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National Industrialization in Philippine Mining: Review and Suggestions

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Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

National Industrialization in Philippine Mining: Review and Suggestions

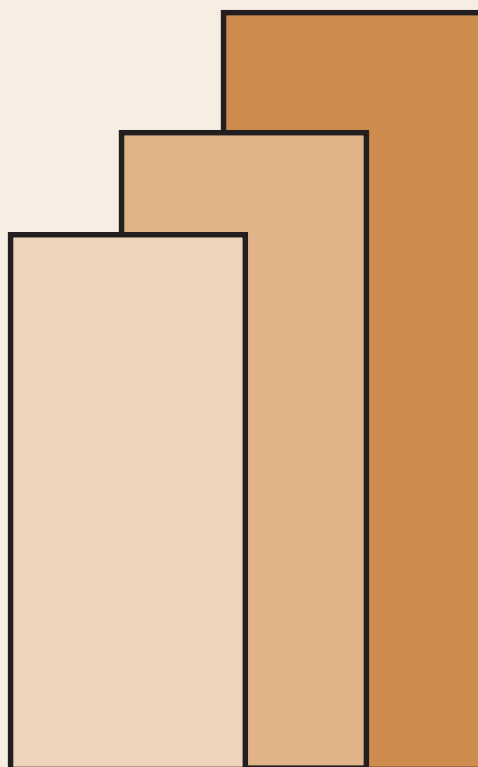
Danilo C. Israel

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National Industrialization in Philippine Mining: Review and Suggestions

Danilo C. Israel

Abstract

The paper reviewed national industrialization as a long-term strategy of mining development in the Philippines. The end purpose was to suggest immediate actions that can be undertaken for the promotion of national industrialization. The paper used secondary data and information from institutional sources and available relevant literature as well as primary data and information from institutional key informants.

The paper found that the knowledge base of the country required to pursue the national industrialization strategy is poor. The following studies therefore were suggested: a) value chain analysis for the mining sector and its sub-sectors, including but not limited to the copper, nickel, gold and chromite industries; b) development of community-based small and medium-scale operations in mining including the technology, financial, institutional and other forms of government support that could be provided to them; c) analysis of resource rents in the mining sector and its subsectors that will determine, among others, how much royalty tax should be imposed on them; and d) evaluation of the appropriated export restrictions that may be imposed on the mining sector taking into consideration their economic, social and other impacts. In addition to the aforementioned research activities, the paper supports the institutional improvements that have been suggested by previous works. These include the strengthening of the organizational, legal, monitoring and enforcement other aspects of governance performed by government mining agencies.

Keywords

National Industrialization, Mining and Quarrying, Processing, Value Chain Analysis, Resource Rent, Institutions

National Industrialization in Philippine Mining: Review and Suggestions

Danilo C. Israel¹

I. Introduction

There is only guarded optimism that the mining sector² will face better times after the Supreme Court finally judged as legal in 2004 the Philippine Mining Act of 1995. This is because the sector continues to face the same old economic, social, environmental and other related problems besetting it over the years. Beyond the legalization of the mining act, clearly much remains to be done before it can be perceived as truly beneficial to all the mining stakeholders and society in general.

Among the most daunting constraints mining has been facing is that it is a generally extractive activity the way it has been traditionally practiced. This makes the country a mere exporter of raw materials to industrialized countries and unable to benefit from value-addition. To help address this problem, the national government has recently pronounced a long-term strategy of national industrialization in the mining sector (Ramos 2010). Among others, this strategy is intended to enable the sector to expand into processing³ and other downstream activities and transform low-value outputs of raw materials into processed products with higher value-added.

The objective of this paper is to review Philippine mining and the long-term strategy of national industrialization in the sector. The end purpose is to suggest some actions that can be immediately undertaken to help jumpstart the implementation of the strategy. The paper uses secondary data and information from the institutional sources and available relevant literature as well as primary data and information gathered through personal interviews with selected key informants in the sector.

II. Review of the Mining Sector

Management

The mining sector is publicly administered by the Department of Environment and Natural Resources (DENR) through its Mines and Geosciences Bureau (MGB). The overall function of the DENR related to mining is the conservation, management, development, and proper use of the state's mineral resources including those in reservations, watershed areas, and lands of the public domain. For its part, the MGB

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² Mining is defined as the exploration, extraction, dressing and beneficiating of minerals such as coal, ores, crude, petroleum, and natural gas. On the other hand, quarrying is the extraction of building and monumental stone, clay, sand and gravel; guano gathering; and salt evaporation (NSO Various Years).

³ In the Philippine Mining Act, mineral processing means the milling, beneficiation or upgrading of ores or minerals and rocks or by similar means to convert the same into marketable products. MIF (2000) has a broader definition which describes it as also covering the secondary processing of waste streams to produce useable or saleable products with the objective to totally eliminate air emissions, dust emissions, water emissions, slurried tailings, or other solid wastes.

is directly in-charge of the administration and disposition of mineral lands and mineral resources and undertakes geological, mining, metallurgical, chemical, and other researches as well as geological and mineral exploration surveys.

The public management of quarrying, on the other hand, is under the local governments and their pertinent local government units (LGUs). To undertake quarrying operations, any qualified person may apply to the provincial/city/municipal mining regulatory board for a quarry permit on privately-owned lands and/or public lands. The provincial governor may then grant the permit after the applicant has complied with all the requirements as prescribed by established rules and regulations.

Recent history

The year 1965 marked the beginning of modern day mining in the Philippines when the first porphyry copper deposit was opened by the Atlas Mining Company in Cebu (Rovillos et al. 2003). By the late 1960s, the country was already a significant producer of gold and copper which today remain as its two most important metallic products. During the 1960s, the Philippines was also a producer of iron although the discovery of high-grade iron deposits in Australia and the exhaustion of high grade local lump iron ores eventually led to the demise of this sub-sector (Cabalda et al. 2002).

Nickel became an important metallic mineral product of the Philippines in the 1970s with the opening of two nickel mines – the Nonoc mine and its nickel refinery in Surigao del Norte and the Rio-tuba nickel mine in Palawan which exports beneficiated nickel ore to Japan. The 1970s was considered as the heyday of the mining in the country with old dormant gold mines being reopened, new gold projects developed, existing copper mines expanded and new copper projects undertaken (Rovillos et al. 2003, Cabalda et al 2002).

In the 1980s, the mining sector started to decline when several mining companies closed due to the financial crisis and the occurrence of several mining accidents. This downtrend continued in the early 1990s and by 1993, out of the 39 mining companies in the 1980s only 16 remained active. A saving grace for mining during this period was the increase in gold production from gold rush areas notably in Mt. Diwata, also known as Diwalwal, in Eastern Mindanao. Since the mid-1990s up to the present, the production of gold in the Diwalwal area alone has accounted for about 50 percent of the total gold production of the country (Rovillos et al. 2003).

To help arrest the continuing declining state of the mining sector in the 1980s and early 1990s, the Philippine Congress enacted in March 1995 Republic Act (R.A.) No. 7942 or the Philippine Mining Act. After its enactment, the legality of this mining law was vigorously contested by several mining stakeholders and major elements of the Catholic Church. In January 2004, the Supreme Court declared that certain provisions of the law and its implementing rules and regulations (IRR) were null and void. However, in December of the same year, the Supreme Court reversed itself and ruled with finality that the mining law is legal including its provisions on Financial or Technical Assistance Agreements (FTAAs).

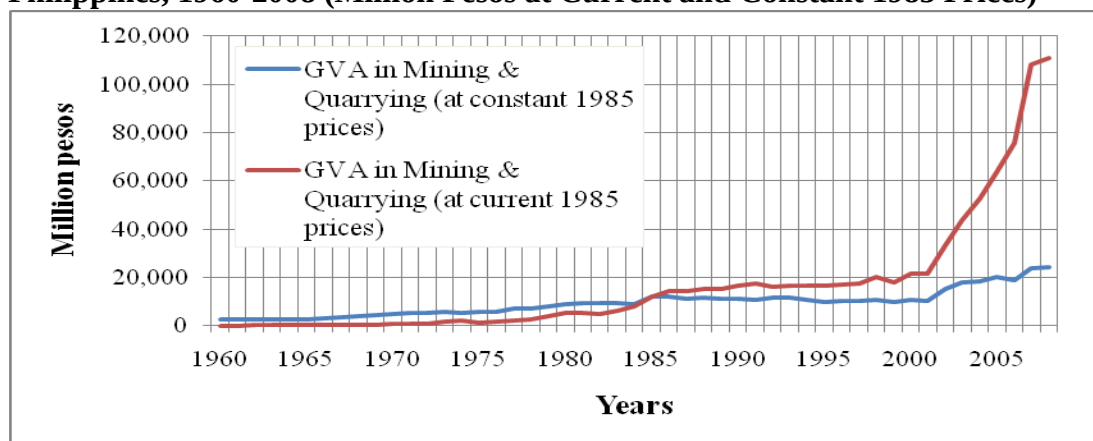
In addition to the Philippine Mining Act of 1995, the overarching legal basis of public management of the mining sector is the 1987 Philippines Constitution. In

Section 2 of Article XII, the constitution provides the basis for the state's main policy framework on the exploration, development and utilization of the mineral resources of the land.

Production

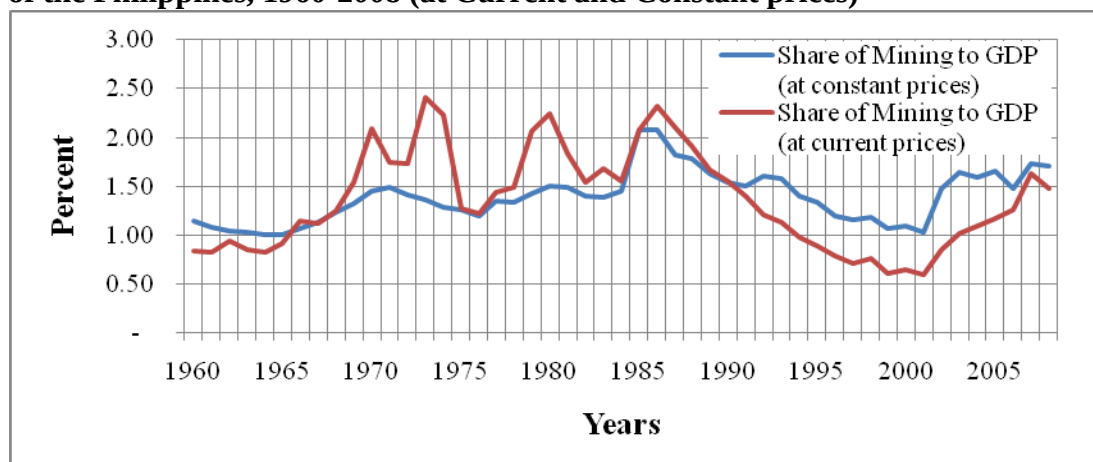
From 1960 to 2008, the Gross Value Added (GVA) in mining and quarrying of the Philippines, in current prices, rose annually by 17.31 percent on average (**Figure 1 and Appendix Table 1**). On the other hand, the percent share of the GVA in mining and quarrying to the Gross Domestic Product (GDP) increased by 2.74 percent (**Figure 2 and Appendix Table 1**). The mining and quarrying GVA rose the fastest in the 1970s followed by the 2000s, 1960s, 1980s and 1990s in that order. On the other hand, the percent share of mining and quarrying GVA to GDP increased the fastest in the 2000s followed by the 1960s and 1970s and fell in the 1980s and 1990s. Both the GVA in mining and quarrying and its percent share to the GDP increased faster after the mining law was judged as constitutional (2005-2008) compared to before that period (1996-2004).

Figure 1 Gross Value Added in the Mining and Quarrying Sector of the Philippines, 1960-2008 (Million Pesos at Current and Constant 1985 Prices)



Sources of data: Appendix Tables 1 and 2

Figure 2 Percent Share of GVA in the Mining and Quarrying Sector to the GDP of the Philippines, 1960-2008 (at Current and Constant prices)

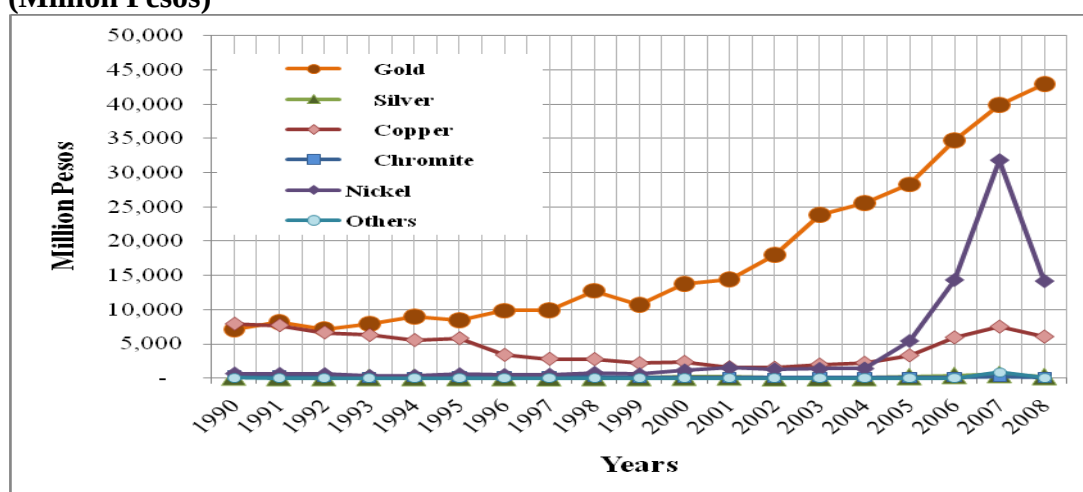


Source of data: Appendix Tables 1 and 2

From 1960 to 2008, the GVA in mining and quarrying, in constant prices, rose annually by 5.39 percent on average (**Figure 1 and Appendix Table 2**). On the other hand, the percent share of the GVA in mining and quarrying to the GDP increased by 1.35 percent (**Figure 2 and Appendix Table 2**). The mining and quarrying GVA increased the fastest in the 2000s followed by the 1960s, 1970s and 1980s and decreased in the 1990s. On the other hand, the percent share of mining and quarrying GVA to GDP increased the fastest in the 2000s followed by the 1980s and 1960s, fell in the 1990s and then grew only slightly in the 1970s. In contrast to figures for current prices, both the GVA in mining and quarrying and its percent share to the GDP in constant prices increased faster before the mining law was judged as constitutional compared to after.

