

Structural Transformation in the Turkish Mining Industry

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SUMMARY: The extensive transformation in the general economy policy of Turkey since the 1980s has shown some critical reflections on the mining industry of Turkey approximately in the same period. Mining legislation and the institutional structure of the industry have undergone some comprehensive changes. The public sector-dominant structure of the mining sector of Turkey has been transformed into a private capital-dominant one especially as from the 1990s. In this study, the transformation process in the mining industry of Turkey has been presented and some outcomes of the process have been examined.

KEY WORDS: Turkey, Mining Industry, Mineral Reserves, Mineral Productions, Mine Legislation, Mining Policy.

1. INTRODUCTION

As a cultural and an economical bridge between East and West, Turkey, an EU candidate country, is a regional power with a young, large population of approximately 71 million [1]. However, as the 15th largest economy in the world with an estimated 941.6 billion international dollars of gross domestic product (GDP) based on purchasing power parity (PPP) in 2008[2], Turkey's economic policies have shown significant differences especially in the last few decades.

Industrialization strategies based on import substitution policy had been left in the 1980s and the reforms were designed to transform the structure of the economy in the direction of an open, liberal and market-oriented system since then. The main components of the economic reform of Turkey are diminishing government intervention and liberalizing economic sectors, loosening import and export regulations, encouraging foreign investments, deregulating financial markets and privatizing public entities.

Structural transformation emerging in the Turkish economy policies since the 1980s is also on the agenda for Turkish mining policies approximately in the same period. The public sector-dominant structure of the mining sector of Turkey has been transformed into a private capital-dominant one, especially from the 1990s.

2. MINING INDUSTRY OF TURKEY

Turkey is a fortunate country with her very diverse mineral resources and produces around 60 different metals and minerals (Table 1). The country has worldwide reserves of barite, boron, clays, emery, feldspar, limestone, magnesite, marble, perlite, pumice, strontium, thorium, trona and zeolite and a leading producer of antimony, boron minerals, chromite, feldspar, magnesite, marble, meerschaum, perlite, pumice, sepiolite and strontium [3, 4, 5, 6].

Table 1. Turkey's share in the world mineral reserves and productions (2005, tonnes)

Mineral	World Reserve Base	Turkey's Reserve	Turkey's Share(%)	World Mine Production	Turkey's Production	Turkey's Share(%)
Antimony	3,900,000	106,306	2.7	137,000	28,377	20.7
Asbestos	Large	29,646,379		2,400,000	0	0.0
Asphaltite		74,370,000			18,135	
Barite	740,000,000	35,001,304	4.7	7,870,000	157,179	2.0
Bauxite	32,000,000,000	87,375,000	0.3	169,000,000	475,349	0.3
Bentonite	Extremely Large	250,543,000		11,700,000	501,142	4.3
Bituminous Shale		1,641,381,000			1,088,637	
Boron	1,176,000,000	851,000,000	72.4	4,910,000	3,478,784	70.9
Chromium	12,000,000,000	25,931,373	0.2	19,300,000	1,620,386	8.4
Copper	940,000,000	2,279,210	0.2	15,000,000	60,000	0.4
Diatomite	Large	44,224,029		2,020,000	44,122	2.2
Feldspar	Large	239,305,500		12,900,000	4,560,226	35.4
Gold	90,000	340	0.4	2,470	4.3	0.2
Hard coal	478,771,000,000	1,126,548,000	0.2		2,000,000	
Iron ore	180,000,000,000	149,925,000	0.1	1,540,000,000	4,598,230	0.3
Kaolin	Extremely Large	89,063,770		44,700,000	908,862	2.0
Lead	140,000,000	860,387	0.6	3,270,000	366,305	
Lignite	430,293,000,000	9,300,000,000	2.2		53,500,000	
Marble+nat.stone		33,000,000,000			8,800,000	
Magnesite	3,600,000,000	111,368,020	3.1	4,210,000	571,142	13.6
Manganese	5,200,000,000	4,560,000	0.1	10,500,000	52,273	0.5
Perlite	7,700,000,000			1,950,000	333,400	17.1
Phosphate	50,000,000,000	70,500,000	0.1	147,000,000	900	0.0
Pumice	Large	1,479,556,876		16,600,000	1,860,037	11.2
Scheelite		36,719			0	
Silver	570,000	6,062	1.1	19,300	95	0.5
Strontium	12,000,000	665,082	5.5	494,000	30,100	6.1
Thorium	1,400,000	380,000	27.1		0	
Trona	40,000,000,000	842,000,000	2.1	42,000,000	0	0.0
Zeolite		345,148,875			249,572	
Zinc	460,000,000	2,294,479	0.5	9,800,000	157,936	

