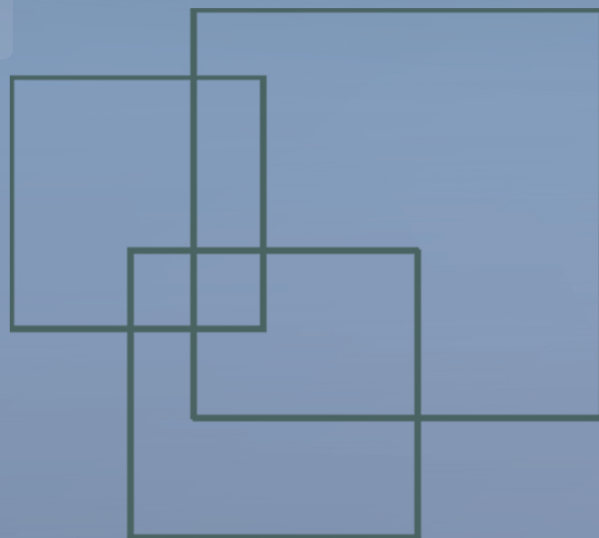


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CONTRACTUAL ARRANGEMENTS IN TURKEY'S COAL MINES

Forms, Extents, Drivers, Legal Drivers
and Impact on OSH



This study is funded by the ILO project
"Improving Occupational Health and Safety in Turkey through
Compliance with International Labour Standards"

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1. PREAMBLE

Turkey's high level of occupational accidents and fatalities, particularly in the mining and construction sectors, became the focus of national as well as international attention in the context of the fire in the underground coal mine in Manisa's Soma district in the afternoon of May 13, 2014. Claiming the lives of 301 miners, this accident was the single worst occupational accident in Turkish history.

This tragedy triggered a multitude of questions and inquiries including the role and functioning of the mining industry, relevant OSH laws and regulations and their implementation as well as impact of the contractual arrangements in the industry, including subcontracting. While the impact of the use of subcontracting arrangements is a matter of global importance, the contractual arrangements relevant in the Turkish mining industry in particular, includes, so called *rödöfans sözleşmesi*¹ (royalty contracts). This was highlighted in consultations between the tripartite constituents in Turkey and the International Labour Organization (ILO) initiated after the Soma tragedy, in the light of international commitments made by Turkey under ILO Conventions on occupational safety and health (OSH). In this area, Turkey has, over the past fifteen years, been engaged in a process of reform, harmonizing its national OSH system with relevant international and EU standards regarding national as well as enterprise level requirements for prevention and risk assessment.

Against this background, it was deemed relevant to examine the Turkish mining industry in more detail including the possible relationship between contractual arrangements such as subcontracting and the effective implementation of relevant OSH standards and national laws and regulations in the industry.

The consultations between the tripartite constituents in Turkey and the ILO resulted in the setting up of a Technical Assistance project "Improving Occupational Health and Safety in Turkey through Compliance with International Labour Standards" at the ILO Office for Turkey in the course of 2015 and the present study was commissioned by the ILO from the Economic Policy Research Foundation of Turkey (TEPAV) in the context of this project.

This study is the result of a close and continuous cooperation between TEPAV and ILO technical experts in Turkey² in the course of 2015. The technical advice and assistance provided by ILO experts in Geneva³ is thankfully recognized, as is the knowledge and expertise generously shared with TEPAV and ILO team by the national tripartite constituents and experts. While the ultimate responsibility for the content of this study - including its conclusions and policy recommendations - lies with the authors, this study has been vetted in a tripartite discussions among relevant stakeholders in August and November 2015, and the conclusions are based on a broad level of consensus.

¹ This term is used in Turkish legislation. As this is a specific Turkish institution the Turkish word will be maintained in the text, but in its abbreviated form *rödöfans*.

² Ms. C. Bråkenhielm, Chief Technical Advisor for OSH, and Ms. B. Akca, National Programme Officer for OSH, ILO Office for Turkey, Ms. Güneş A. Aşık, Economist at TEPAV, Ms. İdil Özdoğan, Project Coordinator at TEPAV, Mr. Timur Kaymaz, Research Associate at TEPAV, Ms. Seda Başıhoş, Researcher at TEPAV, Mr. Emrah Aydınonat, Associate Professor at Bahcesehir University and Ms. Gaye Baycık, Assistant Profesör at Ankara University.

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2. EXECUTIVE SUMMARY

The developments in Turkey's mining industry are closely related to the rapid economic expansion of Turkey over the past decade and the resulting continuing and increasing need for energy. While Turkey in 2014 was the 12th largest producer of coal worldwide with a volume of 70.6 million tonnes, it is a net importer of higher quality peat coal as the nationally available coal is the low energy lignite coal. Nearly 90 percent of all locally produced coal is lignite. Turkey is actively seeking to increase the share of domestic coal in electricity generation and according to Turkey's Tenth Development Plan (2014-2018) it will continue to pursue these efforts.

According to the Constitution, coal mines cannot be subject to private ownership in Turkey. The Mining Law allows, however, for a transfer of licenses to *operate* coal mines to private entities under the so called *rödövans sözleşmesi*⁴ (royalty contracts). Under pressure both to cut costs and to meet Turkey's increasing energy and coal needs, such *rödövans* contracts have enabled state-owned enterprises to finance costly underground mining operations with private capital. The two largest state owned coal mining entities Turkish Coal Industries (TKİ) and the Turkish Hard Coal Authority (TTK) have been contracting out coal mining operations to private enterprises using *rödövans* contracts since 1984 and 1988, respectively. The use of such contracts – or contracts labeled as such - has escalated since then, in particular in the past fifteen years. In the period 2000-13 the share of the private sector's involvement in hard coal production increased almost fivefold and in the period 2005-12 its share in lignite production increased with 50 percent. In 2014, one third of TKİ's coal production was undertaken by private contractors under *rödövans* arrangements, and TKİ has used such arrangements particularly as regards underground mining. At present, virtually all TKİ's underground mines are operated by the private sector while TKİ continues to operate open cast mines.

The basic purpose of this study is to examine the relationship between these practices and the incontestably high level of accidents and fatalities in the mining industry applying a multidisciplinary approach. In order to understand and assess the drivers for these practices and their impact on the developments in the Turkish mining industry, this study initially presents data regarding the fast growing energy dependent Turkish economy and the strategic importance of a continued development of the coal industry in this context. Based on an increased use of *rödövans* contracts, the share of the private sector involvement in coal production is increasing and the private sector will continue to play an important role in energy production in the future: According to the Tenth Development Plan the aim of the Government is to transfer ready-to-operate state owned mines to the private sector using *rödövans* contracts.

The relative importance of the coal mining industry in terms of national formal employment, varies from region to region. Unemployment and youth unemployment is a relatively less important problem in coal mining areas. The coal-mining sector is among the highest paying sectors across Turkey and earnings in the public mines are at least three times higher than the earnings in the private mines. As most mines are located in rural areas, the benchmark for alternative employment is the earnings in the agricultural sector. In this comparison, coal-mining earnings are twice to three times higher than agricultural earnings. Workers engaged in underground coalmines are now entitled to at least twice the minimum wage.⁵ In terms of the levels of skills of workers, there is a declining average of the years of schooling as well as years of experience in the mining sector. The official data regarding employment in coal mining, in particular in the Soma, Manisa region is - according to some sources - grossly

⁴ This term is used in Turkish legislation. As this is a specific Turkish institution the Turkish word will be maintained in the text, but in its abbreviated form *rödövans*.

⁵ According to a decision in December 2015, the minimum wage was increased from around 1000 to 1300 TL.

underestimated due to the prevalence of an informal subcontracting or gang master mechanism. This system, which has proven elusive and hard to penalize, has the particular effect of creating a high pressure on the lowest rung of workers to increase production, which increases the risk for cutting corners in terms of OSH practices.

In terms of the *normative context* the mining laws and regulations as well as relevant national OSH laws and regulations are examined. In terms of OSH the national as well as the international *normative context* for the mining sector is laid down. Over the past fifteen years, Turkey has been engaged in a process of reform, harmonizing its national OSH system with relevant EU standards regarding national as well as enterprise level requirements for prevention and risk assessment. Turkey therefore has a modern set of OSH laws and regulations in line with international commitments.⁶

Subcontracting is a global phenomenon and many countries are grappling with the need to address its implications. A frequent use of subcontracting arrangements appears to have caused a fragmentation of the employers' responsibilities which has had a negative impact not only on the application of OSH laws and regulations, but also on their enforcement. As regards the prevalent contractual arrangements in the Turkish mining industry, the study highlights that *rödövens* agreements must be distinguished from other types of contractual arrangements such as subcontracts. While *rödövens* agreements entail the transfer from the owner to the leaseholder of entire operations, subcontracting agreements are only to be used to transfer auxiliary work or specialization-required work for technological reasons, and entire operations cannot be subcontracted. Furthermore, while the legal effect of *rödövens* agreements is that the employer/owner's responsibilities are transferred from the owner to the operator or *rödövens* holder. Under subcontracting arrangements, however, the employers in the supply chain have a joint responsibility; all while the main employer maintains its responsibilities.

While the law provides for a clear distinction between these two types of contractual arrangements, in actual practice the borderlines are much more unclear. What this study reveals – which is particularly significant - is that there appears to be a frequent practice to use ambiguous and disguised contractual arrangements. Such arrangements are often labeled as *rödövens* agreements, but actually constitute other types of contractual arrangements including subcontracting arrangements. This is reflected in numerous court cases. While the legal conditions for using subcontracting arrangements have been legally regulated for a long time, a detailed regulation of *rödövens* agreements was introduced only in 2010. Further amendments to this regulation were introduced in 2015 following the Soma accident. From a policy perspective it would appear important to limit the use of ambiguous and disguised contractual arrangements by an additional oversight of the award of *rödövens* contracts; particularly as the Government intends to continue to use *rödövens* agreements for the purpose they were intended.⁷ It is still early to evaluate whether these legislative changes will have the required impact on practice or if there is a need for some further regulation and management.

The examination of the economic determinants based on publicly available data of the OSH performance of Turkish coal mines and the analysis of possible statistical links between occupational accidents and fatalities with production and employment patterns suggests that there is a positive but a weak association between the accident rates and profitability; that there is a negative correlation between the productivity-measures by sales per worker and the accident rate; and that, in sectors where the subcontracting ratio is higher, the accident rates tend to be higher too.

⁶ Turkey ratified the Safety and Health in Mines Convention 1995, (No. 176). It will enter into force for Turkey on 23 March 2016. It has thus not yet been the subject of examination by the ILO supervisory bodies.

⁷ Regulation changing the guidelines for the application of the Mining Law. Official Gazette of the Republic of Turkey 06.11.2010 No. 27751.

The Parliamentary Committee examining the particular case of the Soma accident included the contractual arrangements in the industry, as one of the seven factors it considered contributed to the accident. Similarly as the policy recommendations of the present study, the Committee in its final conclusions emphasized the need for a longer-term national policy including a restructuring of the management of oversight mechanisms of the industry. The field visits conducted served to reflect some views regarding the potential benefits and impediments to technological improvements in the mining industry, the functioning of the Dayıbaşılık system and why it has proven to be so elusive and difficult to sanction and the cost increases for the industry caused by the recent “reactive” legislative amendments related inter,alia to the haste with which they were implemented.

Against this background, conclusions and policy recommendations were presented and discussed at two meetings including the tripartite constituents, mining experts and relevant stakeholders on 25 August and 19 November 2015, respectively. In these meetings, the main focus of the discussion shifted from an examination of the contractual arrangements towards the governance structure of the mining industry and the broader policy implications of the findings. It was brought out that the information gathered in this report supported the conclusion that the overriding concern of the government (through the MoENR) is meeting the energy needs of Turkey. As a result, the OSH conditions in the coal mining industry suffer because this pressure to produce has ripple effects through the industry. This undoubtedly affects the OSH conditions in mines. A legislative amendment to the OSH Law has been introduced providing that pressure towards overproduction constitute a cause for closing a mine. An implementing regulation (which should include the definition of overproduction) has yet to be issued however. Another option that was discussed was to require that *rödövens* contracts include a contractual production limit for coal production. But according to the discussions held, more comprehensive action was called for at the national interministerial policy level as the task of the balancing the national interest cannot be task of one ministry alone. Developing such a national policy would be in line with the international commitments made under the newly ratified ILO Safety and Health in Mines Convention 1995, (No. 176)⁸. The overriding recommendation of this study is thus to develop a national mining policy to enable a coordinated response to the need for an efficient, continued development and use of Turkey’s natural resources all while ensuring the safety and health all persons engaged in the industry.