In 2008, by commodity and in terms of value, gold was the most important mineral product of the Philippines, followed by nickel, copper, silver and chromite (**Figure 3 and Appendix Table 3**). Gold production had a generally increasing trend from 1990 to 2008 while nickel production was steady until 2004 when it drastically rose. Afterwards, it peaked in 2007 before it fell the year after. Copper production had been generally declining from 1990 to the early 2000s then rose starting 2004, reached a peak in 2007 and then decreased in 2008. The production of other minerals as a group had been relatively low and steady during the 1990 to 2008 period. The production of gold and chromite increased faster annually on average before the mining law was judged as legal than after while the opposite was true for silver, copper and nickel. Other minerals as a group decreased faster annually on average after the mining law was judged as legal.

Figure 3 Value of Philippine Mineral Production, by Commodity, 1990-2008 (Million Pesos)



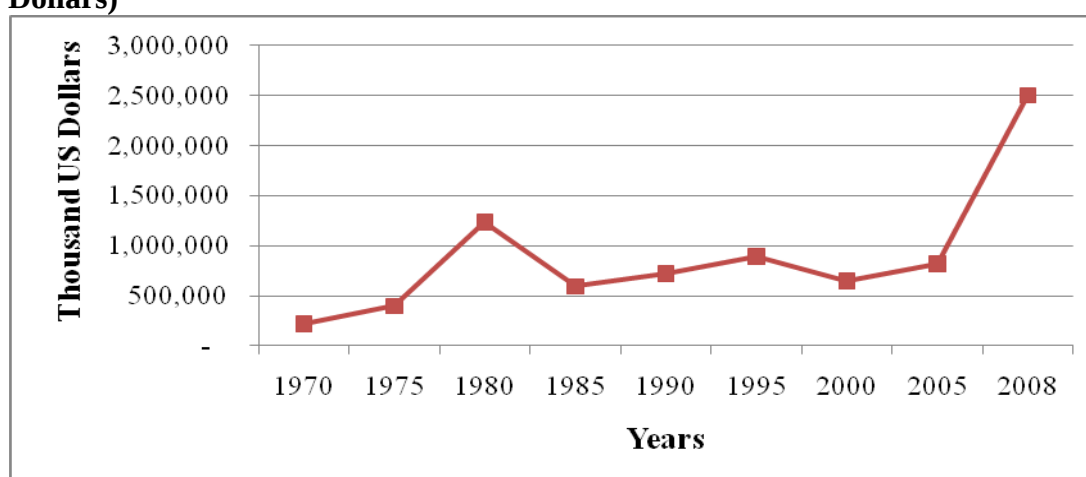
Source of data: Appendix Table 3

To summarize the aforementioned results, the data on production performance indicate that while the mining sector as a whole grew faster in current prices after the mining law was judged as legal, the opposite was true in constant prices. In addition, some minerals experienced decreases in growth in value of production after the law was proclaimed legal. These findings could be taken to mean that so far, positive and significant production impacts of the mining law have not yet been experienced so far in real terms.

Exports

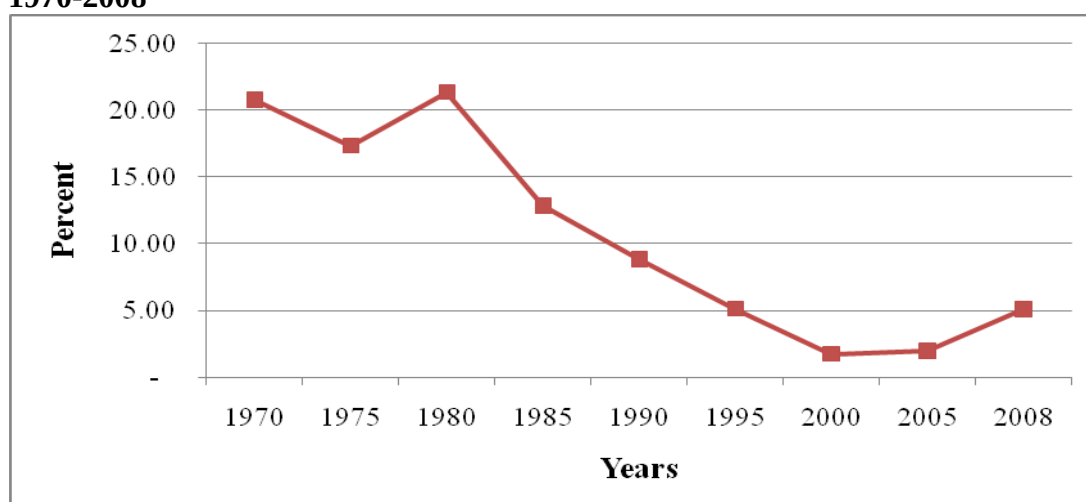
In the 1970s, total mineral exports grew while its percent share to total exports declined during the first half of the decade and then increased in the second half (**Figures 4 and 5 and Appendix Table 4**). In the 1980s, total mineral exports fell in the first half of the period and increased in the second half while its percent share to total exports consistently declined. In the 1990s, total mineral exports rose in the first half of the period and fell in the second half while its percentage share to total exports consistently declined. In the 2000s, both the total mineral exports and its percent share to total exports increased with the growth higher in the second half than in the first half of the decade. Both the mineral exports and its percentage share to total exports increased faster after the mining law was judged as legal. These results seem to indicate that the passing of the mining law as legal has some positive economic impacts in terms of increasing mineral exports.

Figure 4 Total Mineral Exports of the Philippines, 1960-2008 (US Thousand Dollars)



Source of data: Appendix Table 4

Figure 5 Percent Share of Mineral Exports to Total Exports of the Philippines, 1970-2008

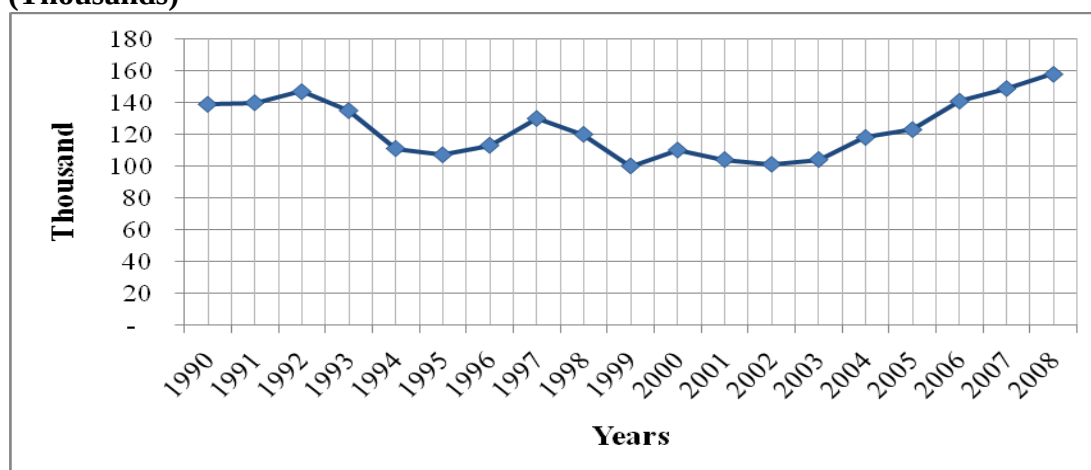


Source of data: Appendix Table 4

Employment

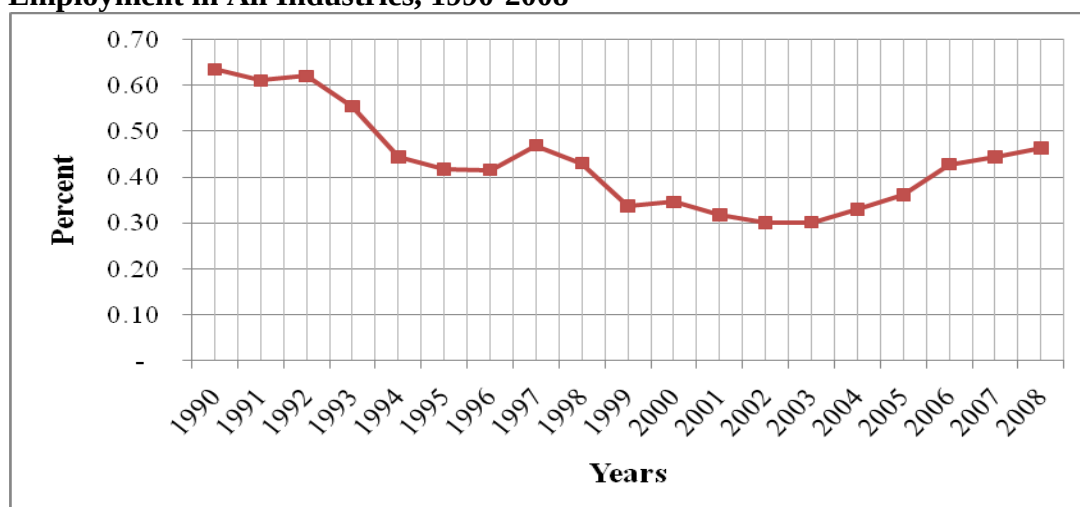
Employment in the mining and quarrying sector in the 1990s generally rose in the first quarter of the decade, declined in the second quarter, increased again in the third quarter and fell again in the last quarter (**Figures 6 to 7 and Appendix Table 5**). In the 2000s, mining employment declined in the first quarter, recovered in the second quarter and increased in the third quarter and onwards. The percent share of employment in mining and quarrying to total employment in all industries generally followed the pattern of growth of mining and quarrying employment. Both the employment in the mining sector and its percent share to total employment rose faster after the mining law was declared legal. These results seem to imply that the legality of the mining law may have important positive effects in terms of employment in the mining and quarrying sector. In 2006, survey data indicated that among the mining industries, nickel mining provided the largest employment with 30.9 percent of the total, followed by gold mining with 28.3 percent and copper and chromite mining with 26.2 percent (NSO 2008).

Figure 6 Total Employment in the Mining and Quarrying Sector, 1990-2008 (Thousands)



Source of data: Appendix Table 5

Figure 7 Percent Share of Employment in the Mining and Quarrying Sector to Employment in All Industries, 1990-2008

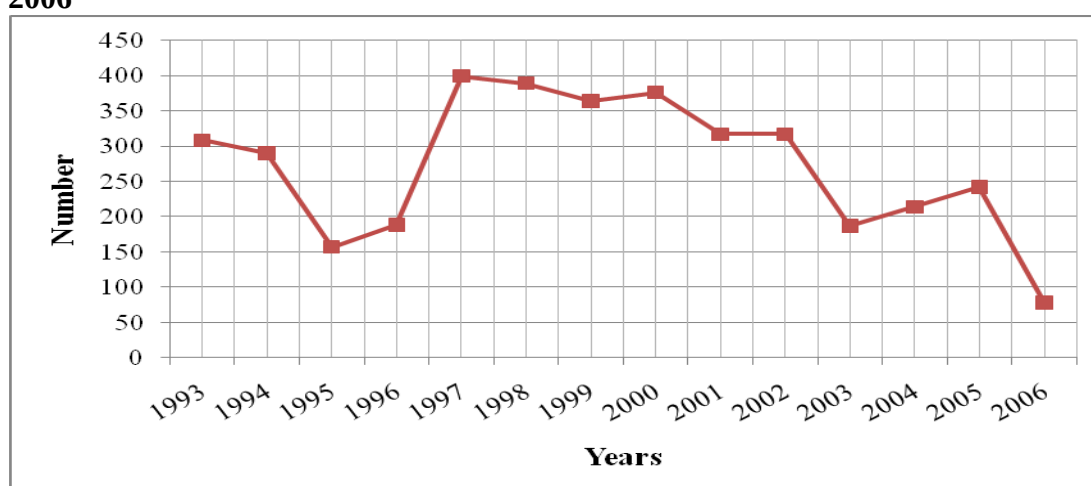


Source of data: Appendix Table 5

Establishments

The number of establishments in the mining sector in the 1990s declined in the second quarter, increased in the third quarter and declined again in the last quarter (**Figure 8 and Appendix Table 6**). In the 2000s, the number of establishments continued to fall in the first quarter and then rose in the second quarter. The number of establishments drastically declined between 2005 and 2006. The number of mining establishments increased before the mining law was declared legal and declined after. These figures indicate that the period after passing of the mining law coincided with a significant decrease in the number of mining and quarrying establishments. In 2006, survey data indicated that the mining and quarrying sector was dominated by establishments engaged in stone quarrying and sand pits with 35 or 44.9 percent, followed by salt farms with 21.8 percent and gold ore mines with 17.8 percent (NSO 2008).