Due to its highly varied geology, Turkey has also several other minerals and metals. Gold and base metal exploration and development have been on the increase in recent years. The iron and steel industry in Turkey is fairly developed. The important mining exports of Turkey are marble, boron minerals, copper, chromite, magnesite, zinc ores and feldspar. Best known for its industrial minerals, Turkey has enormous amounts of marble and natural stone reserves. The country has also significant lignite deposits spread throughout the country.

Much of Turkey's mineral production is from a large number of small mines. There are 38,320 licensed mines in Turkey and 7,220 of the mines are in operation. Turkey's total mining production in 2005 was realized as approximately 250 million tonnes (Table 2) and about 50 percent of this figure was cement raw material production [7].

Table 2. Mining sector production of Turkey in 2005 (tonnes)

Subsector	Production (tonnes)
Energy raw materials (asphaltite, bituminous shale, lignite and hard coal)	55,612,693
Metallic minerals	11,522,890
Natural stones (diabase, marble, onyx, travertine, andesite, basalt, granite, sandstone, serpentine)	8,800,000
Cement raw materials (limestone, marl, clay, pyrophyllite, trass, schist)	122,116,677
Industrial minerals	51,689,002
Total	249,741,262

Turkey has limited oil, natural gas and hard coal reserves and production. The hard coal reserves of Turkey are approximately 1.1 billion tonnes and the annual production is fairly low and gradually decreasing in a period of a few decades. The hard coal production in 2007 was 2.4 million tonnes of run-of-mine and is provided by Turkish Hard Coal Management (TTK) from the Zonguldak Region. Lignite is the most important energy resource of Turkey with approximately 9.3 billion tonnes of reserves. The lignite reserves are extended all over the country but generally poor in calorific value [8]. The annual lignite production is around 55.5 million tonnes in 2005 and is provided mainly by two state owned companies: Turkish Coal Enterprises (TKİ) with 29.5 million tonnes and Electricity Generation Co. with 20 million tonnes. A very large part of the production is utilized for power generation purpose. However, the rising amount of natural gas import has impeded the development of lignite production in recent years [9].

The chromite production of Turkey has increased significantly in recent years. The 2005 production figure is 1.6 million tonnes. With their high grade, chromite reserves in Turkey are worldwide scale. Especially refractory grade chromites have been the most preferable products in the market. Turkey's total chromite reserves are estimated as 26 million tonnes of over 20% grade. In the chromite sector, many small private companies dominate production. Public entities, Eti Krom and Eti Elektrometalurji, have been privatized recently and there are no public productions in the sector any more. The only state owned copper entity, Eti Bakır, has also been privatized recently. However, the copper production has come to a standstill despite global high copper demand. Iron ore produced in Turkey is consumed within the country in the integrated iron and steel plants and far from meeting the home demand.

Turkey has approximately 340 tonnes of gold reserve and world-famous gold companies' interest in this subsector has been high during the last decade. The gold production has been approximately 10 tonnes in 2006. Although there are only two gold mines (Bergama – Ovacık and Uşak – Kışladağ) are in operation today, many gold feasibility studies and exploration programs are underway in Turkey.

Turkey has a total boron reserve of 851 million tonnes on the basis of B₂O₃ content and has about 72% of the world boron reserves [10]. The country is also one of the biggest producers in the world. Therefore, the operation of boron has primary importance among the other mining operations in Turkey. Borate mineral deposits are found mainly in Eskisehir, Kütahya and Balıkesir provinces. A state owned company, Eti Mine Works General Management, is the only boron producer in Turkey. The important boron minerals in Turkey are tincal, colemanite and ulexite. Approximately 40% of the boron production is exported as lumpy ore or concentrate. The remaining production is refined as borax decahydrate, borax pentahydrate, boric acid, ground colemanite and sodium perborate.