More specifically, and based on the issues raised in the study and the discussions held, it is recommended that the Government consider taking the following actions:

1. Revise Turkey’s energy policy, taking into account sustainability principles,
2. Revise the governance structure in the mining sector,
3. Ensure an appropriate assessment and monitoring of compliance with OSH standards, in particular at the licensing stages,
4. Redesign the sectoral governance structure to increase inclusiveness,
5. Ensure that *rödövens* contracts and subcontracting arrangements are not misused,
6. Ensure that workers effectively can exercise their rights and that ambiguous recruitment systems are eradicated,
7. Improve the national capacity to provide standardized first aid, search and rescue trainings,
8. Develop a centralized database on national mining activities, and

⁸ According to Article 3 of the Convention, which will enter into force on 23 March 2016, Turkey is committed to the following: “In the light of national conditions and practice and after consultations with the most representative organizations of employers and workers concerned, the Member shall formulate, carry out and periodically review a coherent policy on safety and health in mines, particularly with regard to the measures to give effect to the provisions of the Convention.

9. Explore the possibility to use non-public entities for additional oversight.

3. TURKEY'S OSH RECORD IN COAL MINING

Introduction

According to official statistics of Turkey's Social Security Institution (SGK), 13,162 workplace had been recorded in the period between 2001 and 2012. This corresponds to 3 fatalities per day. According to the latest data available from SGK, the highest level of fatalities is in the construction and transportation sectors. However, according to an analysis by the Turkish Statistical Institute (TURKSTAT) of the accidents rates, the highest figures was in mining both in 2007 and in 2012.⁹ Coal mining accidents often attracts public attention because of accidents result in a large number of fatalities per accident. The accident in Manisa's Soma district on 13 May 2014, is a case in point. This tragedy placed a renewed focus on the continuing need to improve OSH. This report aims at shedding some light on the factors driving the OSH conditions in the coal mining industry. This sections is concluded with an outline of questions to be examined in the context of the present study.

3.1 Accident and fatality rates

In order to set the stage for the discussion concerning the Turkish coal mining industry, let us present and briefly discuss five important aspects of the industry.

- The fatality rates are high, in particular in terms of fatalities per unit of energy produced in coal mines,
- The fatality rates are volatile.
- In contrast with other major coal producing countries, the fatality rates in the Turkish coal industry does not seem to be decreasing.
- With one exception, since 1995, all coal mine accidents with 10 or more fatalities mines operated by private enterprises.
- Turkey cannot keep up with its energy needs and authorities consider increasing coal production as a way to solve Turkey's energy problem.

3.1.1 Fatality rates are high

Compared with major coal producers like USA and India, the number of fatalities per million tonnes of coal produced in Turkey is very high. Turkey's mining safety record only compares to that of China. Between 2009 and 2012, the average of number of fatalities per million tonnes of coal produced in China was 0.775. In Turkey the average rate of was 0.468. India and USA, the comparable figures 0.135 and 0.021 respectively.

Table 1 Number of fatalities per million tonnes of coal produced

	China	USA	Turkey	India
2007	1.28	0.02	0.46	0.13
2008	1.04	0.02	0.34	0.15
2009	0.80	0.01	0.03	0.13
2010	0.68	0.04	1.06	0.18
2011	0.51	0.02	0.66	0.11
2012	0.34	0.02	0.26	0.11

Sources: U.S. Energy Information Administration, International Energy Statistics, SGK, China State Administration of Work Safety, U.S. Bureau of Labour Statistics, Indian Bureau of Mines, TEPAV calculations

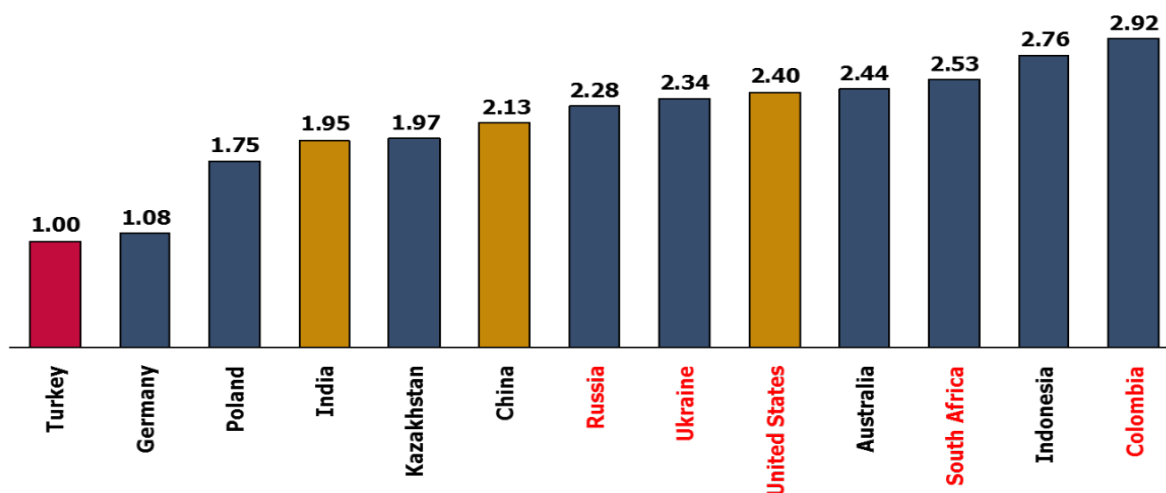
Source: Kaymaz & Kızılca 2014.

⁹ The share of the number of persons that encountered workplace accidents of the total number of persons employed within the last 12 months was the highest in mining and quarrying both in 2007 and 2012.

3.1.2 Turkey is a frontrunner in terms of fatalities

Looking at fatalities per million tonnes of coal produced in 2012, China appears to be the champion of fatalities in coal mining. However, the number of fatalities per tonnes of coal produced does not show us the real situation regarding the level of fatalities in Turkish coal mines. In order to understand the magnitude of fatalities in Turkey, one needs to take into account the relative “quality” of coal produced in Turkey and in other countries. Quality here signifies the average heat content of produced coal, i.e. how much energy that can be produced by one unit of coal. Turkey mostly produces “low quality” lignite, which is used to fire up its thermal power plants. Turkish coal has the lowest heat content in comparison to coal produced in other top coal producers (**Figure 1**).

Figure 1. Heat content of coal produced in world’s top 13 producers, Turkey = 1, 2012



Source: U.S. Energy Information Administration Database, TEPAV calculations. Country names in red indicate the countries from which Turkey imports coal.

Against this background, another way to look at how Turkey’s fatalities compare to those in China is to consider the energy content of what they produce and judge this against the number of fatalities. Let us look at total production of hard coal and lignite in both countries. As of 2012, while 95 percent of Turkey’s production is lignite, only 6 percent of China’s coal production is lignite. That is, while 95 percent of Turkey’s production coal with a low energy content, 94 percent of China’s production is coal with a high energy content. In fact, average Chinese coal has over double the heat content than average Turkish coal. The death toll in Turkish coal mining is thus more troublesome than it first appears. Remember that the number of fatalities per million tonnes of coal production in China was 0.34 and 0.26 in Turkey, in 2012. If these figures are consolidated with the amount of energy these two countries can produce from a unit of domestic coal, Turkey emerges as the unfortunate champion of fatalities in coal mining.

Table 2 shows fatalities per GWh electricity production from domestic coal in China, USA, Turkey and India. The table shows that in this comparison, Turkey sacrifices a larger number of workers in order to produce energy. And even in a comparison with China, Turkey’s fatality rates per unit of energy produced are far higher. This worrisome picture needs to be changed.

Table 2 Fatalities per GigaWatt (GWh) Electricity Production from Domestic Coal Production

	China	USA	Turkey	India
2007	0.244	0.011	6.647	0.145
2008	0.198	0.010	4.971	0.170
2009	0.152	0.006	0.523	0.147

2010	0.130	0.022	18.966	0.211
2011	0.097	0.009	12.331	0.134
2012	0.066	0.013	5.557	0.143

Source: US Energy Information Administration; TEPAV calculations, Heat Content in Btu converted GWh

3.1.3 Fatality rates are volatile

The volatility in Turkey's fatality rates is also striking (see Figure 1). In data released in 2009, the number of fatalities per million tonnes of coal production in Turkey was 0.03, a level similar to that of the United States in the same year. However, according to data released in 2010, Turkey's fatality rate was 1.06 which was higher than that of China in the same year. Likewise, according to data concerning the following two years, Turkey's coal miner fatalities per million tons produced fell drastically to 0.26 in 2012, only to increase again 0.6 level in 2013 (according to preliminary calculations). The fatality rates in the Turkish mining industry are thus more volatile than in other countries.

3.1.4 Fatality rates are not decreasing

Another notable fact is that contrary to other major coal producers, Turkey has not been able to decrease the fatality rates in the coal mining sector. By contrast, there have been dramatic improvements in this respect in many countries, including, in the US. (Saleh & Cummings 2011; Kohler 2015).

Significantly, the OSH related improvements did not only occur in the USA and other developed countries. Developing countries such as China have also been able to achieve an impressive track record of reducing fatalities in mining. In China, the level of fatalities per million tonnes of coal production has fallen from 6.78 in 1988 to 0.34 in 2012.

3.1.5 Major accidents occur in privately owned mines

Table 3 summarizes major mining accidents in since 1995. One striking aspect of this list of accidents is that, with one exception, all major accidents occurred in mines operated by private enterprises. And the exception was a state-owned enterprise in the process of privatization.

Table 3 List of major mining accidents (10 or more fatalities) in the last 30 years

<i>Place</i>	<i>Date</i>	<i>Accident</i>	<i>Fatality</i>	<i>Operator</i>
<i>Yozgat Sorgun</i>	26.3.1995	Firedamp explosion	37	Private enterprise
<i>Karaman Ermenek</i>	22.11.2003	Firedamp explosion	10	Private enterprise
<i>Kütahya Gediz</i>	8.9.2005	Firedamp explosion	18	State-owned Enterprise (in the process of privatization)
<i>Balıkesir Dursunbey</i>	2.6.2006	Firedamp explosion	17	Private enterprise
<i>Bursa M.Kemalpaşa</i>	10.12.2009	Firedamp explosion	19	Private enterprise
<i>Balıkesir Dursunbey</i>	23.2.2010	Firedamp explosion	13	Private enterprise
<i>Zonguldak Karadon</i>	17.5.2010	Firedamp explosion	30	Private enterprise
<i>Kahramanmaraş Elbistan</i>	10.2.2011	Slope failure	11	Private enterprise
<i>Manisa Soma</i>	13.5.2014	Fire	301	Private enterprise
<i>Karman Ermenek</i>	28.10.2014	Flooding	18	Private enterprise

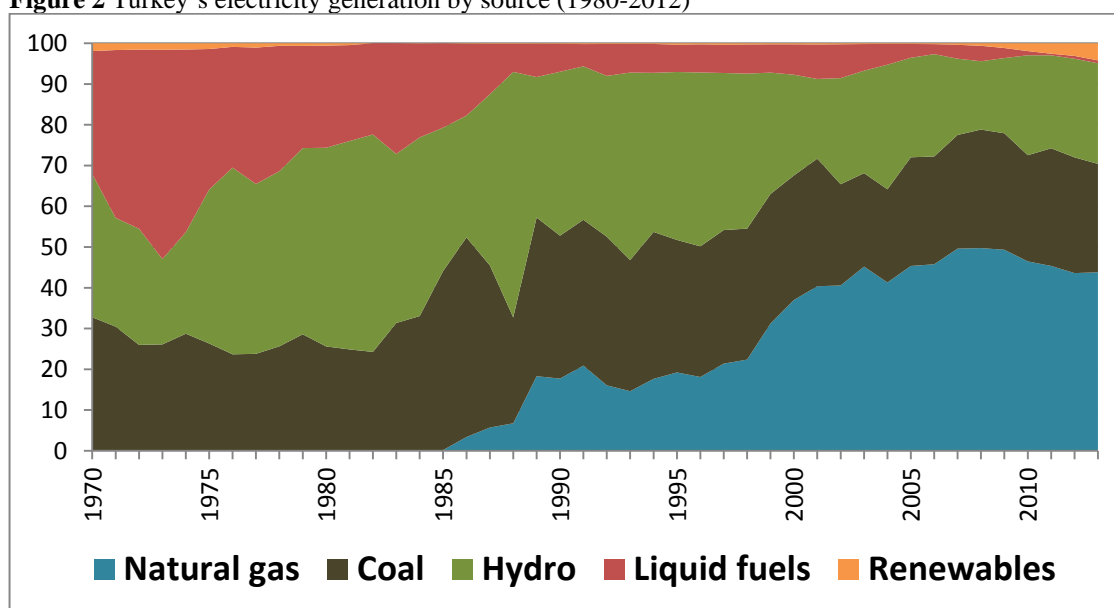
Source: TMMOB 2014

3.1.6 Turkey's energy problem and coal

Turkey has suffered from a significant current account deficit problem over a number of years and its trade deficit constitutes an important part of the current account problem. Since 1990s its trade deficit has been increasing. The cost of energy is an important contributor to this deficit. According to a recent World Bank Focus Note, Turkey's external energy shortfall is 6 percent of its GDP and accounts for 58 percent of its trade deficit. The same note also states that "the average annual energy imports account for about 23 percent of merchandise imports" (World Bank 2014).

