Mongolia's Mining-Based Development and Trade Policy

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This paper analyzes the relationship between the mining-based economic development and trade policy in Mongolia by employing a multi-sector dynamic CGE model. Seven different scenarios, including those with the implementation of the Oyu Tolgoi and Tavan Tolgoi projects, were considered. Investigation of several important mining-related aspects of Mongolia's trade, such as trade and growth forecasts, the impact of the "Dutch disease", income distribution, and others, were employed in this paper.

1. Trade and Economic Overview of Mongolia

Twenty-two years ago Mongolia made a historic decision to change both its political and economic systems and started the transition to a democratic society and market economy. However, at the beginning of the transition, Mongolia faced several turbulent episodes; the country went a long way towards restructuring its obsolete economic system and putting in place a system with a greater degree of competition and a more broad-based ownership of assets, all of which have helped in overcoming the economic downturn of the initial years of transition and to stabilize the economy.

The economy has been on an upward trend since 2000, and there are signs that the transition process is coming to an end. The measures adopted to stabilize the economy and to encourage foreign and domestic investments enabled Mongolia to haul its economy out of the deep crisis of the early years of transition. Its GDP, which was declining on the average by 7.3% a year during the period 1990-1993, grew by an average of 7.9% a year during the period 2005-2010[1]. According to the World Bank, Mongolia's GNI per capita had reached US$1,890 in 2010.

One of the most prominent features of the Mongolian economy since the 1990s has been the liberalization of international trade under conditional agreements with the IMF and the World Bank, as a part of the Structural Adjustment Program and under the multilateral trade regulations of the WTO. During this period, Mongolia has gradually implemented policies to liberalize its foreign trade and foreign investment regimes, to support economic growth and economic sectors through an active trade policy, and increase the country's exports.

On 29 January 1997 Mongolia officially joined the World Trade Organization (WTO). After becoming a member of the WTO, Mongolia made major improvements in its trade and business climates. Mongolia guaranteed to reduce tariff and non-tariff barriers to trade. Mongolia reduced its average nominal tariff to 5 percent and eliminated almost all licenses for export and import commodities. Mongolia reduced barriers to foreign direct investment in many industrial sectors, except in the air transport, telecommunications and power sectors. Mongolia has also eliminated all export and domestic subsidies for all sectors of the economy, eased customs procedures, sanitary and phytosanitary restrictions, and product specifications.

However, an ultimate goal of trade policy was to integrate Mongolia into the regional and world economy, but even today Mongolia has not signed any Free Trade Agreement (FTA) yet. Mongolia is the only WTO member which doesn't belong to any trade bloc or FTA. Nevertheless, Mongolia promotes an open and liberal trade policy and the country is seeking ways to sign effective FTAs with its major trading partners within the framework of multilateral trade regulations. Nowadays this is becoming more important, with the country having gone a long way towards a sustainable growth path and increasing its trade volume.

In general, Mongolia's trade policy since its transition to a market economy was aimed at quickly adapting to the changing economic environment, along with resolving the country's economic difficulties and softening challenges resulting from the transition and integrating into the world economy.

Following the above measures, Mongolia experienced some very important changes during this period that might have important implications for the sustainability of its future trade. Since 1990 Mongolian exports and imports have diversified not only in geographical terms, but its trade turnover has grown nearly 6.8 times compared to its pre-transition level. In 2011 the total value of exports reached US$4,817.5 million and total imports amounted to US$6,598.4 million[2]. Apart from the former Soviet-bloc countries, China, Japan, the ROK, Germany, the United Kingdom, and Kazakhstan have become the major trading partners of Mongolia.

Moreover, trade has come to be rooted much more on the fundamental strengths of the economy instead of the political favors from the Soviet bloc which used to prop it up in the past. In a globalizing world, expansion of the tradable sector must conform to the principle of comparative advantage. In Mongolia, comparative advantage lies in its natural-resource-intensive industries, where there are two major types: livestock-based processing industries, such as textiles, leather and dairy; and the mining industry.

Mining- and livestock-origin raw materials, and textile products account for most of Mongolia's exports. In 2011, the percentage share of those products accounted for 95% of the country's total exports. Therefore, the Mongolian

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[1] Statistical Yearbook of Mongolia: 1990-2011.

[2] International Trade Commodity Statistics 2011, General Customs Administration of Mongolia

economy has remained vulnerable and dependent on the international market prices of its major export commodities.