Trona is the other worldwide scale industrial mineral of Turkey. Trona reserves of Turkey are at nearly 842 million tonnes but still unexploited. The majority of trona reserves (600 million tonnes) belong to an international mining giant, Rio Tinto, and 200 million tonnes belongs to Eti Mine Works General Management.

The other important mineral of Turkey, magnesite, is primarily produced by small private firms. Magnesite reserves of Turkey is approximately 111 million tonnes and the production in 2005 was approximately a half million tonnes.

Turkey has very diverse and large amounts of marble reserves. The total base reserves are about 13 billion m³. The important Turkish marble reserves are found in Afyon, Bilecik, Burdur, Denizli, Muğla, Elazığ, Balıkesir and Eskişehir. Turkey's natural stone and marble production has increased tremendously in the last few years and Turkey has become one of the most important natural stone producers in the world. Production and exports of marble and natural stones have increased substantially in recent years, reaching a value of \$1 billion.

The other important industrial mineral reserves of Turkey are perlite, feldspar, dolomite, barite, rock salt, strontium and zeolite. Turkey has also important rare elements: thorium and fluorite deposits near city Eskişehir.

3. STRUCTURAL TRANSFORMATION

Mining industry in the pre-Republic period of Turkey was not so advanced. In the era of the Ottoman Empire the trading of mining rights had been preferred instead of production. Mining production in this period had been carried out mainly by foreign companies, especially of French, English and German origin, and almost all produced minerals had been exported abroad as raw state.

After the declaration of the Republic, the young Turkish state had entered into the mining sector as an investor and producer on account of the fact that the then private capital behaved timidly about investing. An exploration and research entity in the sector, Mineral Research and Exploration Institute, and a production company, Etibank, had been established to draw national benefit from the mineral resources of the country in 1935. With the new regulations, mining licences of some mines had been purchased from the foreign companies and some mines in the country had been nationalized. However, the government of the Republic had limited nationalization only with hard coal, lignite, iron ore, chromite, copper and sulphur. Of these minerals copper and chromite had been seen as export commodities and sold abroad as purely raw state. In that period, the state was not interest in lead, zinc, mercury, emery, manganese, magnesite, arsenic, antimony or asbestos and the production of these minerals had been left to the private companies.

The principle of development of minerals only through the state had been left with Mining Law No. 6309, published in 1954, and a new principle in that public and private entrepreneurs have equal rights had been brought into the scene. Hence, private entrepreneurs had been encouraged to invest in the mining industry. As a result, the number of exploration and operation licences belonging to private companies increased and the share of the private sector—especially in some mining areas as lignite, chromite and iron production—also rose. In spite of all these efforts to attract private capital to the mining industry, almost all important mining investment projects in this period had been realized through government resources until 1990s.

Starting from the 1980s, the Republic of Turkey has undergone profound economic transformations which are grounded on the idea that "the productivity and welfare could be caught by replacing the public mechanisms in the economy management by market mechanisms". Development strategies in the direction of an open, liberal and market-oriented economy have been promulgated and a huge economic field from foreign trade to privatization and from agriculture to energy policies has been shaped in this context.

The reflection of subject developments to the mining industry of Turkey has gained speed especially as from 1990s and the privatization of public entities has come to prominence in this period [11]. There were some clear basic justifications of the vision that advocates the structural transformation of the mining sector by giving up public entrepreneurship in the sector and assignment of the enterprises owned by the public to the private sector: It had been claimed that the public enterprises cause unproductivity because of the existence of political intervention and absence of motives towards reducing production costs and increasing product quality, and the effective usage of resources would be obtained in the market mechanism. In the proposed structure, competition would be provided with the participation of domestic and foreign capital, costs and prices would drop and economic efficiency would increase. With these justifications, the applications directed towards sectoral unbundling, commercialization, corporationalization and privatization which aimed at the realization of both proprietorship and administration changes in the Turkish mining industry have succeeded. Simultaneously, efforts to loosen tight legal regulations on private companies and to remove or soften the state intervention, regulation or control in the sector have been carried on to provide liberalization of the industry.