- **Coal, particularly lignite, is Turkey's most important indigenous energy resource** and it is considered to be an important resource for reducing Turkey's energy deficit and dependency.
- **Lignite and hard coal is predominantly used to fire thermal power plants.** While the heat content of domestic lignite is low, 90 percent of coal produced is used to generate electricity.
- **Turkey's energy consumption is increasing fast.** Between 2002 and 2012, the world energy consumption increased approximately 30 percent while the energy consumption in Turkey increased 53 percent (TKİ 2014, p.17). While Turkey's *per capita* energy consumption was growing approximately at a yearly average rate of 4 percent in this period, the per capita energy consumption in the world grew merely at a rate of 1 percent.
- **Turkey's ability to meet the growing energy need with domestic resources is limited, however.** In order to fulfill its energy needs Turkey must import energy which aggravates its current account deficit problem. Turkey's energy deficit increased significantly between 1980 and 2012 at an average yearly growth rate of 6 percent. In 2012, Turkey's energy deficit was 91.93 Mtoe, i.e., 6.13 times higher than that of 1980. In the ten years before 2012, Turkey's energy deficit grew with a yearly average rate of 5 percent.
- **The share of imported energy is growing.** In 1960s it increased from 12 percent to 19 percent. In the years that followed it continued to increase; reaching to 66.13 percent in 2000 and to 73.11 percent in 2012. Notably, while the share of domestic coal in electricity generation remained relatively stable, the share of natural (imported) gas has been increasing. In fact, most of Turkey's electricity generation depends on imported gas.

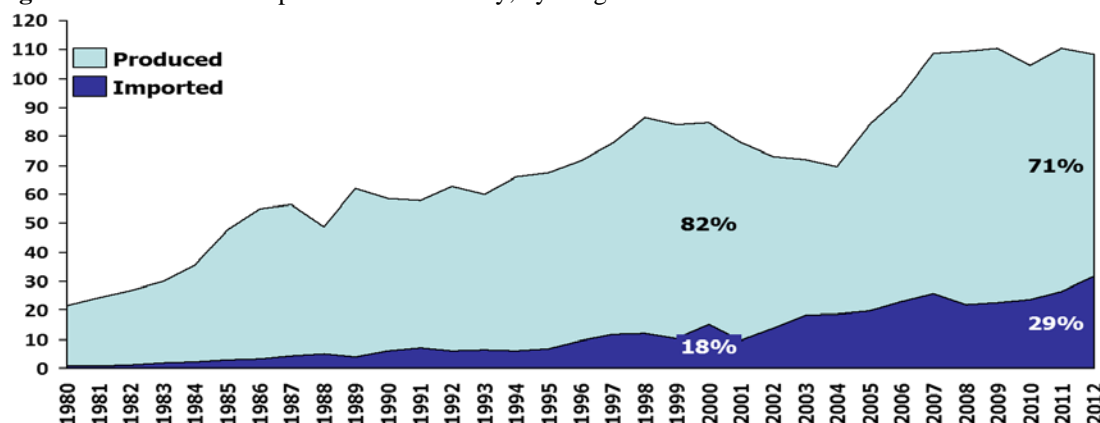
Figure 2 Turkey's electricity generation by source (1980-2012)



Source: The Shift Project, TEPAV calculations

- **Share of imported coal in Turkey's consumption is increasing (Figure 3).** Although Turkey is trying hard to reduce its dependency of imported energy by way of increasing its domestic coal production, Turkey is becoming more and more dependent on imported coal because of its increasing energy needs. The increasing number of thermal power plants operated by private enterprises is also a contributing factor to this trend, because using more efficient imported coal in electricity production is a viable strategy that bypasses the difficulties and costs of extracting low quality domestic coal.

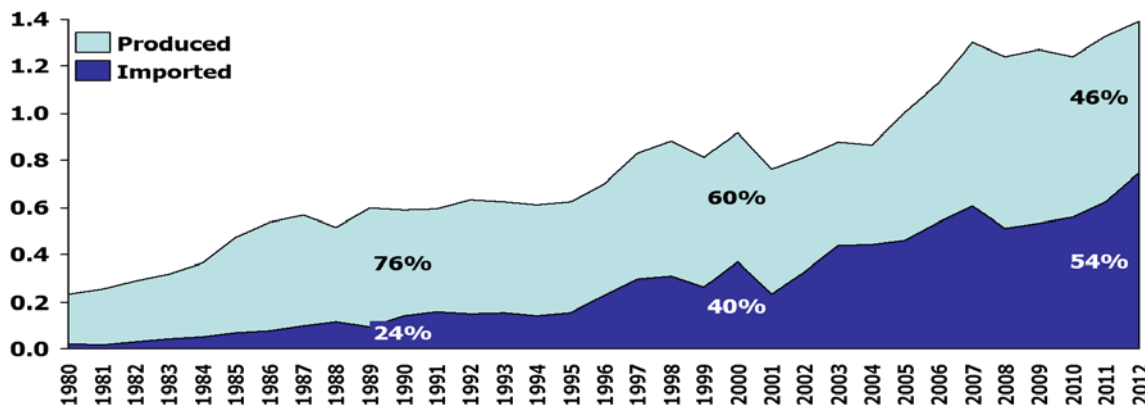
Figure 3 Produced and imported coal in Turkey, by weight 1980-2012



Source: U.S. Energy Information Administration Database

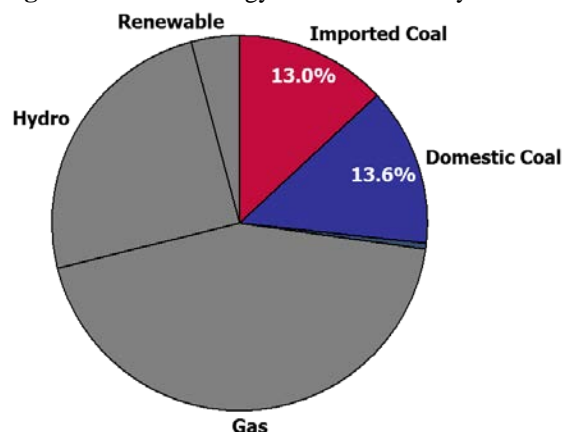
- **The share of imported coal in energy production has already surpassed domestic coal (Figure 4).** One striking fact concerning the use of imported coal in electricity production is that imported coal has already surpassed the energy generated by domestic coal. Although the share of imported coal in electricity production was 29 percent in 2012 in terms of weight, its share in electricity generation was 54 percent.

Figure 4 Produced and imported coal in Turkey, in energy generation, quadrillion btu



Source: U.S. Energy Information Administration Database

Figure 5 Share of energy sources in Turkey's electricity generation, 2013



Source: http://enerjigunlugu.net/enerjide-yerli-kaynak-sorunu-1_11123.html

3.2 How can we explain these accident and fatality rates?

Against this background, the fundamental question to be examined is why does Turkey not seem able to improve its OSH record in coal mines as has been done on other major coal producing countries? In order to respond to this query a multidisciplinary approach has been applied and an effort has been made to respond to the following sets of questions which relate to different areas of research.

- What are the main features of the Turkish coal industry? Are there any specific problems, or conditions which drives the industry and which sets the Turkish coal industry apart from the coal industries in other countries? Could Turkey's increasing energy need be one of the main driving forces behind coal mining accidents?
- What is the normative context of the industry? Are there any particular problems with the regulatory framework including the OSH rules and regulations? Or is something amiss regarding how laws and regulations are implemented? What are the relevant contractual arrangements in the industry and what is their significance and impact in terms of the governance structure in mining and in terms of OSH?
- From the perspective of economic theory, what are the determinants which might explain the OSH practices in Turkey?
- In terms of actual practice, and based of available statistics, what realities can be gleaned regarding problems related to OSH? Is there a relationship between the labour market and the employment structure in Turkish coal mining contribute and Turkey's OSH record?
- In terms of actual practice, what can be learned from experience in the national and international context. And what was the contribution of the field visits conducted?

Summary and Conclusions

In order to set the stage, this section provides a preliminary description and analysis of the accidents and fatality rates in the Turkish mining industry. Against the background of this preliminary analysis, the main questions which will be examined in this study are outlined:

- *What are the main features of the Turkish coal industry?*
- *What is the normative context of the industry?*
- *From the perspective of economic theory, what are the determinants which might explain the OSH practices in Turkey?*

- *In terms of actual practice, and based of available statistics, what realities can be gleaned regarding problems related to OSH?*
- *In terms of actual practice, what can be learned from experience in the national and international context?*

4. NATIONAL IMPORTANCE OF COAL MINING

Introduction

In order to contextualize the nexus of relations within which the OSH practices will be analyzed in the following sections, this section looks at Turkey's coal mining sector from a macro perspective, examining the rate in which coal resources have been exploited, ownership patterns that are observed in coal mines that may be relevant for OSH practices, and the potential importance of coal both as a source of energy and a remedy for Turkey's current account deficit.

4.1 Turkish Coal Resources

4.1.1 Brief History

The history of coal mining in Anatolia goes back to the 19th century. Galata traders (1848-1854), English Coal Company (1855-1865), Armenian Karamanya Company (1884-1908), French Ereğli Company (1884-1908), Georgian Company (1884-1908), Maadin Ottoman Joint Stock Company (1908-1914) are some of the companies that operated in the late Ottoman period (Aktaş 2012).

With the foundation of the Republic of Turkey in 1923, efforts were made to increase first the state's control over and then increase its capacity in the exploitation of natural goods and resources. One of the institutions that were established to this aim was the Mineral Research and Exploration General Directorate (MTA) in 1935. To this day, the MTA carries out the exploration process of all mines and quarries in Turkey. The exploration of hard coal, which takes place exclusively in the Zonguldak basin, can be traced back to 1848. It was carried out by the Turkey Hard Coal Enterprise which was transformed the Turkey Hard Coal Authority (TTK) in 1983 in order to create a separate body to oversee Turkish hard coal¹⁰ production. Another institution that has a significant role is the Turkish Coal Enterprise (TKİ) that was established in 1957, being delegated the mandate of utilizing the country's coal resources in line with the State's overall energy and fuel policies. The institution is also the primary decision making authority regarding the source and volume of Turkey's coal imports. Therefore, jurisdiction over the production of lignite and hard coal in Turkey is currently held mutually exclusively by TTK and TKİ. In 2001, the Electricity Generation Company (EÜAŞ) was established. EÜAŞ is a state owned company which is founded to generate electricity in compliance with the energy and economic policies of the state. EÜAŞ produces lignite for its own use in power plants. Today, there are thus four state-owned enterprises operating in the sector, MTA, TTK, TKİ and EÜAŞ.

4.1.2 What types of coal are mined? How?

The two main types of coal that are mined in Turkey are lignite and hard coal. In addition to these, Turkey produces coke derived from hard coal and also small amounts of asphaltite. Turkey's lignite and hard coal reserves are estimated at 14.7 and 1.3 billion tonnes, respectively.¹¹ Given its high volume of reserves, lignite is Turkey's most important indigenous energy source. However, the quality of lignite mined in Turkey is rather low with 94 per cent of all reserves having a heat content of less than 3000 kcal/kg (Fikkers 2013, p.114).