Today the Mongolian economy has entered into a new era of economic development and the country holds vast potential for economic development, thanks to the discovery of its world-class mining deposits. Mongolia experienced rapid growth in recent years and the country's GDP grew 17.3 percent in 2011. The country is estimating more rapid growth in the forthcoming years and this is primarily linked to two large mining development projects: Oyu Tolgoi (OT) and Tavan Tolgoi (TT).

The Oyu Tolgoi (OT) copper and gold deposit in the South Gobi holds over 35 million tonnes of copper and 1,275 tonnes of gold. Its production is expected to start in 2013 and reach full capacity by 2017-2018 which will supply 1.8 million tonnes of copper concentrate a year, which is close to 3 percent of world output. In October 2009, the government of Mongolia signed an investment agreement for the development of OT with Ivanhoe Mines of Canada and Australian mining giant, Rio Tinto.

Another big deposit, Tavan Tolgoi (TT), holds reserves of over 6 billion tonnes of coal, one third of which is coking coal. Although Tavan Tolgoi has been in operation since 1967, the production has not reached a substantial level. Yet coal production increased sharply when a state-owned mining company Erdenes TT and a consortium of private corporations, Energy Resource Group, started mining at the Tavan Tolgoi deposit site.

These investment projects present a unique development opportunity for the Mongolian economy as a whole. At the same time, the mining boom presents large policy challenges. The key challenge is to sustain economic growth over the long term. International experience has demonstrated that resource-rich countries tend to under-perform compared with resource-poor countries and this tendency has been called the "resource curse".

The changing situation and changing opportunities requires the rethinking of new development objectives for the country. Also, there is a need to formulate new policy objectives for trade policies that will ensure equitable and stable economic growth. Therefore, the role of effective policymaking has great importance.

2. Mining-Based Economic Development Prospects for Mongolia

As mentioned earlier, the mining sector is becoming the most important sector of the Mongolian economy. Mining is not a labor-intensive sector; therefore this sector is unlikely to provide much employment directly. However, the importance of the mining sector is two-fold. First, it is the main source of income, in terms of both budget revenues and foreign exchange earnings. These earnings will be invested in other sectors and will support the development of other sectors. Secondly, the aggregate demand, generated by the export of minerals, will stimulate output and employment in the manufacturing and service sectors.

The economic impact of the mining sector on our economy is very large; therefore any assessment or analysis of the Mongolian economy without the mining sector's impact will be inadequate. Accordingly, in order to determine the economic development prospects for Mongolia for the forthcoming years, this paper analyzes the mining sector's impact on the country's economy by employing a dynamic Computable General Equilibrium (CGE) model.

This study covers the impacts of two large investment projects, Oyu Tolgoi (OT) and Tavan Tolgoi (TT), to be started in the coming years. The government of Mongolia offers two different options of coal extraction at Tavan Tolgoi: 20 million tons (TT1) or 40 million tons (TT2) a year. In considering these options, six different scenarios in addition to the baseline scenario have been investigated in this study. These are:

1. The baseline scenario;
2. OT + TT1 in base-year prices;
3. OT + TT1 in low prices (metal prices on the world market decrease by 20%);
4. OT + TT1 in high prices (metal prices on the world market increase by 20%);
5. OT + TT2 in base-year prices;
6. OT + TT2 in low prices (metal prices on the world market decrease by 20%)
7. OT + TT2 in high prices (metal prices on the world market increase by 20%)

Description of the Model

We applied a small-and-open-economy model and three principal conditions of general equilibrium; an income balance condition, a market clearance condition and steady state conditions are used in the model. We assume forward-looking behavior by consumers and producers, in the sense that they have perfect foresight with regard to their incomes, resources and commodity prices in the economy. In the model, indefinitely-living households allocate their lifetime income to maximize lifetime utility, which is defined as:

$$U(Ct) = \frac{1}{(1-1/\sigma)} Ct^{1-1/\sigma} \tag{1}$$

where C_t – consumption in period t;
C_{t+1} – consumption in period $t+1$;
σ – elasticity of time preference;

Composite consumption covers N sub-composite goods in the model:

$$C = \psi\left(\sum_i \delta_i^c CC_i^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}} \tag{2}$$

where CC_i is the ith good composite of domestic and imported consumption goods, ψ is the unit parameter of the CES (Constant Elasticity of Substitution) composite function and δ_i^c is the share of the consumption good. The overall value of composite consumption should satisfy:

$$P \cdot C = \sum_i P_i \cdot CC_i \qquad \text{for } i=1..N \tag{3}$$

The term P is the net price of composite consumption with indirect taxes, and CC_i is the composite consumption good of both the domestic and imported ith good.