Figure 8 Number of Establishments in the Mining and Quarrying Sector, 1993-2006



Source of data: Table 6

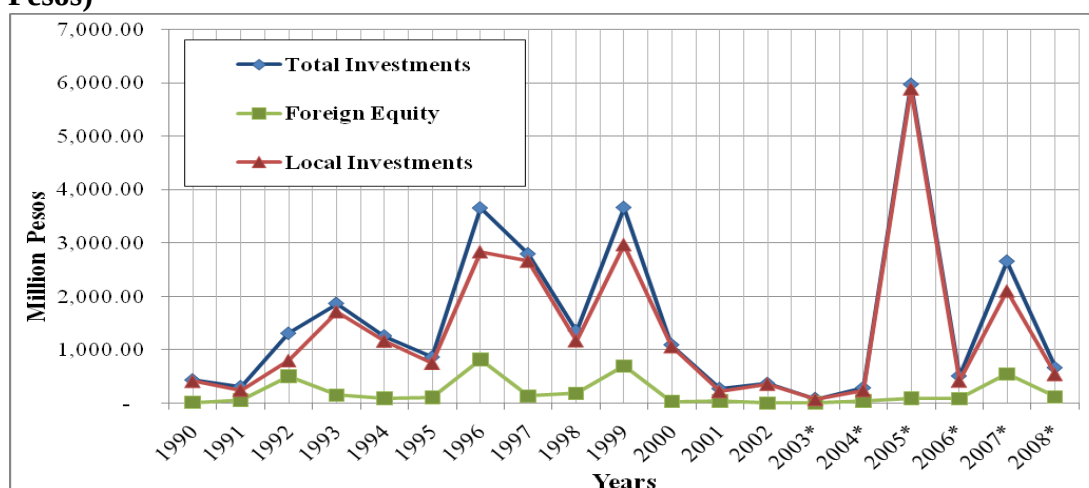
Investments

Total paid-up investment in mining behaved erratically in the 1990s (**Figure 9 and Appendix Table 7**). It generally rose in the first quarter of the decade, fell in the second quarter, increased and declined in the third quarter and also increased and then declined again in the last quarter. In the 2000s, total paid-up investment in mining generally fell in the first quarter, drastically rose in the late second quarter, drastically declined in the early third quarter, increased in the late third quarter and fell again in the early fourth quarter. The total paid-up investments in mining increased at a much faster rate after the mining law was declared legal. This appears to imply that the legality of the mining law has positive impacts on mining investments.

Local investment dominated during the 1990s and 2000s while foreign investment was no more than 40 percent of the total in the two decades (**Figure 10 and Appendix Table 7**). As in the case of total investment, both local investment and foreign investment fluctuated during the two decades in terms of value and percent to total. Local investments increased much faster after the mining law was declared

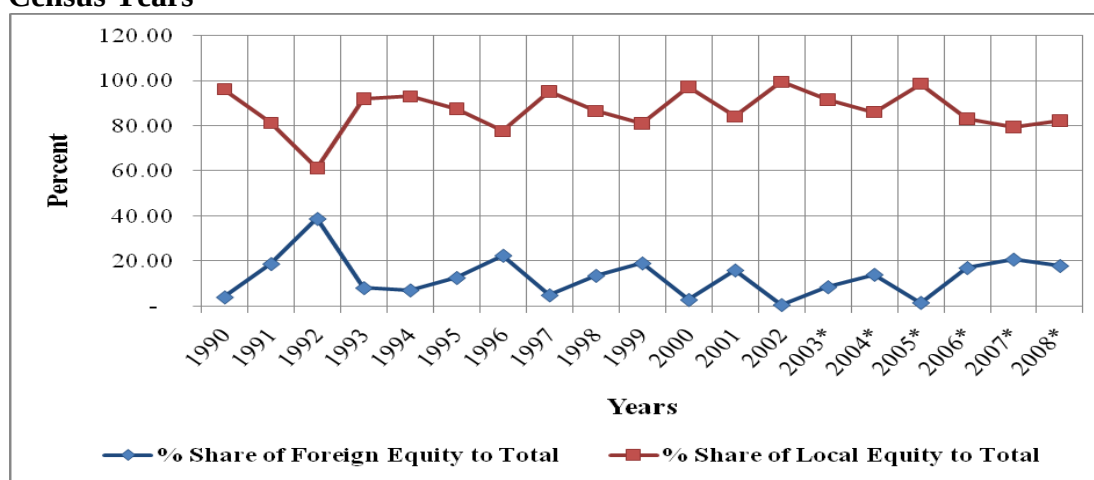
legal. In contrast, foreign investments rose a bit slower after the mining law was declared legal. Overall, these results may mean that the legality of the mining law may have positive impacts particularly on local investments in the mining sector.

Figure 9 Total Paid-up Investment, Foreign Equity and Local Investment in the Mining and Quarrying Sector of the Philippines, Selected Census Years (Million Pesos)



Source of data: Appendix Table 7

Figure 10 Percent Share of Foreign Equity and Local Investment to Total Paid-up Investment in the Mining and Quarrying Sector of the Philippines, Selected Census Years



Source of data: Appendix Table 7

In summary, the results show that there may actually be important positive developments in the mining sector after the mining law was finally judged as constitutional particularly in terms of export, employment and investment promotion. On the other hand and as earlier mentioned, there are also indications that in real terms the sector has not really made progress particularly in terms of production in the years after 2004. Notwithstanding these developments, it must be mentioned that this early, it would be inappropriate to judge the economic contributions of the mining law to mining development given the shortness of the time that elapsed after 2004. More time is clearly needed before the impacts of the mining law can be truly ascertained.

III. Review of National Industrialization in Mining

Executive Order 270 and Mineral Action Plan

Even before the mining law was declared legal in December 2004, the national government has already issued Executive Order (E.O.) 270 in January 2004, later amended in April 2004. This order provides for the revitalization of the mining industry through the promotion of responsible mining and outlines a set of twelve guiding principles for responsible mining towards sustainable development. Of special interest for this paper is the third principle which specifically states that “value-adding as a measure of optimizing benefits from minerals for the Filipino people shall be pursued through the development of downstream industries to achieve greater productivity and efficiency”.

E.O. 270 also calls for the formulation of a Minerals Action Plan (MAP) which was later prepared by the DENR in collaboration with other relevant government agencies and numerous stakeholders in the mining sector. Similarly, this plan states the development of downstream industries or value-adding of minerals among its guiding principles. Specifically, policy agenda C mandates that value-adding as a measure of optimizing benefits from minerals shall be pursued through the development of downstream industries to achieve greater productivity and efficiency (**Table 1**).

Key informants indicated that the MAP has not been fully implemented as it has not generated the much needed government attention since it was formulated. The main reasons put forward for the lack of focus are the change in the secretary position at the DENR and the shifting priorities of the department. In general, however, key informants opined that E.O. 270 has been fairly implemented by the MGB resulting to some important achievements. These include the expediting of the permitting process; attention provided to the activities related to abandoned mines, geo-hazards and groundwater assessment; strengthening of guidelines for environmental protection and vigorous information campaigns in the mining sector among others. Despite the limited attention, key informants also estimated that more than 50 percent of the activities provided for in the MAP have been accomplished among the most significant of which is the promotion of investment in the mining sector.

In closing, there are currently no available documents which outline in detail how national industrialization in the mining sector as contained in the MAP will actually be pursued by the national government. Pronouncements by the government (e.g. Ramos 2010) simply stated that the long-term plan of action for national industrialization under the MAP basically has four component programs. These are a) promoting downstream processing and manufacturing for copper, nickel, gold and chromite; b) developing community-based supplier industries/services; c) improving government benefits from mining; and d) control on the exports of unprocessed minerals.

Table 1 Policy Agenda C: Value adding as a measure of optimizing benefits from Minerals shall be pursued through the development of downstream industries to achieve greater productivity and efficiency

Issues and Concerns	Strategy/Action Agenda	Targets/Specific Activities	Time	Institutions Involved
1. Lack of information on downstream mineral - based industries	1.1 Prepare current situational analysis of the minerals value chain for both metallic and non-metallic minerals industries	1.1.1 DENR to work with the Department of Trade and Industry (DTI)/Board of Investments (BOI), Department of Science and Technology (DOST), Chamber of Mines of the Philippines (COMP) and the academe, in the preparation of mineral commodity profiles and conduct studies on selected minerals to determine the costs and benefits of establishing downstream industries to complete the minerals value chain.	2004 - 2005	Lead: DENR-MGB Others: DTI-BOI, DOST, COMP, Academe
2. Locally extracted minerals are not processed into higher value-added mineral - based products due to:				
2.1 Lack of information on the market and	2.1.1 Provide data/ information on new	2.1.1.1 MGB, BOI and National Economic and Development	2004 - onwards	Lead: DENR-MGB, DTI-BOI, NEDA

(Table 1 continued)

Issues and Concerns	Strategy/Action Agenda	Targets/Specific Activities	Time	Institutions Involved
available technologies for mineral - based products	markets, products and available technologies for mineral - based industries	Authority (NEDA) to post data/ information on new markets and products and available technologies on mineral product processing on mineral -based industries.		
		2.1.1.2 DENR to work with DTI, Department of Foreign Affairs (DFA), and NEDA to build up the database on new markets, products, and technologies.	2004 - onwards	Lead: DENR-MGB, Others: DTI-BOI, DFA, NEDA
	2.1.2 Establish capability building programs on available technologies.	2.1.2.1 DOST and MGB to provide technology extension services on mineral-based industries to the private sector.	2004 - onwards	Lead: DOST and DENR-MGB
		2.1.2.2 DOST and MGB, in coordination with the Academe and COMP, to conduct training for engineers and researchers on new technologies/ products	2004 - onwards	Lead: DOST and DENR-MGB Others: COMP, Academe
2.2 Competition from cheap imported mineral-based	2.2.1 Assist local mineral - based industries, in increasing efficiency or	2.2.1.1 DOST to make available its Small and Medium Enterprise Technology Upgrading Program	2004 - onwards	Lead: DOST

(Table 1 continued)

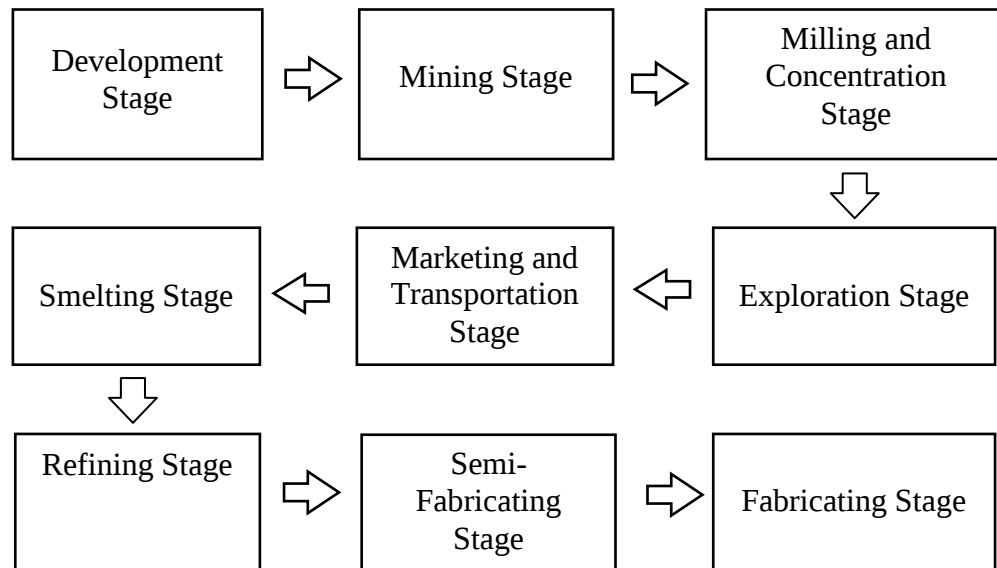
Issues and Concerns	Strategy/Action Agenda	Targets/Specific Activities	Time	Institutions Involved
products	enhancing competitiveness	(SET-UP) and Grant-In-Aid (GIA) Program to enhance efficiency of mineral-based industries, including recycling of metals and mineral products. 2.2.1.2 DTI to assist in ensuring quality standards of mineral –based products and provide information on competitors abroad.	2004 - onwards	Lead: DTI
2.3 Lack of investors in mineral - based downstream industries	2.3.1 Promote investments in downstream/ manufacturing mineral-based industries	2.3.1.1 BOI, Philippine Export Zone Authority (PEZA), Phividec Industrial Authority (PIA), etc. to provide rational incentives to mineral –based industries based on the results of the studies on establishing downstream industries.	2004 - onwards	Lead: DTI-BOI, PEZA, PIA, Other Agencies managing economic zone
	2.3.2 Provide data/ information on financing program(s) which are available to mineral -based industries	2.3.2.1 DTI and government financing institutions (GFIs) to post data/information on available financing programs on their websites.	2004 – onwards	Lead: DTI/GFIs

Source: MAP

Rationale for national industrialization

There may be strong merits for the first component of the long-term plan of action for the national industrialization under the MAP as pronounced by the government, which is promoting downstream processing and other downstream activities, in the mining sector where the different stages of the entire production process are numerous particularly for minerals (**Figure 11**). From the initial exploration stage to the final stage of fabrication stage⁴, the different products of mining pass through many intermediate steps where the potential for value adding at every step exists. With greater value addition, national industrialization through more processing and other downstream activities should lead to higher production, incomes, employment, and other economic benefits for the mining sector and the entire Philippine economy.