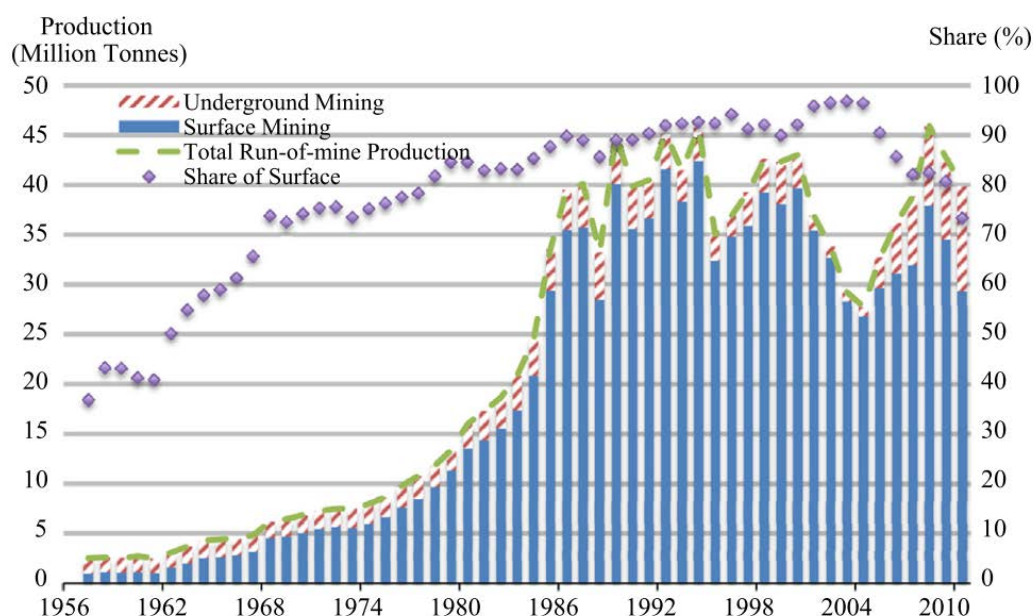
¹⁰ The International Coal Classification of the Economic Commission for Europe (UNECE) recognizes two broad categories of coal: Hard coal and brown coal. In this report hard coal is used to refer to anthracite and bituminous coal (coking coal & other bituminous coal). Lignite, on the other hand is a type of brown coal. Brown coal generally refers to both sub-bituminous coal and lignite. More information can be found at <http://www.unece.org/fileadmin/DAM/ie/se/pdfs/codee.pdf>

¹¹ Tonne (*metric ton* in US) is a metric unit of mass equal to 1,000 kg. 1 tonne is approximately 1.10 tons (US).

In Turkey, one third of all lignite production is done in underground mines, whereas two thirds of the production comes from surface mining. Therefore, in a way, the speed and scale in which open cast mines may be mined through extensive mechanization counterbalances the relatively low heat content of Turkish lignite reserves. Indeed, a historical survey of TKİ's lignite production reveal a steady increase of surface mining's share in total lignite production in Turkey between 1950s and early 2000s (see Figure 2). During this period, share of surface mining in total lignite production skyrocketed from 36.8 percent in 1957 to 96.9 percent in 2004.

After 2003, however, the share of underground mining in TKİ's lignite production rapidly increased and reached nearly 30 percent. By one account, underground lignite production increased 11.6 fold between 2003 and 2010 (Ediger et al. 2015, p.46). This striking change may be partly explained by the emergence of the *rödövens* contract practice in 2004. As will be explained in detail in the following pages, the *rödövens* scheme legally allowed TKİ to outsource some of its production to private sector contractors. TKİ chose to operate almost all of its open cast mines itself, and outsourced costly underground mines to the private sector (TKİ 2009, p.10).

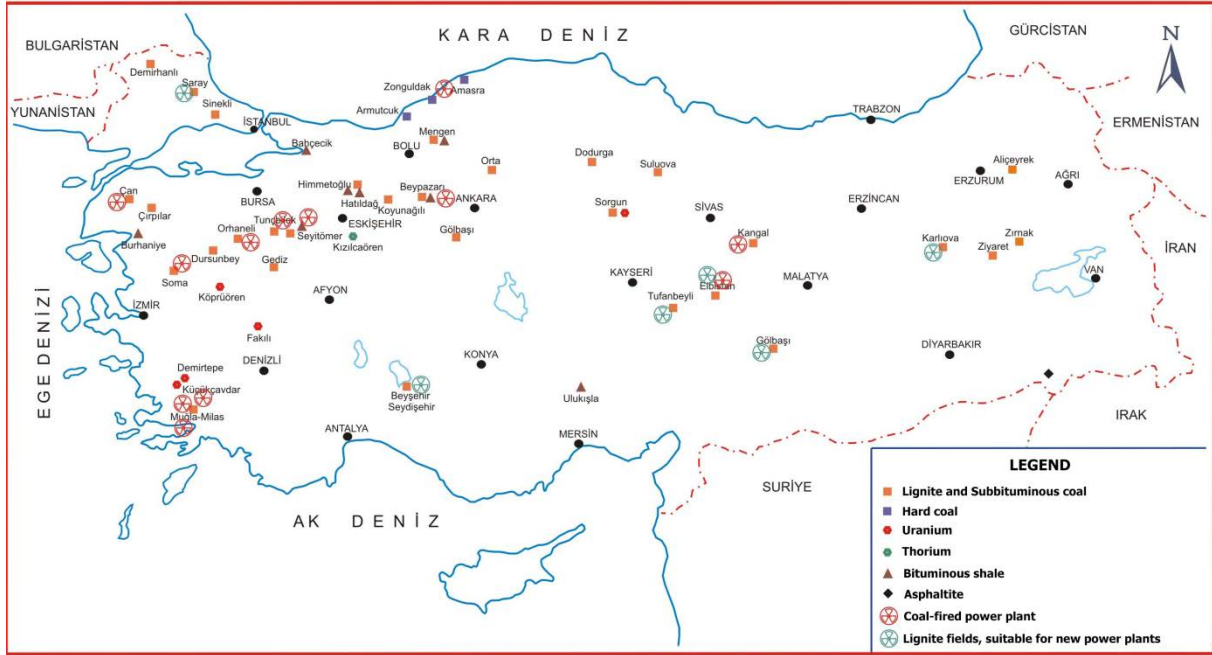
Figure 6 Production in TKİ's open cast and underground mines



Source: Ediger et al. 2015

4.1.3 Reserves and capacity

Whereas Turkey's hard coal reserves are concentrated in the Zonguldak basin, lignite is found and produced all across the country. Most abundant lignite deposits are located in eastern and southeastern Turkey (See Figure 1). In 2012 the Aegean Lignite Enterprise and the Afşin-Elbistan Lignite Enterprise together generated about 40 per cent of all lignite produced in Turkey.

Figure 7 Turkey's coal reserves

Source: MTA

An important indicator for Turkey's increased interest for coal is the extent of recently discovered coal reserves. These have mainly been lignite reserves. Out of the currently proven 14.7 billion tonnes of lignite reserves, 5.8 billion tonnes were discovered between 2005 and 2012 (Table 4).

Table 4 Lignite reserves discovered between 2005-2012 (million tonnes)

<i>Reserve Zone</i>	<i>Reserve</i>
<i>Konya-Karapınar</i>	1,832
<i>Afsin Elbistan</i>	1,300
<i>Eskisehir-Alpu</i>	777
<i>Afyon-Dinar</i>	545
<i>Elbistan</i>	515
<i>Tekirdag-Çerkezköy</i>	495
<i>Manisa-Soma</i>	205
<i>Pınarhisar-Vize</i>	140
<i>Malatya</i>	17
<i>Total</i>	5,826

Source: MTA

4.2 Exploitation of national coal reserves

4.2.1 Ownership structure

The state-owned enterprises EÜAŞ, TKİ and MTA have total estimated lignite reserves of 12.5 billion tonnes. The private sector, on the other hand, commands a total estimated reserve of 2.2 billion tonnes (see Table 5) Table 5 Distribution of Lignite Reserves (thousand tonnes)

<i>Establishment</i>	Proven	Probable	Possible	Total
<i>EÜAŞ</i>	7,872,278	133,706	2,964	8,008,948
<i>TKİ</i>	1,910,759	184,005	25,030	2,119,794
<i>MTA</i>	1,974,905	408,350		2,383,255
<i>Private Sector</i>	2,210,552			2,210,552
Total	13,968,494	726,061	27,994	14,722,549

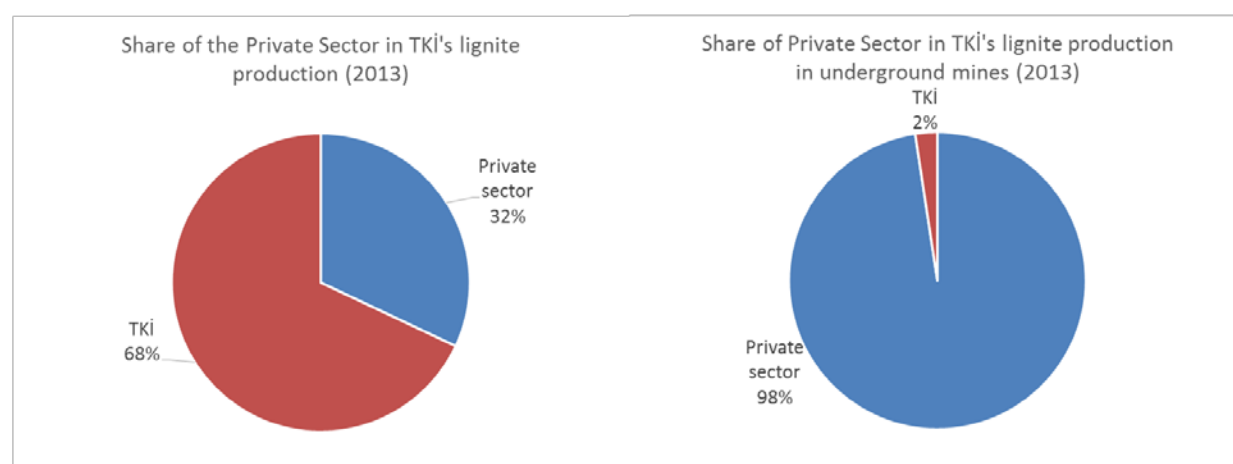
Source: Erdoğan 2015

According to the Turkish constitution, ownership over national resources such as coal shall not be subject to a private ownership. (Turkish Constitution, article 168). Most of Turkey's coal is thus produced by the three state-owned enterprises mentioned earlier: TTK, TKİ and EÜAŞ. However, over the past decade, the involvement of the private sector in coal production has increased for two main reasons. First, the private sector has become more active in coal mining as a result of increasing efforts towards privatization. Second, state-owned enterprises produce some of their marketable coal by contracting out the production stages to the private sector using so called *rödövens* contracts. Consequently, the share of the private sector's involvement in hard coal production increased from 6 percent in 2000 to 29 percent in 2014. Likewise, the share of private sector's production in lignite increased from 6 percent in 2005 to 9 percent in 2012.

An interesting case concerning the private sector's role in production is the production structure in TKİ. TKİ does 68 percent of its coal production by itself, whereas the remaining 32 percent of the production is undertaken by private contractors. But there is an important detail; TKİ operates open cast mines, and contracts out underground mines. As a result, 98 percent of the coal produced in TKİ's underground mines is produced by the private sector (see

Figure 8).

Figure 8 Share of Private Sector in TKİ's production



Source: TKİ 2014

4.2.2 Exploitation rights

According to the Turkish Constitution, all mines are owned by the state and cannot be subject to private ownership. As will be further discussed below¹², the State can, however, transfer the rights to explore a mine and to operate a mine with a license. The 1985 Mining Law¹³ (Mining Law) provides, however, that a mining license should be treated as a whole and that it cannot be divided. Thus, although it is possible to transfer operating rights of coal mines to private enterprises, the law does not allow for a transfer of partial rights. That is, if the license covers a certain mine field, transferring the right to operate a certain portion of that mine field should not be possible.

Turkey's privatization policies since 1980s made it increasingly difficult for state-owned enterprises to continue mining operation and lacking appropriate funding, state-owned enterprises were unable to meet Turkey's increasing energy—hence, coal—needs (Sayıştay 2011, p.xxiii). Contracting out costly mining operations (e.g., underground mining) using *rödövens* contracts was a solution to this problem. The practice of *rödövens* contracts in Turkish coal mining started in the early 1970's and both TKİ and TTK have been using *rödövens* contracts to contract out their coal mining operations to private enterprises since 1984 and 1988, respectively (Kilim 2005, p.13).