The total supply, A_i, for each sector is produced using domestic and imported goods, and is given by a CES (Armington (1969)) function as follows:

$$CCi = \phi\left(\beta QM_i^{\delta} + (1-\beta)QD_i^{\delta}\right)^{\frac{1}{\delta}} \qquad (4)$$

where A_i is the CES aggregate of domestic supply D_i and imported supply M_i, δ_i^d is the share of domestic supply for good i, δ_i^m is the share of imports in good i, σ_m is the elasticity of substitution in the aggregate supply function, and ϕ is the shift parameter of the aggregate supply function.

The standard procedure where a consumer maximizes utility subject to a budget constraint yields the import demand per unit of domestic demand as a function of the relative price:

$$\frac{QM_i}{QD_i} = \left[\left(\frac{\beta_i}{1-\beta_i}\right)\frac{PD_i}{PM_i}\right]^{\sigma_i} \qquad (5)$$

Overall market clearing in the product market implies that:

$$A_i = CC_i + G_i + I_i \qquad (6)$$

where G_i and I_i represent composite consumption by the government and investment, respectively, as discussed below. In value terms:

$$PC_i\,QC_i = PD_i\,D_i + PM_i\,M_i \qquad (7)$$

where D_i and M_i are the domestic and imported supply at prices PD_i and PM_i, respectively, and PC_i is the price of total supply in sector i.

In the above equation, domestic supply, D_i, is the part of the output sold on the domestic market. The rest of domestic output is sold abroad, and given by the product transformation function:

$$XSi = \left(\eta QE_i^{\delta} + (1-\eta)QD_i^{\delta}\right)^{\frac{1}{\delta}} \qquad (8)$$

where QE_i is exports, QD_i is domestic supply, σ_y is the elasticity of substitution in total supply, η is the share of exports, and δ is the shift parameter in the production function. The total value of gross domestic product is composed of the values of domestic sales and exports.

The producer maximizes profit subject to:

$$PX_i\,Y_i = PD_i\,QX_i + PE_i\,QE_i \qquad (9)$$

Production is based on a nested structure of CES functions. Each sector produces a gross output, XS_i, and the producer chooses a mix of a value-added aggregate, QVA, and an intermediate-demand aggregate, QINT. In mathematical terms, this leads to the following formulation:

$$XSi = \left(\varpi QVA_i^{\rho} + (1-\varpi)QINT_i^{\rho}\right)^{\frac{1}{\rho}} \qquad (10)$$

$$min\ PX_i\,Y_i = PVA_i\,QVA_i + PINT_i\,QINT_i \qquad (11)$$

where PVA is the aggregate price of value added, PINT, is the price of the intermediate aggregate, ω and $1\text{-}\omega$ are the CES share parameters, and ρ is the CES exponent.

Producers use labor and capital in each of N sectors to yield value added. This is also given by CES functions:

$$VA_i = \Omega_i\left((1-\delta_i)(K_i)^{\gamma_i} + \delta_i(L_i)^{\gamma_i}\right)^{\frac{1}{\gamma_i}} \qquad (12)$$

where VA_i is the gross value added of sector i, Ω_i is a shift parameter in the production function, K_i and L_i are the amounts of capital and labor used in sector i, δ_i is the share parameter of labor in the CES function, and γ_i is the CES factor substitution parameter.

Applying the CGE model requires SAM (Social Accounting Matrix) data and some other sources for the calibration process. Therefore, one of the most important tasks of this study is the identification and organization of data into a SAM. The availability of the *2005 Input-Output Table of Mongolia* has given an opportunity to construct the SAM for the year 2011. Technological coefficients in the SAM have been updated by using the RAS method.

In the SAM, there are nine production activities with nine counterpart commodities, nine household groups, one government account with six types of taxes included, one investment/savings account, and one account related to foreign trade and capital flows. All of these accounts are combined in a 9x9 matrix.

