar	7.794	19.819	19.504	0.009
Food products nec.	5.979	15.973	15.657	0.005
Beverages and tobacco products	1.825	7.166	6.850	−0.002
Textiles	3.961	12.661	12.306	0.001
Wearing apparel	−9.069	−16.787	−17.142	−0.022
Leather products	8.769	23.526	23.171	0.010
Wood products	6.494	18.385	18.030	0.006
Paper products, publishing	9.379	24.905	24.550	0.011
Petroleum, coal products	5.329	15.752	15.397	0.004
Chemical, rubber, plastic products	−2.764	−2.538	−2.893	−0.011
Mineral products nec.	4.615	14.138	13.783	0.002
Ferrous metals	5.982	17.228	16.873	0.005
Metals nec.	−2.084	−1.001	−1.356	−0.010
Metal products	10.884	28.306	27.951	0.014
Motor vehicles and parts	9.029	24.113	23.758	0.010
Transport equipment nec.	10.883	28.303	27.948	0.014
Electronic equipment	14.712	36.959	36.604	0.021
Machinery and equipment nec.	5.185	15.427	15.072	0.003
Manufacturing nec.	2.089	8.429	8.074	−0.002
Electricity	−0.473	2.639	2.284	−0.007
Gas manufacture, distribution	−1.009	1.428	1.073	−0.008
Other services	−2.636	−2.216	−2.600	−0.010
Capital Goods	−7.796	−12.649	−12.930	−0.021

Notes: 1. nec. = not elsewhere classified;
    2. qfe[**Mongolia] = GTAP variable of demand for endowment i for use in industry j in region r: "Mongolia"
Source: GTAP model, simulation results

Table 14: Effects on Mongolia's Imports   (% change)

Traded Commodities (i)	Version A		Version B	
	Domestic Market Price of Import (pim)	Aggregate Import Quantity (qim)	Domestic Market Price of Imports (pim)	Aggregate Import Quantity (qim)
Paddy rice	0	0.816	11.829	−11.926
Wheat	0	0.397	14.306	−24.806
Cereal grains nec	0	0.029	13.115	−3.785
Vegetables, fruit, nuts	−0.929	1.080	11.221	−11.428
Oil seeds	0	0.390	15.941	−5.282
Sugar cane, sugar beet	0	0.096	19.998	−6.001
Plantbased fibers	0	0.008	20.000	−0.616
Crops nec	0	0.006	14.389	−2.477
Cattle, sheep and goats, horses	2.139	−3.493	11.064	−25.870
Animal products nec	0	−0.036	12.501	−19.276
Wool, silkworm cocoons	0	−0.094	14.886	−27.834
Forestry	0	0.655	15.002	−29.226
Fisheries	0	−0.085	18.522	−10.151
Coal	0	−0.434	16.639	−34.613
Oil	0	−0.071	19.196	−87.901
Gas	0	−0.092	19.991	−14.287
Minerals nec	0	−0.101	14.329	−13.223
Bovine meat products	8.100	−26.144	10.013	−40.664
Meat products nec	1.551	−5.024	12.090	−49.636
Vegetable oils and fats	0	−0.025	13.344	−2.568
Milk and dairy products	6.910	−14.563	10.728	−28.741
Processed rice	0	0.469	9.667	−0.793
Sugar	0	−0.045	14.336	−1.333
Food products nec	0	0.017	12.067	−3.706
Beverages and tobacco products	8.322	−3.139	16.655	−5.611
Textiles	0	−0.114	14.309	−16.738
Wearing apparel	0	0.059	19.630	−33.935
Leather products	0	0.062	14.444	−11.446
Wood products	0.972	−1.252	13.356	−19.750
Paper products, publishing	0	0.011	14.348	−15.229
Petroleum, coal products	0	0.022	14.322	−1.514
Chemical, rubber, plastic products	0	0.018	1.914	−0.168
Mineral products nec	0.969	−1.444	13.352	−20.276
Ferrous metals	0	−0.013	14.287	−8.066
Metals nec	0	−0.096	14.307	−51.393
Metal products	0	−0.021	14.291	−5.742
Motor vehicles and parts	0	−0.063	14.298	−6.406
Transport equipment nec	0	−0.091	14.296	−11.127
Electronic equipment	0.797	−0.323	12.428	−13.832
Machinery and equipment nec	0	−0.072	14.413	−7.562
Manufacturing nec	0	−0.058	13.647	−17.862
Electricity	0	0.089	17.554	−48.399
Gas manufacture, distribution	0	0.063	19.996	−47.422
Other goods and services	0	0.063	0	−3.120

Notes: 1. nec. = not elsewhere classified; 2. qim = GTAP variable for aggregate import quantity of traded commodities i in region s (Mongolia), market price weighting; 3. pim = GTAP variable for domestic market price of composite import price of traded commodities i in region r (Mongolia)