The forms of contracts used for the exploitation of Turkey's coal reserves in underground mines and their potential effect on the OSH conditions in the mines came under the spotlight following the Soma tragedy in 2014. Allegations were made that the OSH conditions in mines operated under *rödövens* contracts was poor because further subcontracting was rife; informal mining activities surrounding their operation areas were allowed (or, not reported); and miners were engaged under informal employment practices (Kilim 2005, pp.14–16).

The Government has addressed some of these issues by introducing amendments both to mining and OSH legislation which included restrictions to the use and practice related to *rödövens* contracts in mining.¹⁴ The legal nature and implications of these contracts, the way they have been used and the amendments recently introduced to the system are examined below.¹⁵

4.3 Coal production in Turkey

The total volume of all types of coal produced in Turkey during 2014 added up to 70.6 million tones, making Turkey the 12th largest producer of coal worldwide. Even though the country's annual coal production multiplied more than threefold between 1981 and 2014, this was not a linear increase. Coal production increased at an annual rate of 7.3 percent between 1985 and 1994, decreased at an annual rate of 1.3 percent in the following ten years (1995-2004) and once again increased at an annual rate of 5.1 percent in the 2005-2014 period. Since the turn of the millennium, the largest annual increase in production was observed in 2005 (31 percent), which occurred following the substantial cut backs on coal production in the aftermath of Turkey's 2001 economic crisis. In turn, the 31 percent annual increase in production in 2005 recuperated the losses in coal production, paralleling the recovery of the Turkish economy due to the implementation of a successful economic stability program - the *Transition to a Strong Economy Program*¹⁶.

Recently there have, however, been some significant reductions in coal production in Turkey. The 15.5 percent drop in production in 2013 is the largest since 1988. Both hard coal and lignite production have decreased in this period. According to as 2014 report by the Turkish Court of

¹² See section 6.3

¹³ Official Gazette of the Republic of Turkey 15.06.1985 No. 18785

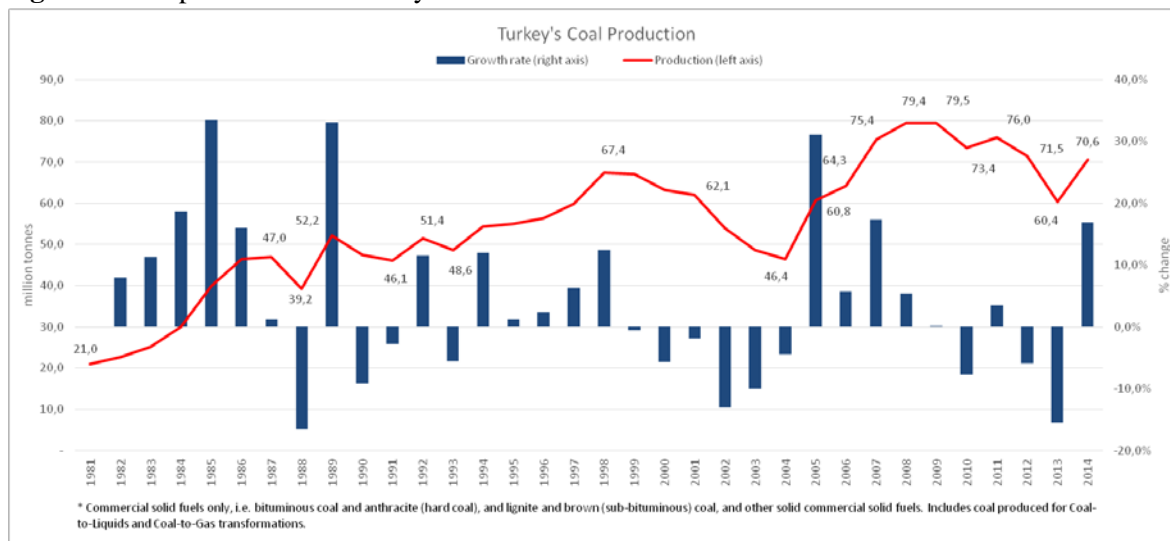
¹⁴ Modification to the Mining Law, published published in the Official Gazette of the Republic of Turkey, 18.2.2015, no. 29271.

¹⁵ See Section 6.3.3 et.seq.

¹⁶ “Türkiye'nin Güçlü Ekonomiye Geçiş Programı” <http://goo.gl/BLY6Ys>

Accounts this drop was due to the suspension of production due to landslides in certain mine fields in the Afşin-Elbistan basin and a decreased level of investment both by state-owned and private sector enterprises (TKİ 2014, p.21). **Figure 9** presents total coal production between 1981 and 2014, together with yearly production growth rates. Further details concerning hard coal and lignite production is presented below.

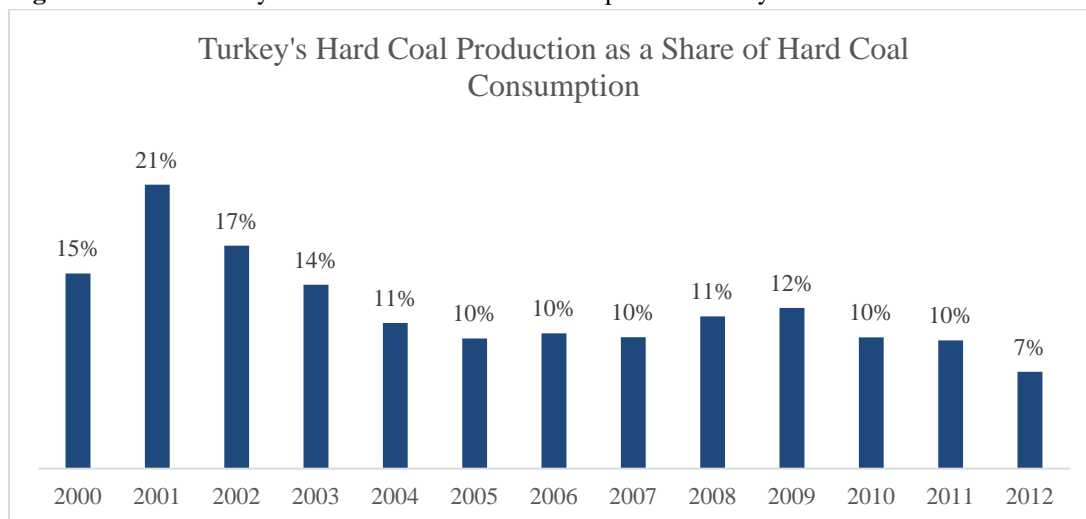
Figure 9 Coal production in Turkey



Source: BP Statistical Review of World Energy 2015

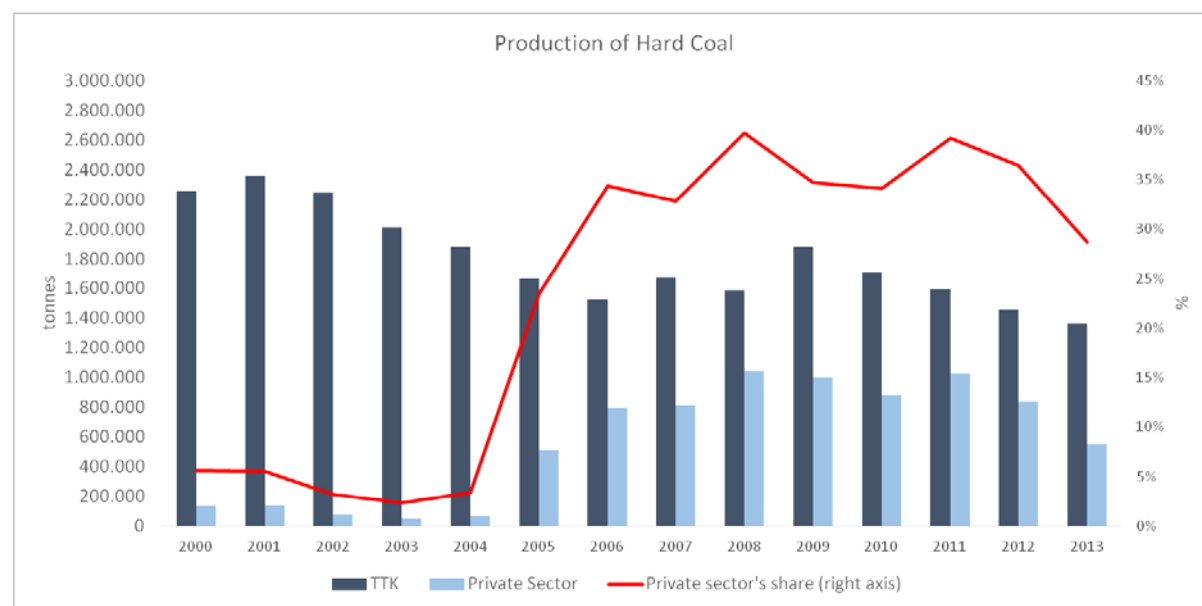
4.3.1 Hard coal production

Hard coal production in Turkey decreased from 4.5 million tonnes in 1970 to 3.5 million tonnes in 1980 and 2.7 million tonnes in 1990 (Güler 2011). The significant reduction in Turkey's hard coal production calls for an explanation. According to a report prepared by the Turkish Court of Accounts, this reduction can be explained by the transformation of the Turkish economy from a predominantly agrarian economy to a regional mid-tech powerhouse economy being out of tune with its energy policy (Sayıştay 2011). Starting with the privatization waves of 1980s, the Government increasingly reduced the transfers of adequate funds to the TTK, and TTK was unable to make the investments required to sustain and expand its mining operations at previous levels (Sayıştay 2011, p.xxiii). As a result TTK, which was able to supply 80 percent of Turkey's energy needs in 1980, was unable to keep up with increasing consumption of energy in Turkey. Consequently, its ability to meet Turkey's energy need reduced drastically. According to TTK's 2014 report, national hard coal production, both public and private, could only meet less than 10 percent of Turkey's hard coal needs.

Figure 10 TTK's ability to meet total hard coal consumption in Turkey

Source: TTK 2014

As it can be seen in **Figure 11**, the private sector's share in hard coal production started to increase after 2004 and its share peaked in 2008 to 40 percent. The private sector's share was also quite high in 2011, as high as 39 percent. Although this is still a high level compared to years before 2005, after 2011 there was a visible reduction of its share.

Figure 11 Production of hard coal in Turkey

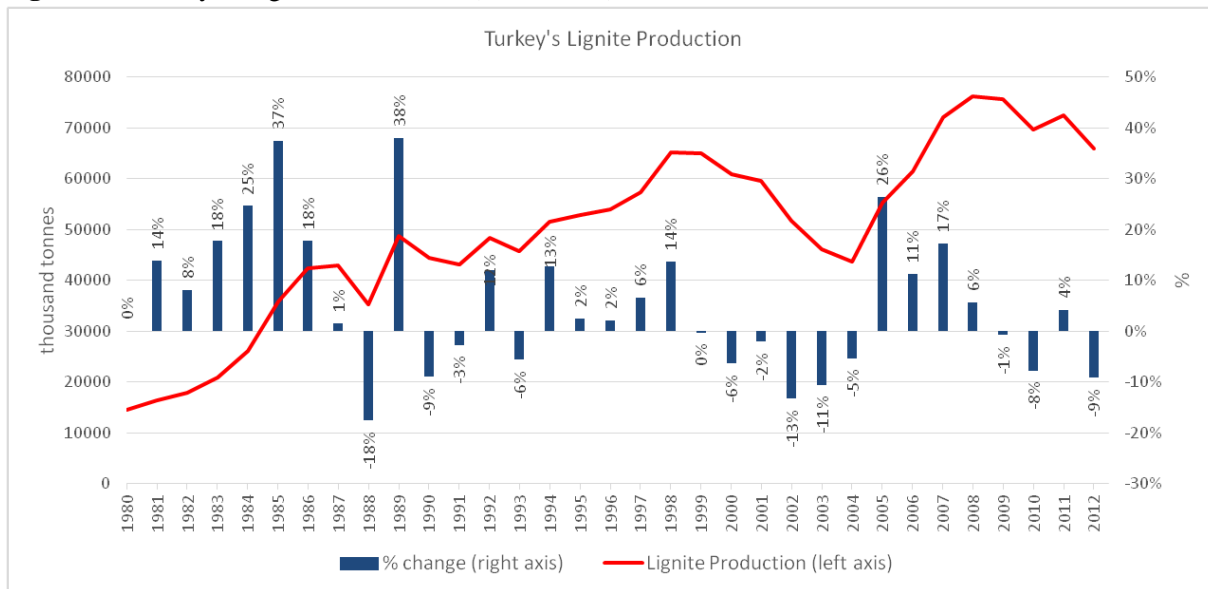
Source: TTK 2014

4.3.2 Lignite production

Turkey's lignite production in 1980 was 14.4 million tonnes. In the course of seven years, with an annual growth rate of 17 percent, lignite production increased to 42.9 million tonnes in 1987. Despite some ups and downs in the production, lignite production continued to grow until the late 1990s with an average annual growth rate of 5 percent. Starting from 1998 and until the end of 2004, however – and as a consequence of the economic turmoil the country underwent - lignite production decreased. In