The Simulation Results

Our study confirmed the important role of the mining sector in the Mongolian economy, as was pointed out earlier. The simulation results show that the two large investment projects will significantly increase Mongolian GDP, up to 7.56 times depending on the world market price movements of copper, gold and coal. Estimations of Mongolia's GDP growth for different scenarios in the forthcoming years are illustrated in Figure 1.

The simulation results also indicate that mining-based growth will lead to a significant increase in Mongolia's exports and improvement of the trade balance. The basic trade-related indicators for each scenario are described in Table.

Recent empirical studies suggest that the growth of a booming natural-resource abundant sector could hurt economic growth and the sustainability of a national

Figure 1: GDP Growth Estimation for Mongolia / GDP2011=1.0
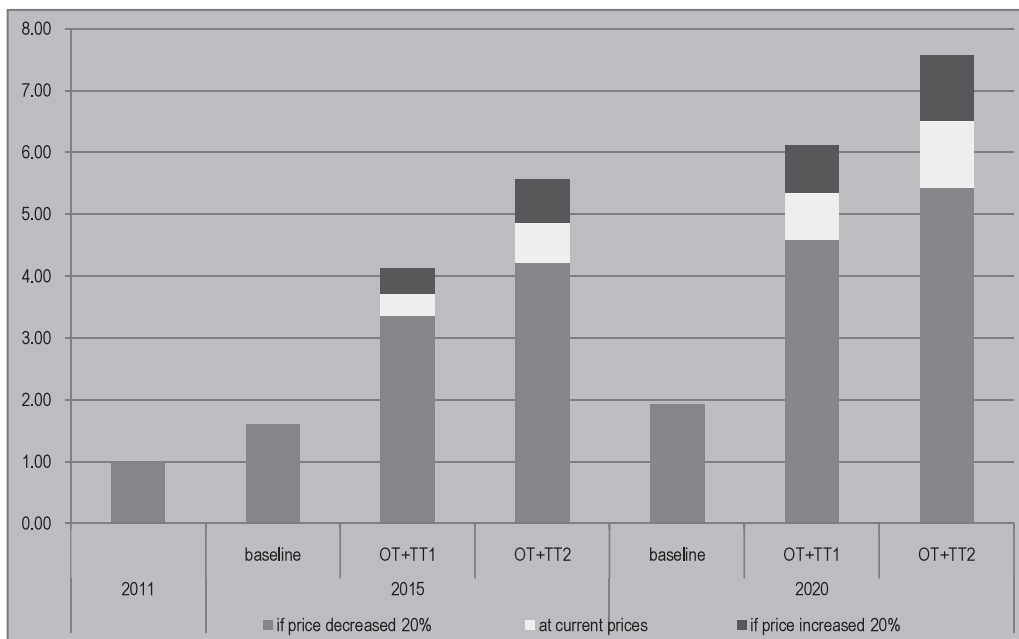
Table: Mongolian Trade Projections under Different Scenarios

Scenarios	2011	2015	2020	2011	2015	2020	2011	2015	2020
	Export			**Import**			**Trade balance**		
Baseline	0.8465	0.9261	1.1108	1.0169	1.0326	1.2386	-0.1703	-0.1065	-0.1278
OT+TT1									
at current prices		3.2560	4.9042		2.0897	2.9596		1.1663	1.9445
if price increases by 20%		3.7158	5.7588		2.2983	3.3473		1.4175	2.4114
if price decreases by 20%		2.8716	4.0496		1.9153	2.5719		0.9563	1.4777
OT+TT2									
at current prices		4.5319	6.1800		2.6686	3.5385		1.8633	2.6415
if price increases by 20%		5.3161	7.3590		3.0244	4.0734		2.2917	3.2856
if price decreases by 20%		3.8230	5.0010		2.3470	3.0035		1.4761	1.9974