Figure 11 Stages of the Mineral Industry



Sources of Data: Santos (1982) and Lopez (1992)

In terms of economic importance, studies have shown empirically that mineral processing can significantly contribute to the development of certain developing countries (Bocuom-Kaberuka 1999, Bocoum 992 and Bocoum and Labys 1992). However, for it to succeed, there are requirements to be met. ABARE (1990) stated that processing should be located in countries with a comparative advantage in the activity. The factors determining this comparative advantage include the a) location of mineral deposits to be processed; b) relative factor costs and input prices; c)

⁴ In plain language, exploration is locating the ore to be mined; development is the preparation of the mining project before the actual mining; mining is the extraction of the ore; milling and concentration is the separation of the desirable minerals in the ore from the undesirable contents; marketing and transportation is the shipping and selling of the desirable minerals to buyers or users; and smelting is the treatment of the desirable minerals to produce impure metal. After smelting, the impure metal is refined and afterwards built into metal structures by cutting, bending, and assembling which are technically referred to as the semi-fabrication and fabrication stages.

availability of processing technology, d) distance from major markets and the associated transport costs, and e) the security of supply. Glance et al. (1992) further said that the cost of meeting environmental regulations, which can vary from site to site of operations, also affects the costs of a prospective location processing. Another important factor affecting the location of mineral processing is the market for by-products as, for instance, the profitability of smelting and refining often depends on the ability of processors to sell by-products. Still another factor affecting the mineral processing activities is government intervention, which can directly or indirectly distort investment decisions and trade flows.

The choice by the government of copper, nickel, gold and chromite as minerals to be promoted for processing and other downstream activities under its strategy of national industrialization may also have a strong rationale (**Figure 3 and Appendix 3**). Total production of the four minerals formed 95.6 percent while their total exports comprised 57.5 percent of the total national mineral production and exports of the country, respectively (**Table 2**). In addition to these economic advantages, total reserves of the four minerals comprised 99 percent of the total national mineral reserves. Furthermore, there are 9 million hectares of high potential sites of gold, copper, nickel and chromite mining in the country although so far only 1.4 percent is covered by mining permits (ISD 2009). With this vast mineral resource base, it may be only fitting that the country will attempt to move away from being just an exporter of cheap and raw copper, nickel, gold and chromite products to being and exporter of expensive processed mineral products and the by-products of these minerals.

Table 2 Amount and Percent of Reserves, Production and Exports of Gold, Copper, Nickel and Chromite in the Philippines to Total Mineral Reserves, Production and Exports, 2002 and 2008

Item	Chromite	Copper	Gold	Nickel	Others	Total
Mineral Production in 2008 (in million Pesos)	109	6,029	42,989	14,168	302	63,597
Percent to Total	0.2	9.5	67.6	22.3	0.4	100
Mineral Exports in 2008 (in million USD)	12	1,309	116	0	1,061	2498
Percent to Total	0.5	52.4	4.6	0.0	42.5	100
Mineral Reserves in 2002 ('000 tons)	9,295	1,439,161	794,858	533,513	2,868	2,779,694
Percent to Total	0.3	51.8	28.6	19.2	0.1	100

Sources of data: MGB and Bangko Sentral ng Pilipinas (BSP)

Similar to the first component, there may also be adequate rationale for the three other components of the long-term plan of action for national industrialization under MAP. Specifically, the second program of developing community-based supplier industries/services may be intended to broaden participation of mining communities and the local population particularly the poor and increase their chances of economically benefitting from processing and downstream activities. Moreover, a community-based approach to processing in the mining sector is consistent with the already applied community-based approaches used in other natural resources of the country such as in fisheries and forestry.

For the third component of the long-term plan of action for national industrialization, which is improving government benefits from mining, desirability is obvious as it can increase government revenues from mining. These revenues can then channel back to the mining communities and the general population. The fourth component, which is control on the exports of unprocessed minerals may be welcome likewise as it will keep important mining raw materials from being exported at cheap ore prices. This point is particularly significant because while the total exports of the mining sector of the country have been generally increasing over the years, the total imports of processed mining-based products have been significantly larger than exports (**Table 3 and Appendix Tables 8 and 9**). This situation has resulted to a negative trade balance in the exports and imports of mining and mining-based products. For the country to have a positive trade balance in this regard, then, it would be important that at least some of the unprocessed ores exported will be kept in the country and processed to add more to their value before they are sold domestically or exported.

History of national industrialization

National industrialization in mining in the Philippines was actually attempted in the past already. Immediately after the Second World War, the government announced its plan to industrialize the country (Lopez 1992, Cabalda et al. 2002). However, it was only in the 1960s and 1970s that concrete measures were undertaken. In 1978, the government through its mining bureau came up with a five-year and ten-year integrated resources development plans as well as a ‘perspective’ plan for the succeeding years up to year 2000. These plans called for the industrialization of the mining industry through the vertical integration of mining extraction activities with the processing requirements of the metal-based manufacturing industries.

This previous industrialization program of the government was expected to eventually result to the establishment of ore processing plants and manufacturing plants around the country that will produce products needed in various industries. Grounded on the local abundance of ore reserves and technical labor, the industrialization was envisioned as a generator of jobs, foreign exchange, and ancillary firms for the economy. It was also designed not only to favor the industrialists and government but also the miners and manufacturing workers who will derive trickle down benefits from the increased profits accruing from processed mining and manufacturing products.

Table 3 Value of Exports and Imports of Mining-Based Products of the Philippines, 1990-2008 (US Million Dollars)

Years	Exports	Imports	Balance of Trade
1990	723	1,157	(434)
1991	610	1,154	(544)
1992	627	1,379	(752)
1993	686	1,726	(1,040)
1994	780	1,938	(1,158)
1995	893	2,525	(1,632)
1996	772	2,848	(2,076)
1997	764	2,778	(2,014)
1998	592	1,793	(1,201)
1999	645	2,103	(1,458)
2000	650	2,025	(1,375)
2001	537	2,052	(1,515)
2002	512	2,015	(1,503)
2003	614	2,239	(1,625)
2004	796	2,548	(1,752)
2005	819	2,804	(1,985)
2006	2,103	2,823	(720)
2007	2,605	2,977	(372)
2008	2,498	3,327	(829)
Average Annual Growth Rates (%)			
1990-2008	11.3	7.1	(11.3)
1990-1999	(0.4)	8.8	(17.7)
2000-2008	23.1	5.4	(4.8)
1996-2004	0.0	1.4	(2.8)
2005-2008	44.8	7.0	(6.0)

Source of data: Appendix Tables 8 and 9

History, however, showed that the Philippines failed miserably while other Asian countries such as Japan, South Korea, Taiwan, Singapore and Hong Kong succeeded in industrializing. Of the major projects then identified for industrialization, only the nickel refinery (Nonoc Surigao Nickel Refinery) and the copper smelter (Philippine Associated Smelting and Refining or PASAR) were established according to plan (Cabalda et al. 2002, Lopez 1992). Today, only PASAR remains in operation although efforts are underway to rehabilitate the Nonoc-Surigao Nickel Refinery. The main reasons put forward for the failure of the country to industrialize is that while it has vast ore resources and available technical labor, it has a narrow capital resource base to finance capital-intensive processing and manufacturing activities and a limited domestic market to absorb processed and manufactured products.

The failure of the national industrialization program of the government is illustrated below (**Table 4**). By the early 1980s, prior to the development of PASAR, only gold production completed all the stages of mining and processing mainly through the smelting facility of the Central Bank. Nickel was only up to the refining stage while copper and chromite were only until the mining and beneficiation stage. The other mining commodities had incomplete processes due to fragmented, questionable or not applicable stages. The one positive note for mining in the Philippines in this decade is that developing countries as a group were processing less than 50 percent of their ore production, with the exception of tin and copper (Moorney 1984). Furthermore, the pattern of exporting minerals in unprocessed form was not confined to developing countries but exhibited by a number of developed countries as well, particularly Canada and Australia.

Tujan and Guzman (2002) pointed out some important data and information on the mining industry of the Philippines particularly related to industrialization in the sector: a) In 1991, there were only nine processing companies, mostly of ferro-alloys and one each for copper cathodes and sintered iron, and these were owned mostly by foreign corporations; b) In 1993, the manufacturing of fabricated metal products, the iron and steel industry, and the non-ferrous metals industry were still small-scale; c) In 2000, the country exported \$28 million worth of copper concentrates but imported \$225 million worth of the same raw materials. d) In 1997, the total export value of the copper industry amounted to \$340.75 million while importation reached \$582 million; e) In 2000, the country imports metal products, produced by the subsidiary industries, 1,000 percent more than it exports; and f) The mining industry imports almost all its capital equipment and intermediate inputs from other countries.

Key informants mentioned that in the Philippines at present, the different stages of mining from exploration to fabrication are complete only for two products, copper and gold (**Table 5**). Along with copper, zinc deposits are explored, extracted and beneficiated but smelting, refining and fabrications are not yet done. Nickel is processed up to the refining stage while chromite is limited to the mining stage. Aluminum is at the exploration and mining stages and has semi-fabrication and fabrication processes but the refined aluminum that is fabricated is imported. For iron, exploration development is complete but existing mining operations are small-scale. During the 1980s up to the late 1990s, exploration, mining and beneficiation of

lead were done but these have declined and may no longer be in existence. Tin production had fragmented processes in the past but these no longer exist at present.

Table 4 Stages in Mining and Processing in the Philippines, by Commodity, 1983

	Exploration Dev't	Mining and Beneficia- tion	Smel- ting	Re- Fining	Semi – Fabri- cation	Fabri- cation
Aluminium	_____	?	?	?	-----	-----
Copper	_____	_____	?	?	-----	-----
Iron	?	?	?	?	_____	_____
Nickel	_____	_____	_____	_____	?	?
Gold	_____	_____	_____	_____	_____	_____
Chromite	_____	_____	?	?	?	?
Lead	_____	_____	?	?	-----	-----
Zinc	_____	_____	?	?	-----	-----
Tin	?	?	?	?	-----	-----
Crude Oil	-----	-----	n.a.	_____	?	-----
Coal	_____	-----	n.a.	?	?	?

Source: Tujan and Guzman (2002), NRMCM (1984),

Notes: complete _____; fragmented -----; questionable ?; n.a. not applicable

Table 5 Stages in Mining and Processing in the Philippines, as of 2010

	Exploration Dev't	Mining	Benefi- ciation	Smel- Ting	Re- fining	Semi – Fabri- cation	Fabri- cation
Aluminum	_____	_____	0	0	0	?	?
Copper	_____	_____	_____	_____	_____	_____	_____
Iron	_____	_____	0	0	0	_____	_____
Nickel	_____	_____	_____	_____	_____	0	0
Gold	_____	_____	_____	_____	_____	_____	_____
Chromite	_____	_____	0	0	0	0	0
Lead	0	0	0	0	0	0	0
Zinc	_____	_____	_____	0	0	0	0
(w/copper)	_____	_____	_____	0	0	0	0
Tin	0	0	0	0	0	0	0

Source: Key Informants

Notes: complete ____; questionable ?; none 0

There are no available data on the number of mineral processing permits (MPPs) granted in recent years. MPPs are granted by the MGB and although quarrying is under the local governments, the permit for processing of rocks and aggregates and sand, gravel and concrete are approved by the MGB. As of 2010, there were 48 existing permits, more of which were for the Visayas followed by Luzon and Mindanao (**Table 6**). More permits were for quarrying operations including the processing of sand and gravel and concrete and aggregates. As shown, relatively few of the permits were for the processing of minerals. In general, the MPPs cover only large-scale and medium-scale processing operations. There are no available data and information on processing permits for small-scale operations although key informants mentioned that there are known operations of this type particularly for iron, nickel, gold and chromite in some parts of the country. These data and information imply that with their reported existence at present, there may be some potential for the development of small-scale mining and quarrying processing operations in some areas of the country.

Table 6 Mineral Processing Permits in the Philippines, by Commodity, 2010

Commodity	Luzon	% to Total	Visayas	% to Total	Mindanao	% to Total	Total
Aggregates	9	90	1	10	0	0	10
Chromite	0	0	0	0	2	100	2
Copper and Copper Minerals	0	0	0	0	2	100	2
Ferronickel	0	0	0	0	2	100	2
Gold and other associated minerals	2	50	1	25	1	25	4
Lime	0	0	6	100	0	0	6
Limestone	0	0	5	100	0	0	5
Magnetite Sand	1	100	0	0	0	0	1
Nickel	1	100	0	0	0	0	1
Quicklime, slakelime, hydrated lime	1	100	0	0	0	0	1
Sand and gravel and concrete	3	21	9	64	2	14	14
Total	17	35	22	46	9	19	48

Source of Data: MGB

IV. Suggestions for the Immediate Future

This section discusses specific actions that can be done in the short-term to lay some ground work for a more effective pursuance of the four components of the strategy of national industrialization in the mining sector:

Promoting Downstream Processing and Manufacturing

As Table 1 illustrates, promoting downstream processing and manufacturing in the mining sector faces several constraints at present. Among the most important is the lack of information about which downstream processing and manufacturing activities to promote. For this reason, the MAP directed the conduct of a current situational analysis of the minerals value chain for both metallic and non-metallic minerals industries during 2004-2005.

In review, value chain analysis is an analytical approach developed by Porter (1985) and now popularly used in business and economics analysis abroad. In its basic form, it describes the activities that a firm performs and their impacts on its competitive position. Specifically, the analysis argues that the ability of the firm to perform particular activities and manage the linkages between these activities is a source of its competitive advantage. In other words, it argues that the margin of profit of a firm depends on its effectiveness in performing particular activities efficiently so that the amount the customer is willing to pay for its products exceeds the cost of the activities in the value chain.

The value chain analysis argues that a firm can attain competitive advantage through the following means: a) creating a cost advantage by reducing the cost of individual value chain activities or reconfiguring the value chain; b) creating a differentiation advantage by changing the individual value chain activities to create uniqueness in the final product or by reconfiguring the value chain; and c) changing the technology to incrementally change the value chain activities or making possible new configurations of the value chain. In its simplest form, the value chain describes the main activities which are required to bring a product or service through its conception, production, distribution, utilization and final disposal phases. In this sense, production is one of a number of links in the chain which can add value to the products (Kaplinsky and Morris 2000).