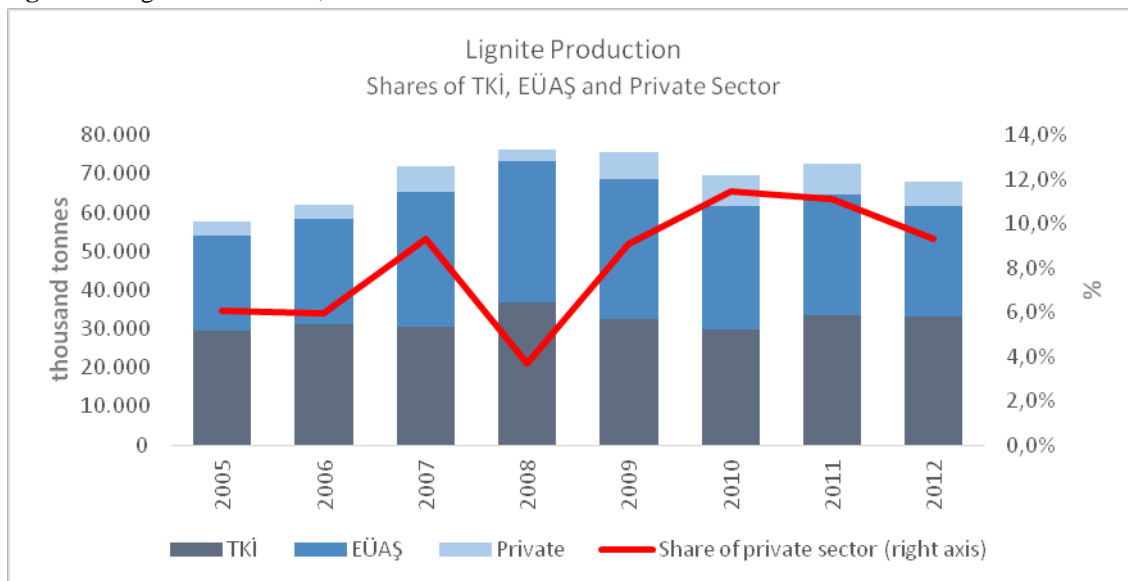
2005 - paralleling the recovery of Turkey from the crisis - lignite production increased 26 percent. This growth continued in the subsequent periods, as lignite production increased 11 percent in 2006, 17 percent in 2007, and 6 percent in 2008. However, thereafter Turkey's lignite production has been decreasing. With an exception for 2011, Turkey was not able to increase its lignite production between 2008 and 2012.

Figure 12 Turkey's Lignite Production (1980-2012)



Source: EIA

Lignite is produced by TKİ, EÜAŞ (both state-owned enterprises) and the private sector. Yearly average production of lignite between 2005 and 2012 by TKİ is 32 million tonnes. In the same period EÜAŞ's yearly average production was 31.4 million tonnes. The private sector produced a yearly average of 5.7 million tonnes of lignite. The private sector's share in production also increased in this period; from 6 percent to 9 percent.

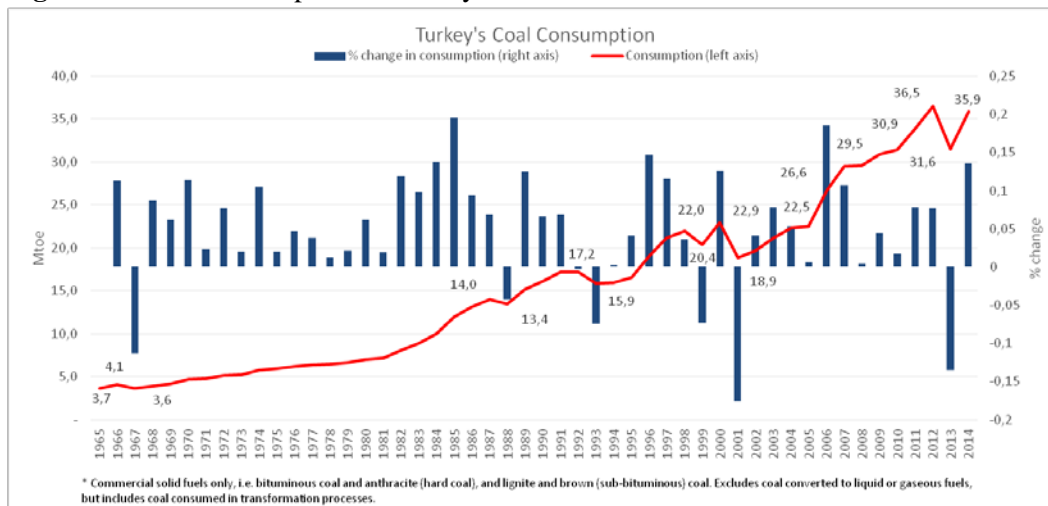
Figure 13 Lignite Production, 2005-2012

Source: Erdoğan 2015

4.4 Coal consumption in Turkey

Coal consumption has been increasing since 1965 with an average yearly growth rate of 5 percent. Consumption of coal increased approximately 10.25 fold in the 1965-2014 period. The yearly average growth of coal consumption in the last 13 years is 5.3 percent. This is above the 1965-2014 average.

Figure 14 summarizes Turkey's coal consumption and yearly changes in consumption.

Figure 14 Coal Consumption in Turkey

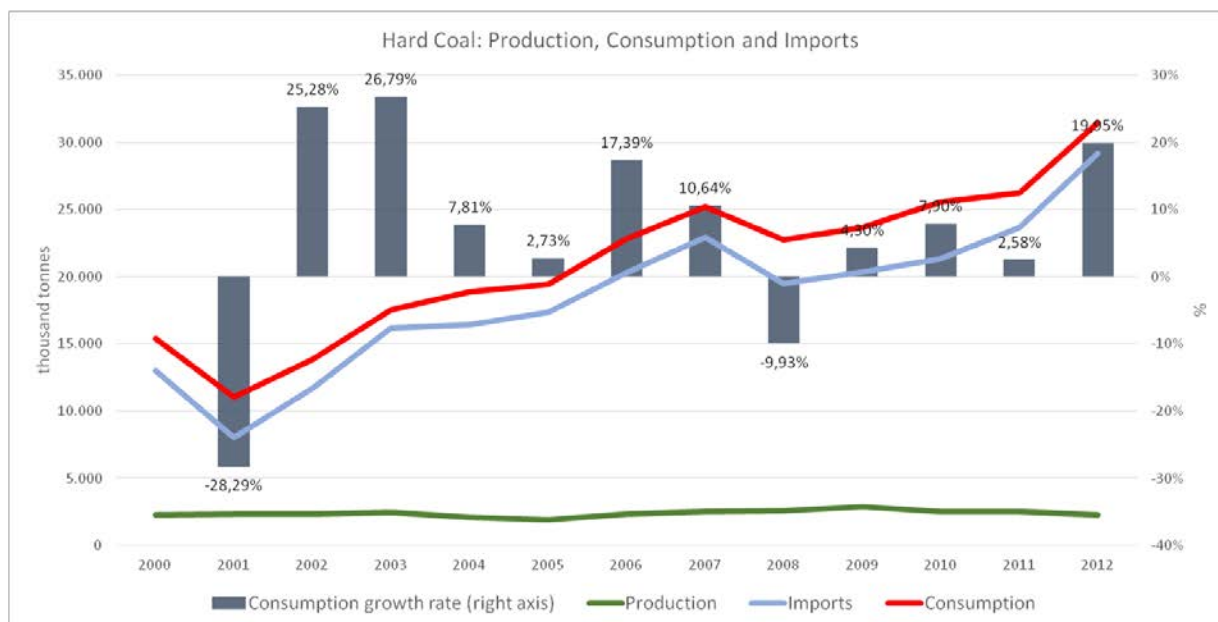
Source: BP Statistical Review of World Energy 2015

4.4.1 Hard coal consumption

The increase in hard coal consumption in Turkey is also remarkable. Between 2000 and 2012 hard coal consumption increased 2 folds. The growth of consumption between 2011 and 2012 was 19.95 percent. Since the hard coal reserves and production is limited Turkey, most of the hard coal consumption is imported. In the beginning of the 1980s approximately 80 percent of the hard coal consumption was domestic hard coal. By the end of the 1980s, however, the share of the domestic

hard coal consumption had dropped to 45 percent. In 2012 its share decreased to 7.28 percent. In the 2000-2012 period, hard coal consumption grew every year with the exception of 2001 and 2008. In 2001 the Turkish economy and in 2008 the global economy were in crisis. **Figure 15** presents a summary of hard coal production, consumption and imports in Turkey.

Figure 15 Hard coal: Production, Consumption and Imports

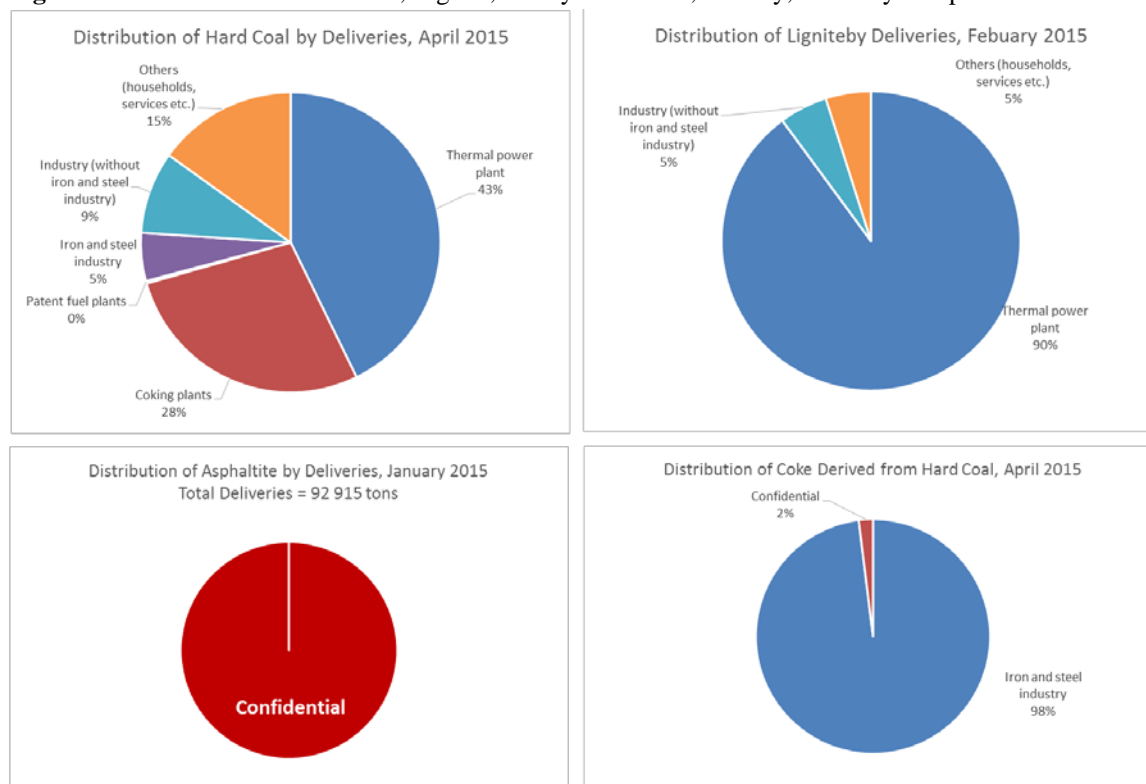


Source: TTK 2014

4.4.2 Uses of hard coal and lignite

In Turkey, coal is mainly used in thermal power plants. According to the latest monthly data of 2015 from the Turkish Statistical Institute (TURKSTAT) 43 percent of hard coal and 90 percent of lignite produced in Turkey were utilized in powering up thermal plants (**Figure 16**).¹⁷ Because of the low quality of lignite produced in Turkey, lignite has little use in other areas and only 5 percent of the lignite production was delivered to industry (excluding the iron and steel industry). The remaining 5 percent was delivered to households, services etc. Hard coal, on the other hand, has a wider use. 15 percent of the hard coal produced was delivered to the industry (excluding iron and steel industry), 5 percent to the iron and steel industry, 28 percent to coking plants, less than 1 percent to patent fuel plants and 15 percent to households, services, etc. 98 percent of the coke derived from hard coal is also used by the iron and steel industry; making the iron and steel industry the second large consumer of hard coal after thermal power plants. Hard coal production is small relative to lignite production. TURKSTAT does not publish data for asphaltite. **Figure 16** presents a summary of the distribution of coal by deliveries in 2015.