Privatization in the Industry

The public weighted structure of the Turkish mining industry has changed significantly in recent years by comprehensive privatization activities, and the government has reduced its share in the industry as a part of the reform agenda. In this context, one of Turkey's largest integrated mining and beneficiation companies, Eti Holdings, has divided into several smaller subsidiary units and privatized then as separate mining activities such as copper, chromite, aluminium and silver mining. In this way, approximately the whole mining production, other than boron minerals and a part of coal, has been done by private sector companies today.

Privatizations in the mining industry had started in the second half of the 1980s primarily within the cement sector. Between 1989 and 1998, 29 cement factories had been divested with approximately 1 billion USD. Public establishments divested by the government in the 1990s included a zinc-lead company, a ceramic factory, a chrome-magnesite factory, and a magnesite company. Especially in the 2000s, privatization efforts in the Turkish mining industry have accelerated tremendously and almost all metallic mines and public utilities were sold to private companies (Table 3).

Table 3. Privatization in the mining industry of Turkey

Enterprise	Sector	Transaction year	Buyer	Transaction Amount USD
29 cement factories	Cement production	1989-1998		Approximately 1 billion USD
Kütahya Manyezit AŞ	Refractory production	1995	Zeytinoğlu Hold.AŞ.	108.100.000
Çinko-Kurşun Metal AŞ	Zinc smelter	1996	K.M. Kayseri Maden Metal Ticaret A.S.	14.000.000
Bozüyük Seramik Sanayi ve Ticaret AŞ	Ceramic factory	1997	Ercan Madencilik A.S.	12.000.000
Konya Krom Magnezit Tuğla Sanavii Ticaret AS	Refractory production	1998	Konya Selçuklu San. Tic. A.S.	40.700.000
Eti Bakır A.Ş. and KBI Karadeniz Bakır İşletmeleri A.Ş.	Copper ore, copper and pyrite concentrate and blistered copper	2003	Ce-Ka Sanayi ve Ticaret A.Ş.	33.000.000
Eti Elektrometalurji A.Ş.	Ferromanganese, carbide, silicoferrum, ferrosilicon, soderberg	2004	Aksu Maden San. Tic.A.Ş.	15.320.000
Eti Krom A.Ş.	High carbon ferromanganese	2004	Yıltaş İnş.Ltd.Şti.	58.000.000
Eti Gümüş A.Ş.	Granulated silver production	2004	Söğütsen Seramik A.S.	41.200.000
Divhan A.Ş.	Iron ore production	2004	ERDEMİR A.Ş.	28.500.000
Eti Alüminyum AŞ	Bauxite, alumina, aluminium, alumina	2005	Ce-Ka Sanayi ve Ticaret A.S.	305.000.000
Çayeli Bakır İşletmeleri A.Ş.	Copper and zinc concentrate production	2004	Inmet Mining Corporation	64.000.000

Changes in Mining Legislation

According to the Turkish Constitution “Natural wealth and resources shall be placed under the control of, and put at the disposal of, the state. The right to explore and exploit resources belongs to the state. The state may delegate this right to individuals or public corporations for specific periods.”

The regulatory framework in Turkey is Mining Law No. 3213. This law has been in effect since 1985 and amended significantly in 2004 to ease the licensing procedures and to diminish unnecessary bureaucratic controls. With the amendments, environmental obligations and licence fees have been changed extensively to attract foreign investments.

The Mining Law constitutes the basic rules in the sector. According to the law, underground resources of the country are under the sovereignty and disposition of the State and are not under the proprietorship of the landowners of the land where they exist. The State grants the right to explore and operate the mines to Turkish citizens that are qualified to enjoy civil rights; companies that are legal entities established in accordance with the laws of Turkish Republic and whose statute prescribes that mining is included in their field of activity; public economic enterprises that are authorized on this matter and their entities, affiliates and associates; and other public institutes, establishments and administrations.