Source: GTAP model, simulation results

Table 15: Effects on Mongolia's Exports   (% change)

Traded Commodities (i)	Version A		Version B	
	Aggregate Export Price Index (pxw)	Aggregate Export Quantity (qxw)	Aggregate Export Price Index (pxw)	Aggregate Export Quantity (qxw)
Paddy rice	0.730	−6.999	−0.806	57.320
Wheat	0.126	−1.125	3.738	−33.271
Cereal grains nec	0.400	−0.955	−0.901	2.153
Vegetables, fruit, nuts	0.086	−0.312	0.388	−1.404
Oil seeds	0.725	−3.301	−0.831	3.784
Sugar cane, sugar beet	0.732	−3.936	−0.844	23.972
Plantbased fibers	0.731	−3.654	−0.813	34.714
Crops nec	0.723	−4.323	−0.829	4.956
Cattle, sheep and goats, horses	0.135	−0.541	−6.282	25.121
Animal products nec	0.070	−0.171	−3.927	9.551
Wool, silkworm cocoons	0.047	−0.586	−1.389	17.359
Forestry	0.181	−0.900	0.514	−2.553
Fisheries	−0.028	0.056	4.133	−8.119
Coal	0.004	−0.024	0.223	−1.233
Oil	0.000	0.001	−0.128	1.284
Gas	−0.019	0.557	15.993	41.082
Minerals nec	0.003	−0.003	−1.261	1.244
Bovine meat products	0.132	−0.960	−2.610	18.990
Meat products nec	0.119	−1.015	−2.301	19.615
Vegetable oils and fats	2.011	−12.545	6.268	−39.100
Milk and dairy products	0.590	−4.307	−2.571	18.761
Processed rice	1.895	−9.848	6.574	−33.602
Sugar	1.986	−10.724	6.439	−34.588
Food products nec	0.188	−0.699	2.517	−9.368
Beverages and tobacco products	0.915	−2.079	5.034	−11.439
Textiles	0.032	−0.231	−1.157	8.243
Wearing apparel	0.036	−0.252	4.382	−30.800
Leather products	0.282	−2.204	−2.550	19.963
Wood products	0.107	−0.649	0.953	−5.762
Paper products, publishing	0.027	−0.149	0.290	−1.589
Petroleum, coal products	0.215	−0.899	5.284	−22.140
Chemical, rubber, plastic products	0.026	−0.155	1.509	−9.135
Mineral products nec	0.057	−0.251	1.519	−6.713
Ferrous metals	0.024	−0.132	4.510	−24.647
Metals nec	0.028	−0.235	0.282	−2.368
Metal products	0.024	−0.168	3.143	−21.662
Motor vehicles and parts	0.025	−0.132	2.115	−11.330
Transport equipment nec	0.028	−0.238	−0.497	4.202
Electronic equipment	0.028	−0.237	0.042	−0.358
Machinery and equipment nec	0.026	−0.200	2.529	−19.793
Manufacturing nec	0.026	−0.188	2.500	−18.421
Electricity	0.028	−0.160	−0.823	4.613
Gas manufacture, distribution	0.037	−0.207	0.892	−4.987
Other goods and services	0.059	−0.191	−0.025	0.083

Notes: 1. nec. = not elsewhere classified; 2. qxw = GTAP variable for aggregate export quantity of traded commodities i from region r (Mongolia), FOB weights; 3. pxw = GTAP variable for aggregate export price index of traded commodities i from region r (Mongolia)
Source: GTAP model, simulation results

3. Conclusion

Foreign trade plays an essential role in Mongolia's economy and it is important to properly analyze and understand the economic impacts of the country's trade policy. Since the beginning of the country's transition toward a market economy, Mongolia has been pursuing a relatively liberal foreign trade policy.

Mongolia's import tariff policy since the economic transition can be classified into four phases, namely: the period of transition toward introducing and setting tariff policies on foreign trade; the period of integration into multilateral trade policies and rules; the period of enhancing the regulatory functions of customs tariffs; and the start of supporting domestic industries by tariff policies.

Currently, Mongolia is imposing much lower tariff rates on imports than the country's commitments to the WTO. Aiming at supporting domestic industries, the government of Mongolia has increased import taxes on some domestically produced products and is planning to increase them further up to the WTO bound rates.

An analysis of the economic impacts on the ongoing and planned tariff reforms using the CGE model and employing the GTAP Data Base 8.1 revealed that although Mongolia's GDP would have positive changes in both cases, such tariff reforms would result in a loss for the country's total welfare. The allocative efficiency loss (US$0.518 million) was greater than the terms-of-trade gain (US$0.018 million) in the former case, while Mongolia would experience both allocative efficiency and terms-of-trade losses if the country raised import taxes up to its WTO bound rates. In order to compensate for these losses, it is required that the government spend the additional tax revenues on projects that will give a return of 1.17% and 13.23% respectively in the ongoing and expected tax reforms, respectively. For example, the government of Mongolia is implementing a mortgage loan program to support low-income families to purchase houses. The housing loan rate to these families is much lower than the market rate and currently amounts to 8% per annum. If the government funded this program with the additional tax revenues from import tax reform, the lending rate would need to be increased to at least 13.23%, otherwise the overall welfare of the economy would incur losses.