¹⁷ Some data is not publicly available. To present the most informative picture for 2015, different months were chosen for hard coal, asphaltite and lignite.

Figure 16 Distribution of Hard Coal, Lignite, etc. by Deliveries, January, February & April 2015.

Source: TURKSTAT

Since 2003, the state-owned TKİ has also been undertaking coal-charity activities based on a government decree. In the period 2003 - 2013 TKİ distributed approximately 17.3 million tonnes of coal to poor families (TKİ 2014, p.47). In 2014 total lignite production between January and June was 31 million tonnes. According to TKİ, in this period 2.1 million tonnes of coal were distributed, which amounts to as much as 6.7 percent of the production in this period.

Table 6 Coal distribution to poor families

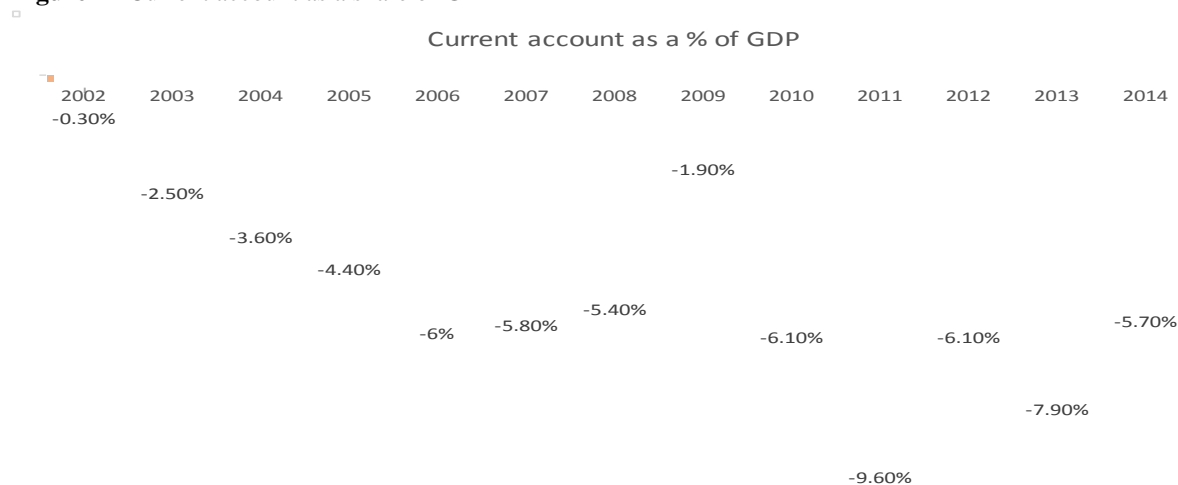
Year	Number of Families	Coal (tonnes)
2003	1,096,488	649,818
2004	1,610,170	1,052,379
2005	1,831,234	1,329,676
2006	1,797,083	1,363,288
2007	1,894,555	1,434,163
2008	2,347,728	1,852,278
2009	2,256,265	1,910,778
2010	2,237,423	1,957,495
2011	2,060,213	1,921,771
2012	2,103,324	1,992,546
2013	2,106,015	2,142,316
2014 June	2,005,675	2,120,850

Source: TKİ 2014

4.4.3 Turkey's current account, trade and energy deficits

As coal is the main domestic resource utilized in thermal power plants it is necessary to have a closer look at the importance of energy production for the Turkish economy. Turkey has suffered from a significant current account deficit problem over a number of years. Recently, in 2014, a Financial Times article listed Turkey as one of the most vulnerable countries mostly due to its current account deficit (Kynge 2015). Similarly, in 2014 Moody's reported that Turkey was the country most vulnerable to exchange rate risks, again mostly due to its large current account deficit (Financial Times 2015). **Figure 17** shows Turkey's current account deficit as a percentage of its GDP. The current account deficit grew continuously until 2006; reaching 6 percent of the GDP. After 2006, it remained high, with the exception of 2009. Current account deficit as a percentage of GDP reached the alarmingly high level of 9.6 percent in 2011. In 2014 it was in a decreasing trend and dropped to 5.7 percent.

Figure 17 Current account as a share of GDP



Source: OECD & World Bank

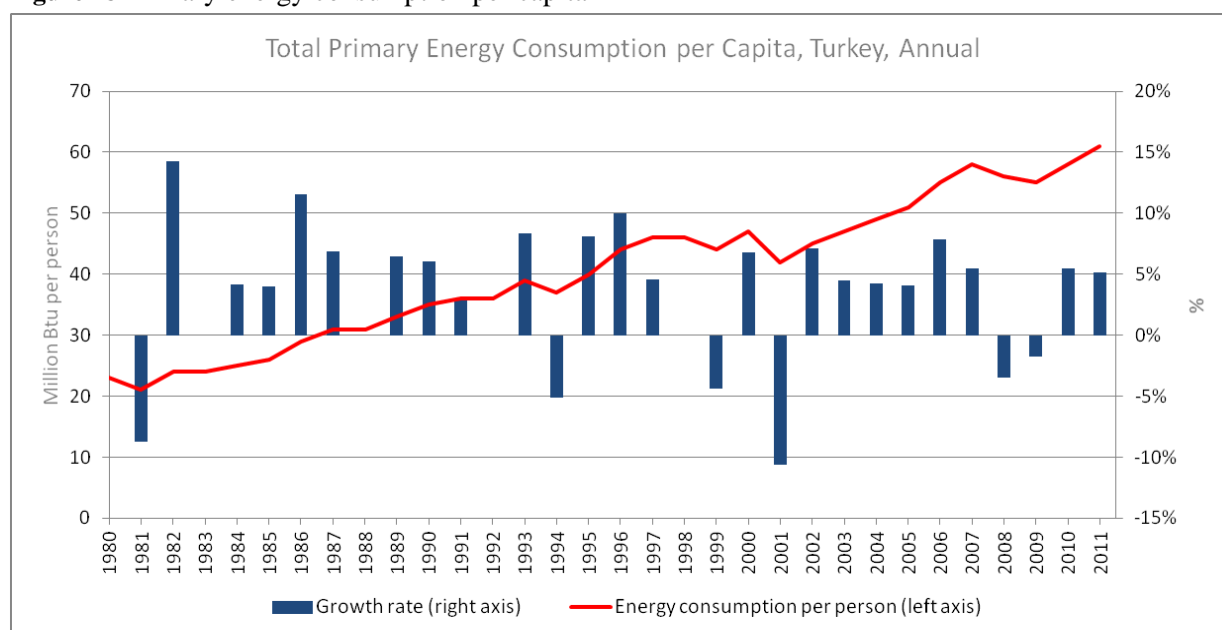
Turkey's trade deficit constitutes an important part of the current account problem and it presents a similar picture. Since 1990s Turkey's trade deficit has been increasing. After 1980s, Turkey became increasingly integrated with the global economy. This, of course, helped Turkey to grow. However, it also brought about a problem. Turkey was not able to match the increasing amount of imports with the increases in its exports. As a consequence Turkey's trade deficit grew significantly.

According to TURKSTAT, the share of coal, coke and briquettes in Turkey's imports was 0.38 percent in 2014. The share of petroleum and its products' was 6.64 percent while the share of gas (natural and manufactured) was 1.11 percent. Electric current, on the other hand, had a share of 0.18 percent. These items add up to 8.31 percent of Turkey's imports. It should be noted, however, while data on exports are fully available there is large amount of data (14 percent) regarding imports which is not published. This data is likely to include energy related trade products. Thus, the 8.31 percent share of coal, petroleum, electric current and gas in imports is very likely to be underestimated. The trade deficit caused by the importation of these products amounting to a recorded 16.57 percent of the total trade deficit of Turkey is therefore also likely to be underestimated. Due to this unpublished information we do not know the true share of energy in Turkey's imports. If we assume that the unpublished data only concerns energy imports, and add it to energy imports announced by TURKSTAT, energy imports' share in Turkey's imports would increase to 22.66 percent. Moreover,

the share of energy deficit in Turkey's trade deficit would increase to 57.68 percent. A recent World Bank Focus Note seems to confirm this calculation. It indicated that Turkey's external energy shortfall is 6 percent of its GDP and which would accounts for 58 percent of its trade deficit. The same note also states that "the average annual energy imports account for about 23 percent of merchandise imports" (World Bank 2014).

Turkey's energy consumption is increasing fast. In 1980 the per capita energy consumption in Turkey was 23 million British thermal units (Btu) per person. In 2011, however, it increased to 61 million Btu per person. The 10 yearly average growth rates in per capita energy consumption was as follows: 6 percent (1982-1991), 2 percent (1992-2001), and 4 percent (2002-2011). That is, per capita energy consumption in Turkey grew very rapidly in 1980s and 2000s. The growth in the 2002-2011 period corresponds with the recovery program that was implemented after the 2001 economic crisis. The IMF-led economic recovery program paid off in terms of economic growth but also increased Turkey's energy needs. **Figure 18** presents the growth of per capita energy consumption in Turkey.

Figure 18 Primary energy consumption per capita



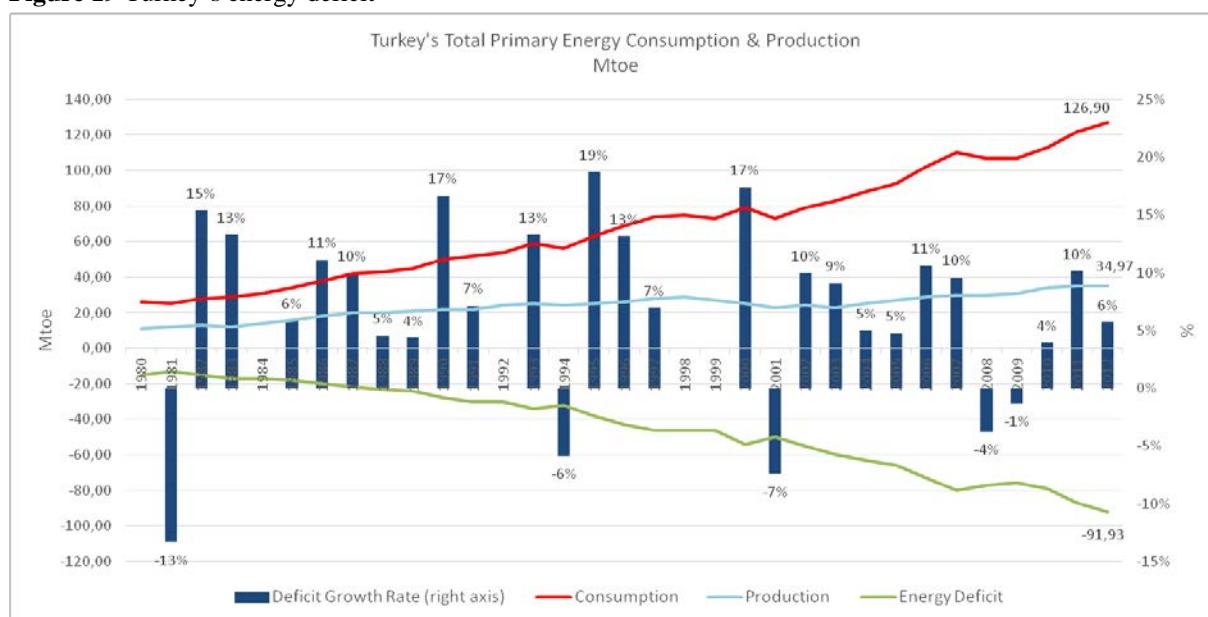
Source: U.S. Energy Information Administration

A 2013 report by TKİ states that between 2002 and 2012 world energy consumption increased approximately 30 percent while the energy consumption in Turkey, increased 53 percent (TKİ 2014, p.17). Thus, Turkey's energy consumption grew faster than the world energy consumption. This observation is also confirmed when we look at the growth of per capita energy consumption. While Turkey's energy per capita energy consumption was growing approximately at a yearly average rate of 4 percent in this period, per capita energy consumption in the world grew merely at a rate of 1 percent. Between 1980 and 2001, per capita energy consumption grew 4.35 percent yearly, the average yearly growth rate of world per capita energy consumption was only 1.23 percent.