Presently, value chain analysis has already been used for analysis not only at the firm but also at the industry, national and even global levels. Basically, an industry value chain considers the various processes that are involved in producing goods and services at the industry level, starting with raw materials and ending with the delivered products, also known as the supply chain. In the now interconnected national and global economies, value chains can be more complex and this may require an extended value chain analysis. Thus, the value chain can be extended beyond the firm and industry since their use of inputs and delivery of products and services to their customers may mobilize different firms and economic sectors as well, each managing its own value chain. This larger interconnected system of value chains is called the "value system" (Porter 1985). The value system includes the value chains of a firm or industry's supplier and their own suppliers all the way back, the firm or industry itself, its distribution channels, and finally its buyers.

The expanded value chain analysis could of course be done within the confines of one country or in connection with other economies in a globalized setting. Kaplinsky and Morris (2000) explain that there are three main sets of reasons why value chain analysis is important in this era of rapid globalization. These are the following: a) With the growing division of labor and the global dispersion of the production of components, systemic competitiveness has become increasingly important; b) Efficiency in production is only a necessary condition for successfully penetrating global markets; and c) Entry into global markets which allows for sustained income growth, that is, making the best of globalization, requires an understanding of dynamic factors within the whole value chain. Since the 1980s, value chain analysis has been applied for various firms, sectors and countries all over the world. More recent and available studies employing value chain analysis in the mining sector are Mziray (2008), Kilimba (2008) and Orr and Whittle (2005).

Given the virtues of value chain analysis, therefore, it is much welcome as an analytical approach for the mining sector. Several works on the methodology of value chain analysis for general use are already available including Kaplinsky and Morris (2000). In summary, the methodology begins with the identification of the point of entry for value chain analysis. For instance, if gold is the mineral of interest, the point of entry may be the entire gold industry specifically. After the identification of the point of entry, the mapping of the value chain is then done which presents the backward and forward linkages between the different activities in the chain. An example, a preliminary mapping of the entire gold industry of the country is presented in **(Figure 12)**.

After the mapping of the value chain, the rest of the methodology of value chain analysis that addresses the other important issues which are also explained in Kaplinsky and Morris (2000). These issues include: a) product segments and critical Success factors in final markets; b) producers access final markets; c) benchmarking production efficiency; d) governance of value chains; e) upgrading in value chains; and f) distributional issues:

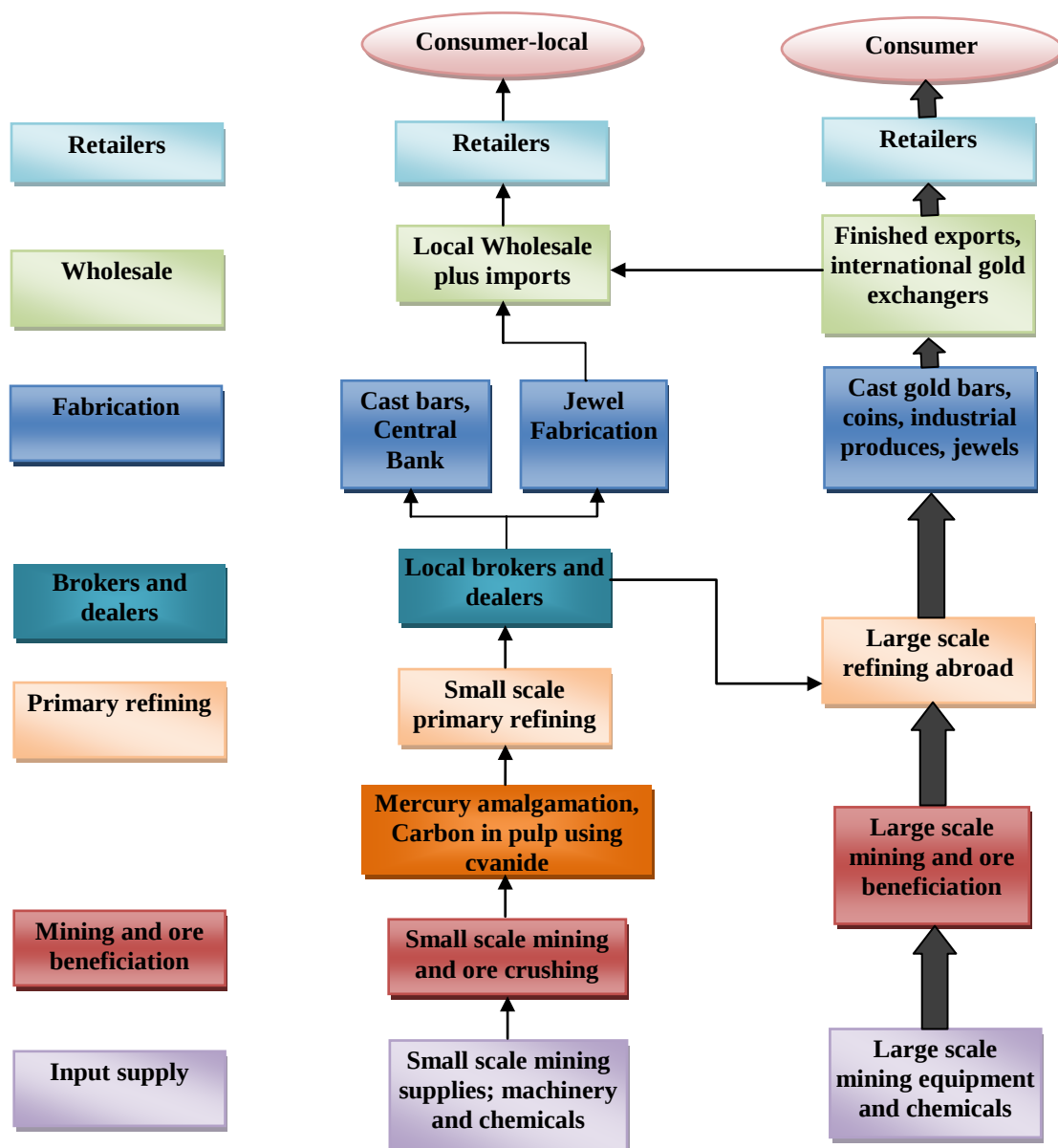
Going back to the activities stated in Table 1, key informants opined that the conduct of a situational analysis of the minerals value chain for both metallic and non-metallic minerals industries scheduled in 2004-2005, as in the case of the MAP itself, has not been completely implemented. This paper, therefore, suggests the following actions for the short term:

- a) presentation of whatever results the situational analysis already conducted had to the different stakeholders in the mining sector for validation and improvement; and
- b) conduct of a full-blown value chain analysis for the mining sectors and its sub-sectors, including but not limited to the copper, nickel, gold and chromite industries.

The above proposed conduct of sectoral and sub-sectoral mining value chain analysis is deemed important as, among others, it will help identify the a) particular activities in the entire sectoral and sub-sectoral mining value chains from input generation, production, processing, manufacturing, trading and other related activities where the most comparative advantage of the country exist and should be promoted;

b) technology, manpower, financial and other capabilities required to promote these particular activities in the value chain; and c) income, employment and other economic and social benefits that promoting these particular activities generate and their distributional impacts on the various stakeholders in the mining sector and society as a whole.

Figure 12 Preliminary Gold Value Chain for the Philippine Mining Sector



Source of Data: Mziray (2008) and Key Informants

Developing Community-Based Supplier Industries/Services

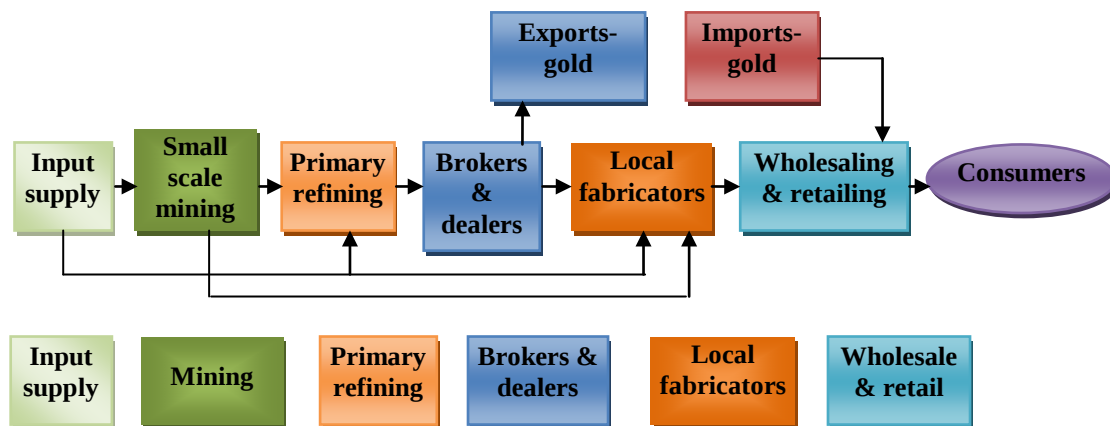
As earlier mentioned, the second approach to mining industrialization of developing community-based supplier industries and services democratizes mining from production down to its processing and other downstream activities. It will allow not only the large-scale operators in the entire value chain but also the small and medium enterprises (SMEs) particularly in the rural areas close to the mining areas to benefit from industrialization. It would also help break the traditional monopolistic/monopsonistic nature of the mining industry which large players generally control while small players have a less than fair share of the benefits. Once the value chain analysis for the entire mining sector and its subsectors are completed, therefore, a study should be conducted on how to develop community-based SME activities in the value chain where they would have comparative advantage. Among others, this study would identify how technology, financial, legal and institutional and other forms of government support could be provided to these community-based SMEs so that they would prosper and contribute to mining development. In this study, the development of cooperatives among the small players in the entire value chain of the mining sector should also be considered so that they can have greater economic and political clout and leverage in the market for processed and other mining products and services.

As a case in point, the small-scale gold mining industry in the Philippines is a subsector where developing community-based supplier industries/services would be highly needed. It is clear that the participation of community-based SMEs in this subsector is not limited to small-scale mining itself but also in the input supply and the numerous downstream activities after ore extraction as a preliminary mapping shows (**Figure 13**). Once support is provided to the community-based SMEs in the input supply and to refining and other downstream portions of the chain, the benefits of the small-scale mining subsector will be more democratized and spread out among the small players including the poor.

Improving Government Benefits from Mining

In terms of government benefits from the mining sector, at present, there are already various taxes imposed by the Mining Act, National Internal Revenue Code and other relevant laws. At the national level, these include the following: a) Corporate Income Tax; b) Excise Tax on Minerals; c) Customs Duties; d) Value Added Tax; e) Royalties on Minerals Extracted from Mineral Reservation; f) Documentary Stamp Tax; and the f) Capital Gains Tax. At the local level, the taxes imposed are the following a) Business Tax; b) Real Property Tax; c) Registration Fees; d) Occupation Fees; e) Community Tax; and f) Other Local Taxes. In addition to the above, withholding taxes are also imposed on a) Payroll; b) Interest Income in Banks; c) Royalties to Technology Transfer; d) Interest Payments to Foreign Loans; e) Foreign Stockholders Dividends; and f) Remittance to Principal. Furthermore, duties and fees, mining contractors are required to pay or expend on: a) Additional Government Share for FTAA contractors; b) Royalties to Landowners/Claim owners; c) Royalties to Indigenous Peoples; d) Social Development Programs; d) Environmental Obligations; and e) Research and Development of Mining Technology and Geosciences.

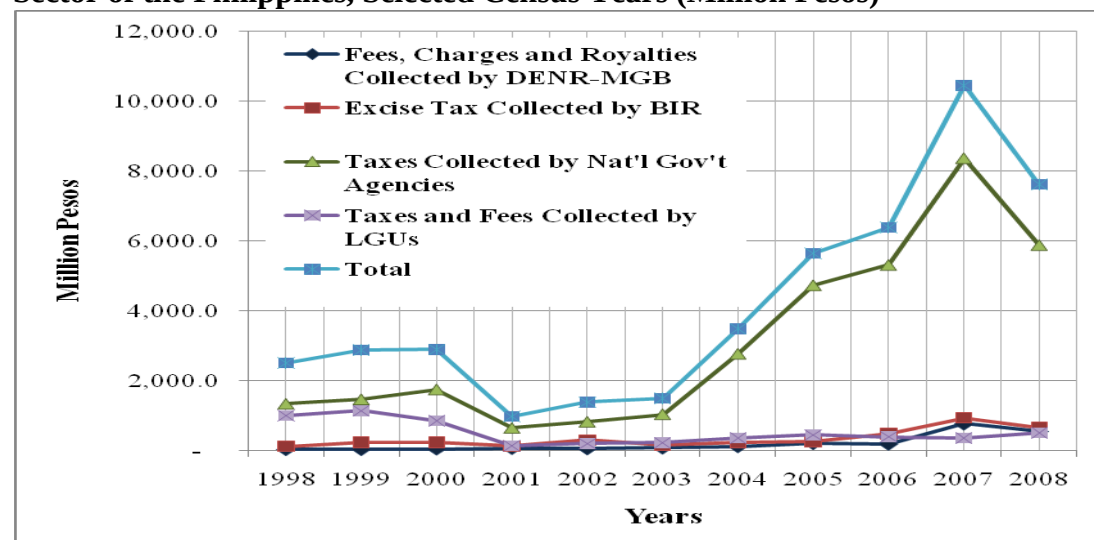
Figure 13 Tentative Gold Value Chain for Small Scale Miners in the Philippines



Source of Data: Mziray (2008) and Key Informants

Reviewing the revenues generated by the government from the mining sector, the available data show that while the total government revenues in terms of fees, charges, royalties and taxes from the in general and the taxes collected by the national government grew annually on average at a faster rate in the years after the mining law was declared legal **Figure 14**). On the other hand, the taxes and fees collected by the local governments fell annually on average before the law was declared legal and rose thereafter. The taxes collected by the national government were many times more that those collected by the local governments and the difference grew larger after the law was declared constitutional. These data appear rto indicate that the declaration of legality of the mining law may have positive impacts on the collection of public revenues from mining in totality as well as both at the national and local levels.