The other general equilibrium effects indicated that import tariff reforms would affect Mongolia's industrial structure and foreign trade. The increased import tariffs had a similar effect to a real exchange rate appreciation that made Mongolia's products relatively expensive at world markets. Therefore, most of the sectors that had import tariff increases would have reductions in their exports, despite their output expansions, especially as a result of the tariff reforms in 2015–2016.

However, in case Mongolia would rise import tariffs up to for its WTO bound rates, the country's industrial output would expand along with increase of exports of Mongolia's major manufacturing industries, such as leather products, meat products, dairy products, and wool and cashmere products.

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Appendix Table A1: Commodity Aggregation Used in the Model

The Model (44 Sectors)	GTAP Data Base 8.1 (57 Sectors)
Paddy rice	Paddy rice
Wheat	Wheat
Cereal grains nec.	Cereal grains nec.
Vegetables, fruit, nuts	Vegetables, fruit, nuts
Oil seeds	Oil seeds
Sugar cane, sugar beet	Sugar cane, sugar beet
Plantbased fibers	Plantbased fibers
Crops nec.	Crops nec.
Cattle, sheep and goats, horses	Cattle, sheep and goats, horses
Animal products nec.	Animal products nec.
Wool, silkworm cocoons	Wool, silkworm cocoons
Forestry	Forestry
Fisheries	Fisheries
Coal	Coal
Oil	Oil
Gas	Gas
Minerals nec.	Minerals nec.
Bovine meat products	Bovine meat products
Meat products nec.	Meat products nec.
Vegetable oils and fats	Vegetable oils and fats
Milk and dairy products	Raw milk, Dairy products
Processed rice	Processed rice
Sugar	Sugar
Food products nec.	Food products nec.
Beverages and tobacco products	Beverages and tobacco products
Textiles	Textiles
Wearing apparel	Wearing apparel
Leather products	Leather products
Wood products	Wood products
Paper products, publishing	Paper products, publishing
Petroleum, coal products	Petroleum, coal products
Chemical, rubber, plastic products	Chemical, rubber, plastic products
Mineral products nec.	Mineral products nec.
Ferrous metals	Ferrous metals
Metals nec.	Metals nec.
Metal products	Metal products
Motor vehicles and parts	Motor vehicles and parts
Transport equipment nec.	Transport equipment nec.
Electronic equipment	Electronic equipment
Machinery and equipment nec.	Machinery and equipment nec.
Manufacturing nec.	Manufacturing nec.
Electricity	Electricity
Gas manufacture, distribution	Gas manufacture, distribution
Other services	Water; Construction; Trade; Transport nec.; Sea transport; Air transport; Communication; Financial services nec.; Insurance; Business services nec.; Recreation and other services; Public administration; defense, health, education; Dwellings

Notes: 1. The original sectors in the GTAP Data Base 8.1 start with capital letters;
           2. nec. = not elsewhere classified

Appendix Table A2: Systematic Sensitivity Analysis (SSA) of the EV Results to Changes with 100% Variation in the Shocks

(tms = % ad valorem import tax by source)

Indicators	Version A		Version B	
Confidence Intervals*	**75%**	**95%**	**75%**	**95%**
Mean (X)	−0.096	−0.096	−33.949	−33.949
Standard Deviation (sd)	0.039	0.039	13.86	13.86
Standard Deviation Multiplier (k)	2	4.47	2	4.47
Upper limit (X+sdK)	−0.018	0.078	−6.229	28.005
Lower Limit (X−sdK)	−0.174	−0.27	−61.669	−95.903

Note: *Estimations made according to Chebyshev's Theorem
Source: GTAP model, SSA simulation results

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[1] Otgonsaikhan, N., p. 83

[2] Resolution 24 of 18 April 1997, "Customs Duty on Imported Goods"

[3] The Law on Supporting Manufacturing, 2015

[4] Customs Tariffs and Customs Duty Law, Clause 4.2. The Customs tariffs on imported goods consist of general tariffs, most-favoured-nation (MFN) tariffs and preferential tariffs. The general tariff rates are twice the MFN tariffs. Preferential tariffs are set by international treaty. The law was amended on 3 December 2015.

[5] For more details on the GTAP model and database, see Hertel, T. (ed.) 1997.

[6] tot (REG) [% change]: terms of trade for region r: tot(r) = psw(r) − pdw(r);
psw(r) # *index of prices received for tradables produced in* r #;
pdw(r) # *index of prices paid for tradables used in region* r #

[7] DTBAL(REG) [change]: change in trade balance X−M, US$ million