According to the regulations mining rights are granted in 2 phases. The first phase, the exploration period, is for a maximum of 5 years, including the extension period; and an exploration license is must be obtained from the state. The second phase is the operation license, which has a duration of a minimum of ten years, extendable up to sixty years. The royalty is 2-4 percent of the gross revenue in

the mine and is paid to the Treasury by the license holder. The “Right of Discovery” is 1 percent of the gross revenue and is paid to the right’s owner by the license holder annually.

Institutional Structure of Turkish Mining Industry

The policy maker and leading body in Turkish mining industry is the Ministry of Energy and Natural Resources (MENR). Turkey has also several important state owned establishments (Table 4). Two bodies, MTA and BOREN, are the research institutes of the mining industry in Turkey, the former is an 80-year old research and exploration entity while the latter is only 2 years old. The other 4 establishments are state owned producers. One of those, TKI, is the main lignite producer of Turkey with its 30.4 million tonnes of lignite production in 2006. EUAS, actually an electricity production company, is the other significant lignite producer with 21.1 million tonnes in 2006. Lastly, TTK is the state-owned hard coal producer, and Eti Mine is the only boron producer of Turkey.

Table 4. Public establishments in Turkey’s mining industry

Establishment	Main functions
Ministry of Energy and Natural Resources (MENR)	Policy making, monitoring and controlling
General Directorate of Mining Affairs (MİGEM)	Licensing, monitoring and controlling
General Directorate of Minerals Research and Exploration (MTA)	Research and exploration
National Boron Research Institute (BOREN)	Research and development on boron minerals
Mining Departments of Universities	16 mining departments
Turkish Coal Enterprises (TKİ)	State owned lignite producer (55% of tot. prod.)
Electricity Generation Co Inc. (EUAS)	State-owned electricity and lignite producer (38% of total production)
Turkish Hard Coal Management (TTK)	State-owned hard coal producer (100% of tot.prod.)
Eti Mine Works General Management	State-owned boron producer (100% of tot. prod.)

4. CONSEQUENCES OF TRANSFORMATION

The mining industry in Turkey is very dynamic, especially in recent years. Over 100,000 people are employed in the mining and mineral processing sectors in Turkey. Approximately 1.4 percent (\$5.2 billion) of Turkey’s GNP of 2005 was contributed to by the mining and mineral processing industries. Although it has shown some variability in recent years, the growth rate of the mining industry has accelerated, especially in the last few years (Figure 1). The growth of the sector in 2004 was 2.6 percent and 12.9 percent in 2005 [12].

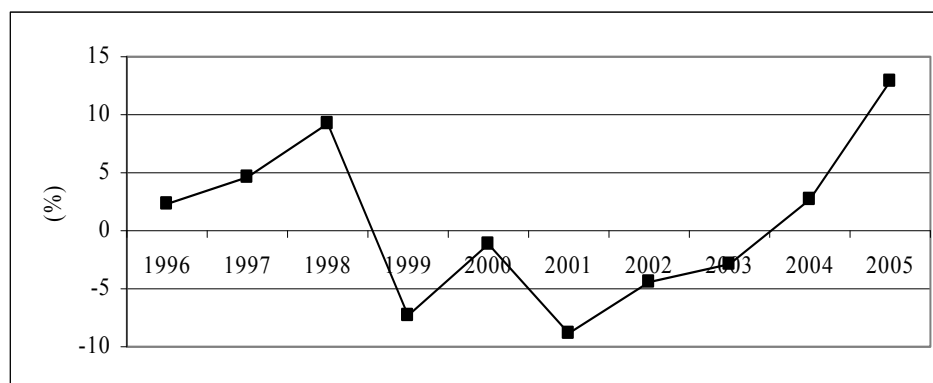


Figure 1. Mining industry growth rate (% change at 1987 prices)

The gross fixed investment of mining sector in 2005 was realized as approximately \$1.3 billion and 80% of that was of private sector share. Mineral foreign trade has also had some striking developments in the last 5 years and both export and import figures have increased markedly (Figure 2). In 2006, 2.4 percent of total exports and 2 percent of total imports were provided by minerals and mineral products [12, 13].