Figure 14 Fees, Charges, Royalties and Taxes in the Mining and Quarrying Sector of the Philippines, Selected Census Years (Million Pesos)



Source of data: Appendix Table 10

On the royalties from mining, in particular, the DENR recently declared that it will now actively require mining companies to pay five percent of their gross profit as royalty over and above the two percent excise tax imposed (Galves 2010). The agency explained that this is because under the mining law, the government can charge companies a maximum of five percent royalty on all mineral reservation areas for strategic minerals which it says should include gold, copper, nickel, and the other minerals. The agency further asserted that the country demands less royalty tax compared to other countries as for instance Australia requires its mining firms to pay eight percent royalty, Indonesia charges seven percent while Mongolia levies 40 percent of the bonanza from mining operations. The actual available secondary data, on the other hand, indicate that as of 2006, among selected Asian and Pacific countries, the Philippines had no royalty tax for gold like other countries with the exception of China (**Appendix Table 11**). The country had a two percent tax on copper which was the same or lower compared to those imposed by other countries. In addition, the tax rate of the country had no variation unlike those imposed in most other countries.

Since the royalty tax is payment for the use of a natural resource, which in this case the ore mineral that is extracted by the miner but owned by society in general, it is only fitting that the miner must pay for a reasonable part of its value. The amount paid has to justly compensate society for the ore that it owns. This point of proper payment is made the more important since ore is a non-renewable resource that the society loses forever once extracted.

A good way of determining the royalty tax in mining is to determine the resource rent which is generally defined as the returns received by mining firms above their normal profit. Domingo and Lee (2007) proposed two methods for computing economic rent as follow:

Method A:

a) Gross rent is calculated as total revenue less current operating expenditures; b) The resource rent is obtained by subtracting the rent to capital (both depreciation and a normal rate of return for capital) from the gross rent; c) The per-unit rent to the resource equals the resource rent divided by the physical quantity extracted; and d) The value of the resource equals the per unit rent times the physical quantity of reserves

Method B:

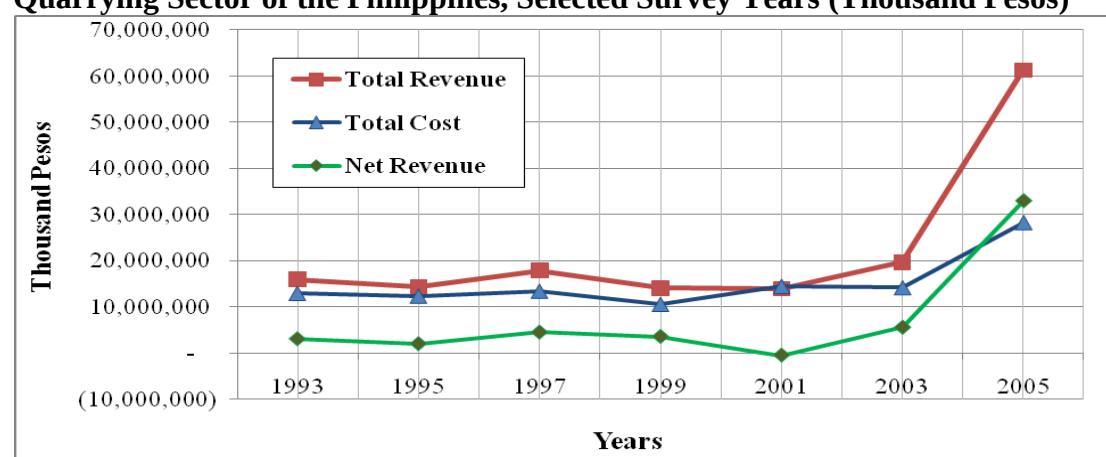
a) Gross rent/unit derived by dividing gross rent by the physical quantity of extraction; b) Total value of the mineral reserve (the resource and the associated invested capital) equals the gross rent per unit times the quantity of reserves; c) Value of the resource equals the total value of reserves less the current replacement value of the net stock of invested capital, and d) The resource rent per unit equals the value of the resource divided by the quantity of reserves

An indicative way of determining whether or not mining operations in the Philippines can pay for the resource rent is to review the available data on their total

revenues, total costs and net revenues. On a bi-annual basis, from 1993 to 2005, the total revenues of the mining and quarrying sector had been greater than total costs, resulting in positive net revenues, except for 2001 (**Figure 15**). The net revenues in particular suddenly jumped during the time the mining law was declared legal in 2004. Furthermore, except for 2001, the net revenues to total costs ratios had been at 23 percent or greater during the period. This ratio finally reached peak at 116 percent in 2005 which is doubtless a very high figure (**Figure 16**).

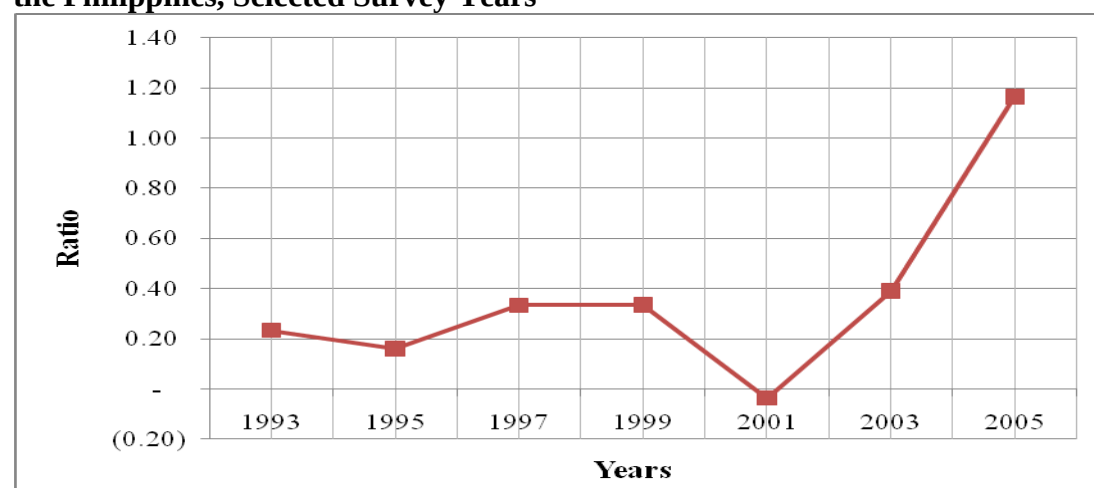
The aforementioned figures on the total revenues, total costs and net revenues of mining seem to preliminarily indicate that the mining and quarrying sector as a whole may be earning very high economic returns. This assertion is reinforced by additional data which suggest that when compared to some other economic sectors of the country, including resource dependent sectors like fishing; agriculture, hunting and forestry; and electricity, gas and water supply, the mining and quarrying sector has the highest net revenue to total costs ratios (**Figure 17**). These are reasons to suspect that the mining and quarrying sector as a whole is generating above normal profits or resource rents and that a fair part of this must be returned to society.

Figure 15 Total Revenues, Total Costs and Net Revenues in the Mining and Quarrying Sector of the Philippines, Selected Survey Years (Thousand Pesos)



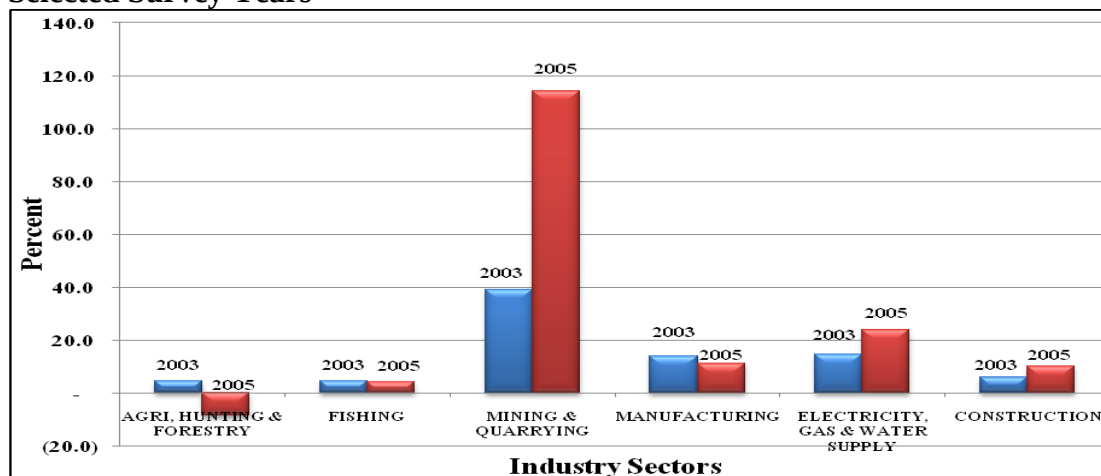
Source of data: Appendix Table 12

Figure 16 Net Revenue/Total Cost Ratio in the Mining and Quarrying Sector of the Philippines, Selected Survey Years



Source of data: Appendix Table 12

Figure 17 Net Revenue/Total Cost Ratio in Selected Industries of the Philippines, Selected Survey Years



Source of data: Appendix Table 13

This paper suggests that to improve government benefits from mining, a study on resource rent in the mining and quarrying sector and its individual subsectors should be conducted in the short term. Among others, this study will determine how much royalty tax should be imposed on the mining sector and its subsectors in order to attain increased government revenues. Furthermore, this study should include revenue sharing as past works (e.g. Clark 1999) have shown that there may be an inequitable sharing of the proceeds of resources rents between the national and local governments and between certain local government units.

On a broader scale, greater accountability and transparency in the mining sector related to the generation, sharing and use of taxes from mining should be further considered in the management of government revenues from mining. The Chamber of Mines of the Philippines has been leading the adoption of the Extractive Industry Transparency Initiative (EITI), which is an implementing system that institutionalizes a mechanism of disclosure from both mining companies and their host governments of the legitimate payments the former make to the latter (Halcon et al. 2007). This and similar projects must be supported as they can potentially increase benefits from mining not only through increased taxation but also through accountability, transparency and overall efficiency and effectiveness in the generation, sharing and utilization of government revenues.

Control on the Exports of Unprocessed Metals

In general, export restrictions are imposed to achieve diverse policy objectives, including environmental protection or conservation of natural resources, promotion of downstream processing industries, controlling inflationary pressures, and increasing fiscal receipts (Kim 2010). Other rationale for export may even include certain noneconomic objectives such as strategic arms control (Bonarriva et al. 2009). Export restrictions take various forms such as export duties, minimum export prices, and reduction of value-added tax (VAT) rebates which directly affect export prices. Other forms include export bans, quotas, and licensing requirements which affect export volumes. In the 2000s, the number of countries applying export

duties was higher compared to previous decades and that such duties were introduced primarily by developing and least developed countries than developed countries.

Theoretically and in general, export restrictions may result in losses of efficiency since it induce too much production in the exporting country's downstream industry (Kim 2010). These measures may also have income redistribution effects by penalizing exporters of the restricted product while benefiting domestic processing industries. This is because, export controls may create a differential between the price available to domestic processors and the price charged to foreign processors providing domestic processing industries with an advantage over their competitors.

In the Philippine mining sector, the products where exportation is currently regulated are copper concentrates and gold produced from small-scale mining operations. Another export restriction that is being implemented is the requirement that mining firms secure a mineral ore export permit from the DENR. Some key informants explained that this new policy will allow the government to control the illegal exportation or technical smuggling of raw materials out of the country and impose the proper export taxes as well as protect the interests of legitimate firms. In contrast, other key informants opined that this may only discourage investments into the sector.

Because of the contradicting potential impacts of export restrictions on the mining sector and the whole economy, it would be necessary to conduct a detailed study on what particular restrictions should be utilized taking into consideration their total and net economic, social and other impacts. Kim (2010) pointed out that when designing export restrictions, several factors should be carefully considered including: a) whether the measures are effective in achieving intended policy objectives; b) whether the benefit of the measures outweighs the cost; and c) whether the measures achieve the objectives in the least trade distorting ways. The detailed study on export restrictions for the Philippines, therefore, should take these factors into consideration in coming up with the appropriate restrictions for the mining sector.

Other Suggestions

In addition to the aforementioned suggestions that can be conducted immediately, there are other requirements for mining industrialization to succeed. Kloeckner (2010) argued that some of the most important requirements are a) necessary legal, fiscal, and environmental policies to support strong mining institutions with accountability and transparency, and b) establishing clear environmental and social policies, as well as compliance standards that achieve rigorous standards of environmental and social conduct, which would include providing support to local and indigenous populations. In short, developing an industrialized and at the same time sustainable mining industry requires society to consider the relative value of the environment, social equity, and economic prosperity.

Several studies have been conducted in the Philippines about the economic, social and environmental impacts of mining on its stakeholders and society. Many of these offer contrasting views depending on which side of the mining debate the

authors belong (e.g. Doyle et al. (2007), TWBFI (2003), Rovillos et al. 2003, Tujan and Guzman 2002). While they represent opposing sides, these works have common proposals that should be considered even if only because they are generally accepted. Among these are the need for institutional strengthening that would eventually result to the overall efficiency and effectiveness of management in the mining sector. Suffice it to say in this paper that the numerous studies on the mining sector be revisited and the commonly agreed good suggestions they offer be considered for implementation.