Figure 2: Mongolian Trade Forecast (in comparison with GDP for 2011)
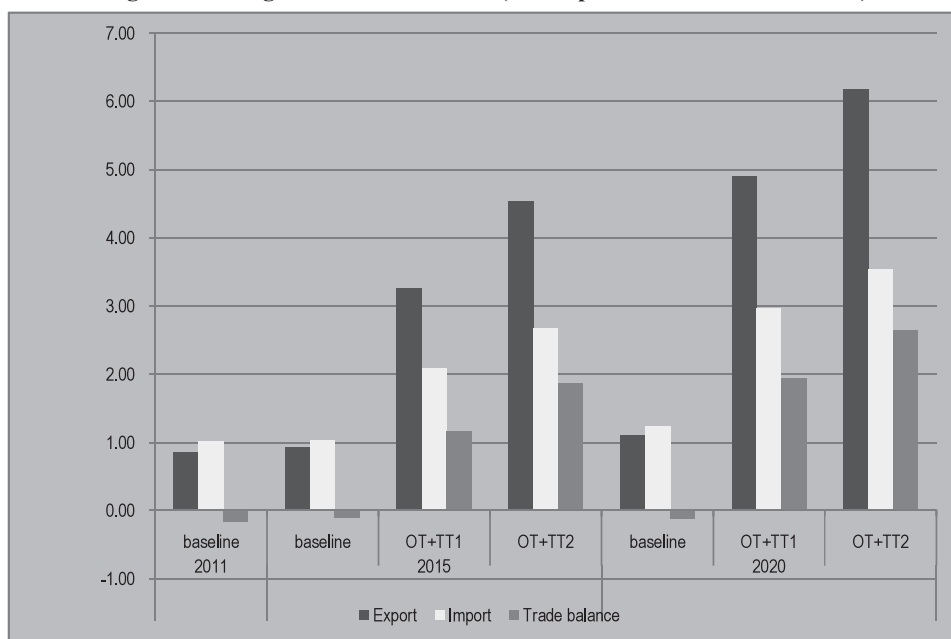
economy indirectly, primarily through the "Dutch disease". The growth in production and export of the booming mineral sector may raise the real exchange and real wage rates that create the "Dutch disease"; and this in turn will reduce the competitiveness of economic sectors, making export diversification more difficult. This could be observed in labor-intensive sectors especially, as a result of their excessive wage costs. Growth in the mining sector increases the labor wage rate in intensive sectors, and reduces their competitiveness. Thus growth in the mining sector may lead to stagnation in labor-intensive sectors, within which most poor people work.

Therefore a rapid growth of mineral exports may become a cause of economic volatility, income inequality, and the crowding-out of productivity growth in the non-mining sectors; all of these effects could increase poverty and hamper human well-being.

Thus all economic policies should be aimed at preventing market distortions created by the resource boom. The major tasks of macroeconomic policy in the short and medium term should aim at preventing excessive overheating of the economy, appreciation of the exchange rate, and cost increases that may reduce the competitiveness of the non-mining tradable sectors.

3. Trade Policy Issues

Summing up the above conditions, Mongolian trade policy should be aimed at enhancing the strong growth rate, to diversify the economy and reduce poverty. Trade policy should act as a bridge between the growth and equity of the economy, and should perform twin roles in providing more sustainable growth in the economy: on the one hand it should be aimed at preventing the market distortions created by the "Dutch disease", and on the other hand it should be aimed at integrating the Mongolian economy into the world economy.

In that sense the trade policy of Mongolia needs to take into consideration the following important issues:

First, trade policy should be aimed at neutralizing the market distortions created by "Dutch disease" and to diversify the production and exports of non-booming sectors. Mongolia should not use protective instruments of trade policy to achieve these ends, because tariff or other protective instruments will reduce imports and the demand for foreign currency. In doing so this may in turn accelerate the "Dutch disease". Here I should mention that the combination of trade liberalization and the right investment policies will be useful for neutralizing the effect of the "Dutch Disease."

Second, trade policy should be aimed at integrating Mongolia into the global economy, eliminating tariff and non-tariff barriers to trade, and reducing transportation costs. However, Mongolia liberalized its trade, and transportation costs were left as a major barrier to its exports and imports. The reason is because Mongolia has always been a landlocked country and isolated from the sea. Resulting from the country's specific problem of "landlockedness" Mongolian trade policy should be aimed at reducing higher transportation costs, at ensuring producers' greater competitiveness in the global market, and

at guaranteeing its citizens a wealthier standard of living.

Even though FTAs and RTAs are useful for cost reduction, the overlapping effect of FTAs and the "Dutch disease" may reduce the production and competitiveness of non-booming sectors. From this point of view, FTAs or RTAs are useful only in terms of Mongolia's new production structure. FTAs or RTAs may help Mongolia export new products from the booming sector, gaining advantage from preferential market access. Those agreements are useful in the dissemination of fresh knowledge and technology transfer which is needed for enhancing productivity.