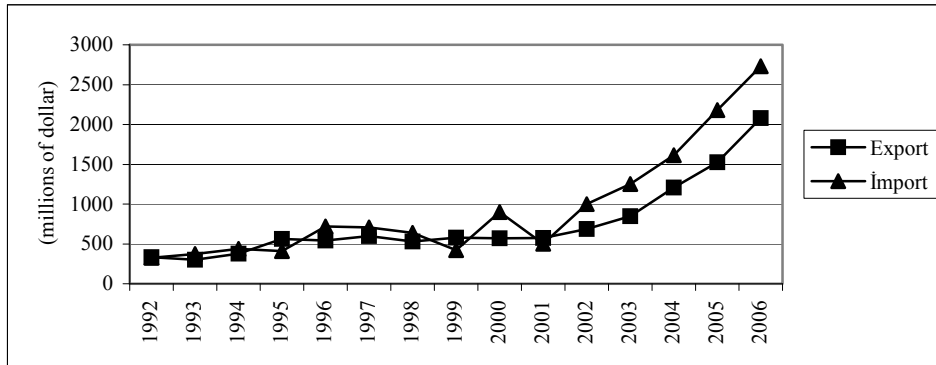


Figure 2. Mining sector foreign trade by years

At the end of the transformation process beginning in 1980s and accelerating in 1990s, public weighted structure of the Turkish mining industry has changed on a large scale. Today, there is not any notable production of the public sector in the mining industry except in coal and boron sectors, and a great number of minerals such as gold, silver, copper, barite, bentonite, zinc, iron ore, marble-natural stone, feldspar, calcite, kaolene, chromite, lead, magnesite, clay have been produced by private sector companies.

It could be possible to observe the transformation in the mining industry capital structure by reviewing total fixed capital investments (Figure 3). While the public/private distribution of the mining sector investments was 91% public and 9% private in the year 1980, the figure has reversed to 21% public and 79% private in 2005 [14, 15].

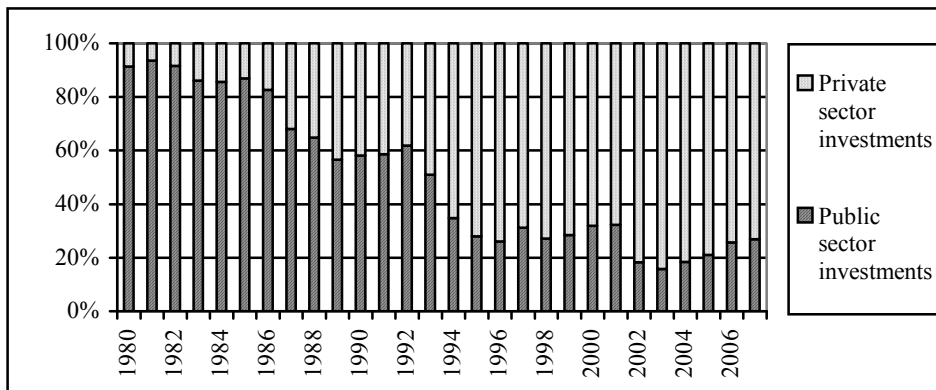


Figure 3. Distribution of public and private sector investments in total mining sector fixed capital investments

Although Turkey has a very wide variety of minerals, the mineral wealth has only been partially explored and known reserves have been developed to the limited extent. This situation may be an advantage for the country because the country's mineral potential could be an important contributor to the wealth of the nation due to better technologies in the future.

Today, the main strategy of the Turkish mining industry is to encourage exploration and exploitation activities in the sector to provide necessary low cost and high quality raw materials demanded by domestic industrial sectors and to increase the competitiveness of the economy. To accomplish this objective, improving the sector compliance with the environmental legislation, making the bureaucratic structure efficient, encouraging the enlargement of the scales of companies and enterprises, and increasing the value added through processing mining products domestically are the key issues on the Turkish mining industry's agenda.

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