In particular, Doyle et al. (2007) proposed following institutional improvements:

- a) Government departments should be upgraded and reorganized. The DENR should be restructured to eliminate the conflict of interest of the mandate of the department. .
- b) The legal frameworks for sustainable development should be strengthened. Departments, including those on health, agriculture and tourism should be empowered to act when mining projects cause environmental or social damage.
- c) An inter-departmental coordinating committee should be established to approve all extractive industry projects and ensure that they meet national and international standards for sustainable development.

Of the institutional improvements proposed by TWBFI (2003), the following may deserve consideration:

- a) For greater efficiency, the DENR/MGB must do task specialization. The head office should focus on policy-making, development of guidelines and supervision of the regional offices. The regional offices should play a more direct hand in evaluating proposed mining projects and other operational issues in within their jurisdiction.
- b) The DENR/MGB should lead in the enhancement of the country's competitive advantage in mining. Two of the concrete measures being suggested in this regard are the development of a reasonably comprehensive mineral mapping of the country and coordination with all concerned agencies and local governments to create an environment conducive to investments in mineralized provinces.
- c) The DENR/MGB and other relevant government agencies must strictly enforce mining and environmental laws. This will assure the public that the government is serious in its pursuit of responsible mining and help create some momentum towards greater public support to the industry.

VI. Summary and Conclusions

This paper looked into national industrialization in the mining sector as a long-term strategy of mining development in the Philippines. The end purpose is to suggest specific actions that can be immediately undertaken to jumpstart national industrialization. The paper uses secondary data and information from the institutional sources and available relevant literature as well as primary data and information gathered through personal interviews with selected key informants.

The paper found that the knowledge base of the country needed to pursue national industrialization strategy is poor. It therefore suggests the following research activities to be done in the short term: a) value chain analysis for the mining sectors and its sub-sectors, including but not limited to the copper, nickel, gold and chromite industries; b) analysis on how to develop community-based SME activities in the value chain including an assessment of the technology, financial, legal and institutional and other forms of government support that could be provided to them; c) analysis of actual resource rents in the mining sector and individual subsectors that will determine, among others, how much royalty tax should be imposed to the sector and its subsectors; d) study of the appropriated export restrictions that should be imposed on the mining sector taking into consideration their total and net economic, social and other impacts on the sector and economy. In addition to the aforementioned, the paper supports institutional improvements that were suggested by previous works including the strengthening the organizational, legal, monitoring and enforcement and other related function of the DENR, MGB and other relevant agencies.

In conclusion, judging by experience, the search for national industrialization in the mining sector would be difficult. In the past, the record of the Philippines in this regard was one of failure. This, however, should not prevent the country from attempting once again especially given the importance of industrialization to the growth of the economy. If done in a socially equitable and environmentally sustainable manner, national industrialization may yet prove to be less of a pipe dream and more of a worthy and attainable objective of economic development.

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Appendices

Table 1 Gross Value Added (GVA) in the Mining and Quarrying Sector, Gross Domestic Product (GDP) and Percent Share of GVA in the Mining and Quarrying Sector to GDP, at Current Prices, 1960 – 2008

Year	GVA in Mining and Quarrying (million pesos at current prices)	GDP (million pesos at current prices)	Percent Share of GVA in Mining and Quarrying to GDP
1960	113	13,478	0.84
1961	121	14,682	0.82
1962	155	16,421	0.94
1963	163	19,126	0.85
1964	169	20,677	0.82
1965	207	22,617	0.92
1966	283	24,878	1.14
1967	298	26,717	1.12
1968	372	29,835	1.25
1969	507	33,062	1.53
1970	828	39,506	2.10
1971	831	47,648	1.74
1972	927	53,515	1.73
1973	1,639	68,123	2.41
1974	2,084	93,545	2.23
1975	1,368	107,950	1.27
1976	1,547	127,211	1.22
1977	2,094	145,451	1.44
1978	2,485	167,249	1.49
1979	4,182	202,900	2.06
1980	5,460	243,749	2.24
1981	5,173	281,596	1.84
1982	4,882	317,177	1.54
1983	6,182	369,077	1.67
1984	8,142	524,481	1.55
1985	11,893	571,883	2.08
1986	14,144	608,887	2.32
1987	14,354	682,764	2.10
1988	15,275	799,182	1.91
1989	15,446	925,444	1.67
1990	16,659	1,077,237	1.55
1991	17,504	1,248,011	1.40
1992	16,263	1,351,559	1.20
1993	16,621	1,474,457	1.13

(Table 1 continued)

1994	16,509	1,692,932	0.98
1995	16,801	1,905,951	0.88
1996	17,175	2,171,922	0.79
1997	17,311	2,426,743	0.71
1998	20,093	2,665,060	0.75
1999	18,016	2,976,905	0.61
2000	21,788	3,354,728	0.65
2001	21,707	3,631,474	0.60
2002	33,524	3,963,873	0.85
2003	43,566	4,316,402	1.01
2004	52,887	4,871,555	1.09
2005	63,639	5,444,039	1.17
2006	75,557	6,032,835	1.25
2007	108,286	6,648,245	1.63
2008	110,989	7,497,535	1.48
Average Annual Growth Rates (%)			
1960-2008	17.31	14.26	2.74
1960-1969	18.85	10.51	7.57
1970-1979	28.02	20.09	6.39
1980-1989	15.20	16.73	(0.96)
1990-1999	1.79	12.43	(9.44)
2000-2008	23.47	10.82	11.50
1996-2004	15.01	11.01	3.74
2005-2008	21.22	11.39	8.94
Sources of data: National Income Accounts (NIS), NSCB (Various Years)			

Table 2 Gross Value Added (GVA) in the Mining and Quarrying Sector, Gross Domestic Product (GDP) and Percent Share of GVA in the Mining and Quarrying Sector to GDP, at constant prices, 1960-2008

Year	GVA in Mining and Quarrying (million pesos at constant 1985 prices)	GDP (million pesos at constant 1985 prices)	Percent Share of GVA in Mining and Quarrying to GDP
1960	2,437	212,211	1.15
1961	2,432	224,130	1.09
1962	2,442	234,828	1.04
1963	2,569	251,408	1.02
1964	2,600	260,074	1.00
1965	2,727	273,769	1.00
1966	3,064	285,886	1.07
1967	3,385	301,107	1.12
1968	3,886	315,998	1.23
1969	4,363	330,712	1.32
1970	4,955	343,162	1.44
1971	5,395	361,791	1.49
1972	5,409	381,497	1.42
1973	5,668	415,529	1.36
1974	5,544	430,314	1.29
1975	5,738	454,260	1.26
1976	5,886	494,265	1.19
1977	7,065	521,954	1.35
1978	7,318	548,950	1.33
1979	8,249	579,909	1.42
1980	9,128	609,768	1.50
1981	9,350	630,642	1.48
1982	9,165	653,467	1.40
1983	9,244	665,717	1.39
1984	8,959	616,962	1.45
1985	11,893	571,883	2.08
1986	12,313	591,423	2.08
1987	11,232	616,923	1.82
1988	11,704	658,581	1.78
1989	11,389	699,448	1.63
1990	11,091	720,069	1.54
1991	10,770	716,460	1.50
1992	11,495	718,941	1.60
1993	11,571	733,097	1.58
1994	10,763	766,368	1.40

(Table 2 continued)

1995	10,035	802,224	1.33
1996	10,166	849,121	1.20
1997	10,338	893,151	1.16
1998	10,624	888,000	1.19
1999	9,736	918,160	1.06
2000	10,833	972,960	1.09
2001	10,125	990,042	1.02
2002	15,285	1,034,094	1.48
2003	17,856	1,085,072	1.65
2004	18,325	1,154,295	1.59
2005	20,032	1,211,452	1.65
2006	18,813	1,276,156	1.47
2007	23,713	1,366,493	1.74
2008	24,157	1,418,952	1.70
Average Annual Growth Rates (%)			
1960-2008	5.39	4.08	1.35
1960-1969	6.82	5.06	1.69
1970-1979	6.02	6.02	0.02
1980-1989	3.03	1.66	1.91
1990-1999	-1.32	2.76	-3.90
2000-2008	11.88	4.84	6.94
1996-2004	8.95	4.05	4.63
2005-2008	7.28	5.42	1.66

Source of data: NIS, NSCB (Various Years)

Table 3 Philippine Mineral Production, by Commodity, 1990-2008 (Million Pesos)

Year	Gold	Silver	Copper	Chromite	Nickel	Others	Total Metallics
1990	7,166	171	7,891	453	686	25	16,392
1991	8,177	134	7,677	403	648	7	17,045
1992	7,189	103	6,641	135	596	8	14,672
1993	7,926	116	6,262	101	351	1	14,757
1994	8,966	124	5,521	140	376	0	15,127
1995	8,484	115	5,786	243	598	0	15,226
1996	9,855	104	3,364	277	480	0	14,080
1997	9,909	91	2,792	287	514	0	13,594
1998	12,763	125	2,753	164	793	0	16,599
1999	10,725	114	2,147	38	583	0	13,607
2000	13,764	158	2,336	74	1,144	1	17,477
2001	14,382	197	1,569	98	1,519	0	17,765
2002	18,009	68	1,493	52	1,318	0	20,940
2003	23,846	81	1,950	127	1,361	1	27,366
2004	25,595	112	2,205	146	1,431	0	29,489
2005	28,303	246	3,288	92	5,436	9	37,374
2006	34,733	418	5,911	126	14,329	0	55,518
2007	39,924	562	7,479	160	31,780	823	80,728
2008	42,989	263	6,029	109	14,168	39	63,597
Average Annual Growth Rates (%)							
1990-2008	11.29	11.11	2.20	7.88	36.70	-35.58	9.60
1990-1999	5.51	-2.89	-12.36	-10.29	2.96	-27.25	-1.46
2000-2008	17.08	25.11	16.76	26.06	70.45	-43.92	20.65
1996-2004	14.15	6.85	-7.50	15.26	15.48	-22.22	8.83
2005-2008	13.98	42.70	34.01	-1.23	127.46	-48.82	24.87

Source of data: MGB

Note: Others include Iron, Zinc, Lead, Molybdenum, Cadmium, Pyrite Cynders, Manganese, Quicksilver and Cobalt.

Table 4 Total Mineral Exports, Total Exports and Percent Share of Mineral Exports to Total Exports of the Philippines, 1970-2008 (US Thousand Dollars)

Year	Total Mineral Exports	Total Exports	Percent Share of Mineral Exports to Total Exports
1970	220,503	1,062,000	20.76
1971	228,628	1,136,000	20.13
1972	248,607	1,106,000	22.48
1973	463,193	1,886,000	24.56
1974	555,124	2,725,000	20.37
1975	397,483	2,294,000	17.33
1976	458,985	2,574,000	17.83
1977	558,278	3,151,000	17.72
1978	575,991	3,425,000	16.82
1979	851,000	4,601,000	18.50
1980	1,234,786	5,787,788	21.33
1981	1,025,489	5,722,157	17.92
1982	727,000	5,020,593	14.48
1983	660,000	5,005,291	13.19
1984	516,054	5,390,646	9.57
1985	594,000	4,628,954	12.83
1986	557,000	4,841,781	11.50
1987	462,000	5,721,238	8.08
1988	764,000	7,074,190	10.80
1989	829,000	7,820,713	10.60
1990	723,000	8,186,027	8.83
1991	610,000	8,839,514	6.90
1992	627,000	9,824,314	6.38
1993	686,000	11,374,805	6.03
1994	780,000	13,483,000	5.79
1996	772,000	20,543,000	3.76
1997	764,000	25,228,000	3.03
1998	592,000	29,496,000	2.01
1999	645,000	35,037,000	1.84
2000	650,000	37,297,000	1.74
2001	537,000	32,150,200	1.67
2002	512,233	35,208,160	1.45
2003	614,461	36,231,210	1.70
2004	796,401	39,680,520	2.01
2005	819,323	41,254,680	1.99
2006	2,058,319	47,410,120	4.34
2007	2,604,559	50,466,000	5.16
2008	2,498,361	49,025,380	5.10

(Table 4 continued)

Average Annual Growth Rates (%)

1970-2008	10.54	11.70	-1.18
1970-1979	19.80	20.13	-0.77
1980-1989	-1.27	4.09	-5.08
1990-1999	-0.38	17.68	-15.39
2000-2008	25.52	3.83	19.13
1996-2004	1.8	8.6	-5.55
2005-2008	57.9	6.2	45.41

Source of Data: Bangko Sentral ng Pilipinas (BSP)

Notes: Starting January 2000, the BSP has adopted the new framework for Balance of Payments (BOP) compilation and reporting in accordance with the International Monetary Fund's (IMF) Balance of Payments Manual, 5th edition (BPM5). Export Data for 1999-2008 were based on the new conceptual coverage (BPM5) while export data for 1970-1998 were based on the old concept (from BSP's Notes on the External Accounts).