Here I should mention Mongolia's need for economic cooperation with Northeast Asian countries. Historically, Northeast Asian countries have always been strategically important partners for Mongolia in terms of their geographical proximity, historical relationships and low transportation costs. Now those countries are becoming the most important partners for Mongolia, resulting in a growing number of areas of common interest.

Third, by considering equity issues for the population, the regions of the country and the sectors of the economy, trade policy should be aimed at ensuring more equitable and stable growth. For these purposes export promotion and diversification is needed, especially in labor-intensive sectors, including agriculture. This is because most poor Mongolians work in the agricultural and service sectors.

Fourth, the sustainability of the economy is important for Mongolia. It requires paying attention to ecological problems, investing in education, health and other human development fields, and promoting investment in infrastructure.

Conclusion

Even though Mongolia is one of Asia's smallest countries in terms of the size of its economy and trade turnover, it is a rich country in terms of its land area and natural deposits, and is a country which has good prospects for economic growth. Mongolia is becoming one of the important suppliers of minerals to the world market.

Our study reveals that the mining sector can act as the engine that drives growth and resources in the rest of the economy through its twin roles of providing investible resources on the one hand and the stimulation of demand on the other. A crucial policy concern here is how to develop an integrated and balanced economic development strategy that will ensure that the resources and demand generated by mining do actually promote the other sectors of the economy and improve the living standard of Mongolian citizens. In the new era of globalization, every country aims at boosting people's incomes and the quality of life, by improving the terms of trade using demand opportunities in foreign markets, increasing the efficiency of trade participation, and improving the trade balance. In doing so, sound and strong policies are needed that target well-defined market segments, particularly in specific geographical regions.

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鉱業を基盤としたモンゴルの開発・貿易政策

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（要約）

　モンゴル経済は新しい経済成長の時代に入った。世界有数の鉱床探査のお陰で、経済成長の可能性が大いに高まっている。近年、モンゴルは急速に発展を遂げ、国のGDP成長率は2011年に17.3％となり、今後、さらに目覚ましい成長が期待されている。この成長は、主にタバントルゴイとオユトルゴイという２つの大規模鉱山開発事業に関連している。

　タバントルゴイとオユトルゴイの投資事業は、モンゴル経済全体に比類なき発展の機会をもたらした。同時に、この鉱業ブームは政策を大きく変えている。主要課題は「資源の呪い」である。

　本論文では、これからのモンゴル経済発展の見通しを判断するため、ダイナミックな計算可能一般均衡（CGE）モデルを使い、鉱業部門が国の経済に与える影響を分析する。

　本研究は、上述のようにモンゴル経済における鉱業部門の重要な役割を裏付けた。シミュレーションの結果、この２つの大規模投資事業は銅、金、石炭の世界市場価格に応じて、モンゴルのGDPを最大7.56倍まで飛躍的に増大させることが示された。また、鉱業を基盤とした成長は、モンゴルの輸出を大幅に増大させ、貿易収支を改善に導く。

　「オランダ病」の場合、急激な鉱物輸出は、経済の変動、所得の不均衡、非鉱業部門における生産活動成長のクラウディングアウトを招きかねない。これらの結果、貧困が増え、人間の福利が妨げられる可能性がある。

　そのため、貿易政策によって経済成長と公平さの均衡を図り、モンゴル経済と世界経済の統合を目指しながら、一方でより持続可能な経済成長を規定し、他方で「オランダ病」から生まれる市場の歪みの抑制を目指すという二重の役割を果たす必要がある。

　本研究は、投資可能な資源と刺激的な需要という鉱業部門の２つの役割を通じて、その他の経済の成長を促す機動力となることを明らかにした。鉱業によって生み出された資源と需要が、実際にその他の経済部門の成長と、国民の生活水準の向上を保証する統合されたバランスの取れた経済成長戦略をどのようにして発展させるかが、重要な政策的関心事である。

　グローバリゼーションの新しい時代において、各国は海外市場における需要の機会を基盤とした貿易条件の改善、貿易参入の効率の向上、貿易収支の改善を通じて国民の収入と生活の質の向上を目指している。そうした中、とりわけ特定の地理的地域において、明確に定義された市場区分を狙った安定した強い政策が求められている。

［英語原稿をERINAにて翻訳］