Table 5 Employment in All Industries and in the Mining and Quarrying Sector of the Philippines, 1990-2008 (Thousands)

Year	Total Employment In All Industries	Employment in the Mining and Quarrying Sector	Percent Share of Employment in the Mining and Quarrying Sector
1990	21,900	139	0.63
1991	22,915	140	0.61
1992	23,696	147	0.62
1993	24,382	135	0.55
1994	25,032	111	0.44
1995	25,676	107	0.42
1996	27,186	113	0.42
1997	27,715	130	0.47
1998	27,911	120	0.43
1999	29,644	100	0.34
2000	31,830	110	0.35
2001	32,808	104	0.32
2002	33,675	101	0.30
2003	34,560	104	0.30
2004	35,845	118	0.33
2005	34,047	123	0.36
2006	32,962	141	0.43
2007	33,559	149	0.44
2008	34,089	158	0.46
Average Annual Growth Rates (%)			
1990-2008	2.53	1.17	-1.19
1990-1999	3.44	-3.06	-6.10
2000-2008	1.62	5.41	3.73
1996-2004	3.80	1.60	-2.16
2005-2008	-1.20	7.65	8.85

Sources of Data: MGB and Department of Labor and Employment (DOLE)

**Table 6 Number of Establishments in the Mining and Quarrying Sector
1993-2006**

Year	Number
1993	308
1994	290
1995	157
1996	188
1997	399
1998	389
1999	364
2000	376
2001	317
2002	317
2003	187
2004	214
2005	242
2006	78
Average Annual Growth Rates (%)	
1993-2006	-1.72
1993-2004	8.71
2005-2006	-27.34

Sources of Data: Annual Survey of Establishments (ASE), Annual Survey of Philippine Business and Industry (ASPBI), Census of Philippine Business and Industry (CPBI), Industry and Trade Statistics Department, (NSO)

Table 7 Total Paid-up Investment, Foreign Equity and Local Investment in the Mining and Quarrying Sector of the Philippines, Selected Census Years (Million Pesos)

Year	Total Paid-up Investment	Foreign Equity	Percent Share of Foreign Equity to Total	Local Investment	Percent Share of Local Equity to Total
1990	430.20	16.90	3.93	413.30	96.07
1991	305.00	57.10	18.72	247.90	81.28
1992	1,304.70	505.30	38.73	799.40	61.27
1993	1,865.00	149.80	8.03	1,715.10	91.97
1994	1,254.60	88.20	7.03	1,166.40	92.97
1995	859.90	107.90	12.55	752.00	87.45
1996	3,653.00	818.60	22.41	2,834.40	77.59
1997	2,794.10	134.90	4.83	2,659.20	95.17
1998	1,354.03	182.70	13.49	1,171.33	86.51
1999	3,662.70	695.50	18.99	2,967.20	81.01
2000	1,089.28	30.44	2.79	1,058.84	97.21
2001	268.60	42.68	15.89	225.92	84.11
2002	363.92	1.85	0.51	362.07	99.49
2003*	81.24	6.88	8.46	74.36	91.53
2004*	282.68	39.43	13.95	243.25	86.05
2005*	5,969.91	89.28	1.50	5,880.63	98.50
2006*	504.78	85.53	16.94	419.25	83.06
2007*	2,654.92	547.73	20.70	2,098.19	79.30
2008*	661.26	117.94	17.84	543.32	82.16
Average Annual Growth Rates (%)					
1990-2008	168.28	166.83	197.21	178.53	0.55
1990-1999	77.52	202.77	76.69	66.40	0.13
2000-2008	259.04	130.90	317.74	290.66	0.97
1996-2004	249.23	161.16	204.21	275.06	2.12
2005-2008	567.80	146.04	237.12	637.75	(0.53)

Source of Data: Securities and Exchange Commission (SEC)

Note: * preliminary

Table 8 Value of Exports of Mining-Based Products of the Philippines, by commodity group, 1990-2008 (f.o.b. Value in U. S. Million Dollars)

Years	Copper Concentrates	Copper Metal	Gold	Iron Ore Agglomerates	Chromium Ore	Nickel	Others	Total
1990	207	281	90	81	17	0	47	723
1991	174	222	65	78	16	1	54	610
1992	140	217	128	63	14	0	71	633
1993	109	264	51	62	9	0	191	686
1994	113	270	65	74	8	0	250	780
1995	134	341	62	74	12	0	270	893
1996	52	297	55	70	8	0	289	771
1997	44	231	49	90	6	0	342	762
1998	25	178	34	61	6	0	288	592
1999	43	236	0	73	4	0	0	645
2000	28	234	42	77	3	0	266	650
2001	10	256	31	61	2	0	175	536
2002	13	216	30	59	2	0	184	503
2003	12	269	14	63	3	0	253	614
2004	14	411	10	83	6	0	273	796
2005	37	361	25	110	5	0	282	819
2006	84	1231	50	153	5	0	580	2103
2007	137	1294	93	172	8	0	901	2605
2008	134	1309	116	114	12	0	813	2498
2009	150	688	116	92	11	0	415	1470
Average Annual Growth Rates (%)								
1990-2009	11.62	13.65	6.76	2.97	3.67	-5.26	15.04	8.61
1990-1999	-9.24	0.17	-13.44	0.61	-11.87	-11.11	18.21	-0.39
2000-2009	30.40	25.79	24.94	5.10	17.67	0.00	12.19	16.71
1996-2004	-12.00	4.97	-29.35	3.40	0.00	0.00	-8.23	0.07
2005-2009	72.83	37.53	72.15	6.20	17.00	0.00	21.12	27.66

Source of Data: BSP

Table 9 Value of Imports of Mining-Based Products of the Philippines, by commodity group, 1990-2008 (f.o.b. Value in US Million Dollars)

Years	Metalliferous ores	Non-metallic mineral manufactures	Iron & steel	Non- ferrous metals	Metal product s	Total
1990	162	114	572	177	132	1,157
1991	211	63	564	170	146	1,154
1992	192	126	676	209	176	1,379
1993	227	104	820	209	366	1,726
1994	299	118	870	260	391	1,938
1995	395	186	1312	335	297	2,525
1996	384	276	1436	347	405	2,848
1997	349	284	1260	374	511	2,778
1998	230	144	764	284	371	1,793
1999	328	164	947	362	302	2,103
2000	242	217	887	387	292	2,025
2001	306	235	834	354	323	2,052
2002	239	163	974	354	285	2,015
2003	297	157	1062	387	336	2,239
2004	397	160	1218	453	320	2,548
2005	438	186	1381	470	329	2,804
2006	409	195	1195	630	394	2,823
2007	408	233	1221	653	462	2,977
2008	402	274	1610	609	432	3,327
Average Annual Growth Rates (%)						
1990-2009	13.12	10.10	5.14	6.22	9.58	6.08
1990-1999	11.10	13.86	8.72	9.67	15.38	8.79
2000-2009	14.95	6.71	1.93	3.12	4.36	3.65
1996-2004	3.65	2.68	1.11	4.39	2.80	1.43
2005-2009	22.64	11.78	-1.78	1.29	6.99	3.15

Source of data: BSP

Table 10 Fees, Charges, Royalties and Taxes in Mining and Quarrying of the Philippines, Selected Census Years (Million Pesos)

Year	Fees, Charges and Royalties Collected by DENR- MGB	Excise Tax Collected by BIR	Taxes Collected by National Government Agencies	Taxes and Fees Collected by LGUs	Total
1998	34.9	123.9	1,339.70	1,007.70	2,506.20
1999	37.5	241.1	1,466.90	1,140.20	2,885.70
2000	51.2	243.3	1,747.90	852.7	2,895.10
2001	66.3	129.8	647.6	138.4	982.1
2002	58.5	303.6	823.8	204.8	1,390.70
2003	79.8	155.8	1,039.20	226.9	1,501.70
2004	120.1	232.5	2,769.10	358.5	3,480.20
2005	210.2	251.4	4,733.60	453.5	5,648.70
2006	192.1	489.6	5,313.20	395	6,389.90
2007	774	942.1	8,371.70	359.8	10,447.60
2008*	557.4	660.3	5,884.20	515.2	7,617.10
Average Annual Growth Rates					
1998-2008	49.00	34.87	29.66	6.88	24.26
1998-2004	24.77	30.55	30.92	3.49	21.79
2005-2008	85.34	41.35	27.76	11.97	27.96

Source of Data: MGB

Note: *Preliminary

Table 11 Summary of Royalty Practices in Selected Asian and Pacific Countries

	China	India	Indonesia (7th generation COW)	Mongolia	Myanmar	Papua New Guinea	Philippines
Format	National law	National law	Model agreement	National law	National law	National law	National law
Royalty type (most non- construction minerals)	Two types: 1. Royalty: unit based plus 2. Mineral resources compensation fee: ad valorem based	Ad valorem or unit based	Ad valorem	Ad valorem	Ad valorem	Ad valorem	Ad valorem
Ad valorem rate range	1: Various ranges for each mineral, expressed in yuan/tonne ore, plus 2: 1–4% depending on mineral	0.4–20.0%	n.a.	2.5%, except placer gold at 7.5%	1.0–7.5%	2.00%	2.00%
Variation: Minerals	Yes, 1: Ranges of unit charges for each mineral, plus 2: valorem rate for each mineral	Yes, Ad valorem rate or unit based charge for each mineral	Yes, Unit-based rate for each mineral	No, Except gold	Yes, Gemstones: 5.0–7.5%; precious metals: 4–5%; industrial minerals: 1–3%; other minerals: 3–4%	No	No, Except Coal

(continued)

Table 11 (continued)

	China	India	Indonesia (7th generation COW)	Mongolia	Myanmar	Papua New Guinea	Philippines
Copper	2% ad valorem plus 0.4–30.0 yuan/tonne ore	3.2% ad valorem metal of London Metals Exchange value of copper in ore	< 80,000 tonnes, US\$45.00 per tonne; (80,000 tonne, US\$ 55.00 per tonne	2.5% ad valorem on sales value	3 to 4% ad valorem, international reference price	2% NSR	2% ad valorem on market value
Gold	4% ad valorem plus 0.4 to 30 yuan/tonne ore						
	1.5% ad valorem; London Bullion Market Association price of gold in ore	< 2,000 kg, US\$225/kg; >2,000/kg, US\$235/kg	If from placer 7.5% ad valorem; otherwise 2.5% on sales value	4–5% ad valorem, international reference price	2% realized FOB	2% ad valorem on market value	
Limestone	2% ad valorem plus 0.5–20.0 yuan/tonne or yuan/m ³ ore	55 rupees/ tonne	< 500,000 tonnes: US\$0.14/tonne; (500,000 tonnes: US\$0.16/tonne	2.5% ad valorem on sales value	1–3% ad valorem, international reference price	2%	2% ad valorem on market value
Coal	1% ad valorem plus 0.3–5.0 yuan/tonne	65 to 250 rupees/tonne	13.5% FOB or of sales revenue	2.5% ad valorem on sales value	---	2%	10 pesos/ tonne

(continued)

Table 11 (*continued*)

	China	India	Indonesia (7th generation COW)	Mongolia	Myanmar	Papua New Guinea	Philippines
Variation: Mine size	Yes, Unit-based royalties set mine- by-mine	No	Yes, Different rates for miners with COWs than miners with mining law licenses	No	No	No	Yes, Special treatment of small-scale operations
Deferment /Reduction	Yes	No	No (under most COWs)	No	Yes, Gemstones: 5.0–7.5%; precious metals: 4–5%; industrial minerals: 1–3%; other minerals: 3– 4%	No	No

Source of Data: Otto et al. (2006)

Note: --- not available; n.a. not applicable; FOB = free on board.

Table 12 Total Revenues, Total Costs, Net Revenues and Net Revenues/Total Costs Ratio in the Mining and Quarrying Sector of the Philippines, Selected Survey Years (Thousand Pesos)

Year	Total Revenues	Total Costs	Net Revenues	Net Revenues/ Total Costs
1993	15,952,299	12,930,936	3,021,363	0.23
1995	14,294,666	12,327,501	1,967,165	0.16
1997	17,842,825	13,378,907	4,463,918	0.33
1999	14,054,519	10,518,598	3,535,921	0.34
2001	13,919,046	14,433,567	-514, 521	-0.04
2003	19,674,819	14,150,132	5,524,687	0.39
2005	61,273,836	28,317,738	32,956,098	1.16
Average Bi-Annual Growth Rates (%)				
1993-2005	40.84	19.64	94.63	-151.75

Source of Data: NSO

Note:

Total Compensation - includes salaries and wages (Basic pay, vacation/sick/maternity leave pay, overtime pay and other benefits) and employer's contribution to SSS/GSIS and the like. Excluded are cost of uniform/working clothes, reimbursable transportation and representation allowances.

Total Cost – Includes total compensation plus all other expenses incurred during the year whether paid or payable including materials and supplies purchased, goods purchased for resale, real estate purchased, fuels purchased to run motor vehicles, machinery and other equipment, electricity purchased, industrial and non-industrial services done by others, interest expenses, indirect taxes, computer software expenses, research and experimental development, bad and doubtful debts, and depreciation of fixed assets. Valuation is at market prices including taxes and other charges, net of rebates, returns and allowances. Goods and services received by the establishment from other establishments of the same enterprise are valued as though purchased.

Total Revenue - includes cash received and receivables for goods sold and services rendered. Valuation is at producer's prices (ex-establishment), net of discounts and allowances, including duties and taxes but excluding subsidies.

Table 13 Total Revenues, Total Cost, Net Revenues and Net Revenues/Total Costs Ratio in Selected Industries of the Philippines, Selected Survey Years (Thousand Pesos)

Item/ Year	Agriculture, Hunting and Forestry	Fishing	Mining And Quarrying	Manufacturing	Electricity, Gas and Water Supply	Construction
Total Revenue						
2003	39,711,367	8,298,138	19,674,819	2,331,388,144	365,673,892	74,457,893
2005	45,598,095	11,579,019	61,958,188	2,785,434,270	499,546,143	103,373,829
Total Costs						
2003	38,031,695	7,946,196	14,150,131	2,047,097,865	319,645,686	70,396,585
2005	49,883,175	11,126,092	28,930,935	2,507,991,598	403,336,342	93,838,731
Net Revenue						
2003	1,679,672	351,942	5,524,688	284,290,279	46,028,206	4,061,308
2005	(4,285,080)	452,927	33,027,253	277,442,672	96,209,801	9,535,098
Net Revenue/Total Cost Ratio						
2003	4.40	4.40	39.00	13.90	14.40	5.80
2005	(8.60)	4.10	114.20	11.10	23.90	10.20

Sources of data: National Statistics Office (NSO) (Various Years)