Turkey's energy consumption has been increasing at an impressive speed. However, Turkey's ability to meet the growing energy need with domestic resources is limited. In order to satisfy its energy needs Turkey is required to import energy and this aggravates its current account deficit problem. Let us now look closer at Turkey's energy deficit.

Figure 19 presents an overview of Turkey's energy deficit. In 1980 Turkey's total energy production was 10.99 Million Tonnes of Oil Equivalent (Mtoe), its consumption however was 25.98 Mtoe. Turkey's ability to meet its energy needs was already limited in 1980s. The gap between consumption and production (energy deficit) was approximately 15 Mtoe. Turkey's energy deficit increased significantly between 1980 and 2012 with an average yearly growth rate of 6 percent. In 2012, Turkey's energy deficit was 91.93 Mtoe, i.e., 6.13 times higher than that of 1980. In the ten years leading to 2012, Turkey's energy deficit grew with a yearly average rate of 5 percent.

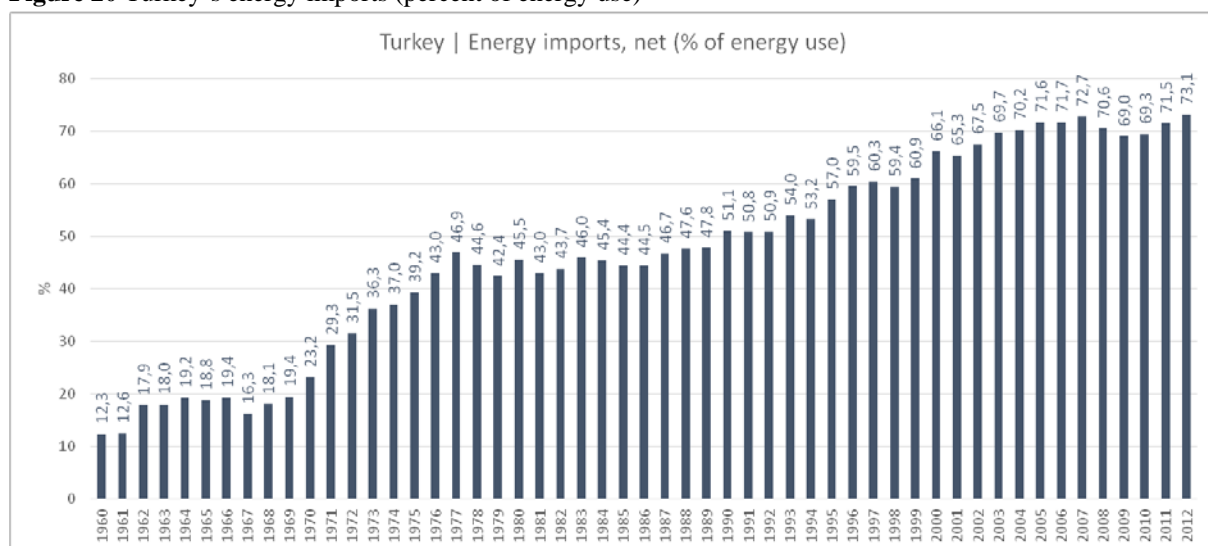
Figure 19 Turkey's energy deficit



Source: U.S. Energy Information Administration

Similarly, the share of imported energy grew. In 1960s it increased from 12 percent to 19 percent. In the years that followed it continued to increase; reaching 66.13 percent in 2000 and 74.11 percent in 2012.

Figure 20 Turkey's energy imports (percent of energy use)



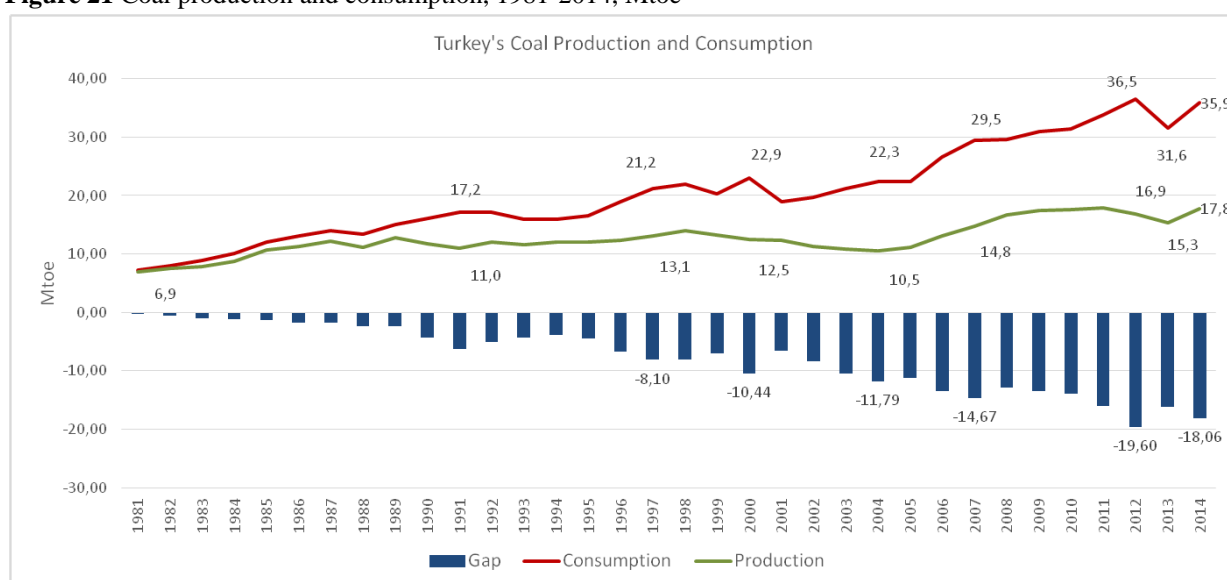
Source: World Bank, World Development Indicators

As noted previously, coal, particularly lignite, is Turkey's most important indigenous energy resource and it is an important resource for reducing Turkey's energy deficit and dependency. As noted above, the quest for further coal reserves resulted in a 5.8 billion tonnes increase in discovered lignite reserves. (See **Table I** above). These reserves have provided an additional opportunity for the Government's to meet Turkey's energy needs by using domestic resources. However, as will be further outlined below, although domestic energy production did increase, this increase did not suffice to meet the increasing national energy needs.

4.4.4 Coal Imports and Exports

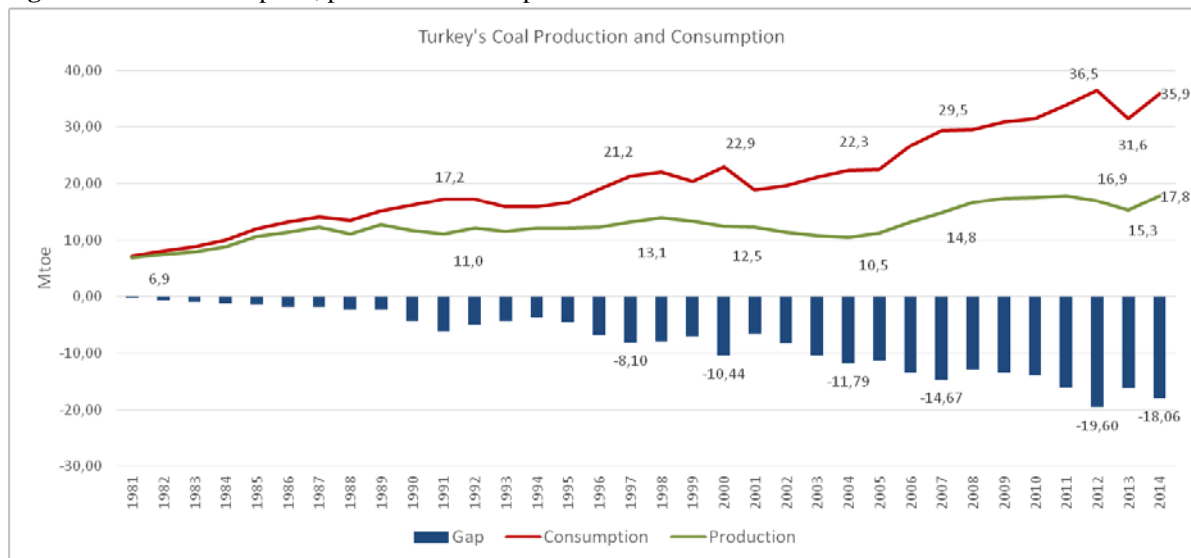
In 1981 Turkey was practically meeting its coal needs; the gap between Turkey's coal production and consumption was only 0.25 Mtoe. By 1991 the gap grew to 6.21 Mtoe and increased continuously thereafter. In 2012, the gap became 19.60 Mtoe, reaching the highest level between 1981 and 2014 (**Figure 21**).

Figure 21 Coal production and consumption, 1981-2014, Mtoe



Source: BP Statistical Review of World Energy 2015

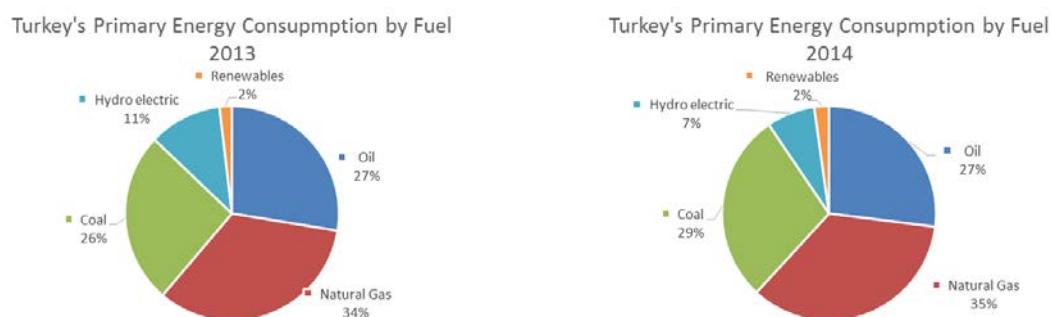
The increase in the gap between consumption and production was paralleled with an increase in coal imports. **Figure 22** presents coal production, imports in thousand tonnes. The figure also presents the yearly growth rates of imports between 1980 and 2012. Between these years coal imports increased with an average yearly growth rate of 14 percent. In last 10 year period, the growth of imports continued with an average yearly growth rate of 13 percent. Since the year 2000, the only exceptions to this growth story was years 2001 and 2008. The significant reductions in coal imports were mostly due to the crises in the Turkish economy in 2001 and the global economic crisis in 2008.

Figure 22 Coal consumption, production and imports

Source: U.S. Energy Information Administration

4.4.5 Coal's place in Turkey's energy sector

As it can be seen in **Figure 23** the most important items in Turkey's primary energy consumption are natural gas, oil and coal. As coal primarily is used in the production of electricity, it is important to have a closer look at how coal is used in the production and consumption of electricity

Figure 23 Turkey's Energy Consumption by Fuel

Source: BP Statistical Review of World Energy 2015

Table 7 summarizes the key statistics for the production, consumption, export and import of electricity in Turkey. According to the latest report of the Ministry of Energy and Natural Resources (MENR/ETKB) (ETKB 2015) as of March 2015, Turkey's production of electricity amounted to 64.1 billion kWh and its consumption to 64,4 billion kWh. As of March 2015 the share of the private sector in the production of electricity was 79 percent, which increased from 58.4 percent (in 2004) as a result of governments efforts in privatizing the production of electricity.

In parallel with the economic growth of Turkey, the demand for electricity has increased rapidly since 2004. Between 2004 and 2014 Turkey's consumption of electricity increased at an average rate of 5.53 percent while the production of electricity increased at an average rate of 5.27 percent. This gap in the average growth rates of production and consumption resulted in an increase in the production gap from 680 Giga watt hours (GWh) to -2,873 GWh. This gap had to be closed with imports, which increased 16.8 fold between 2004 and 2014.

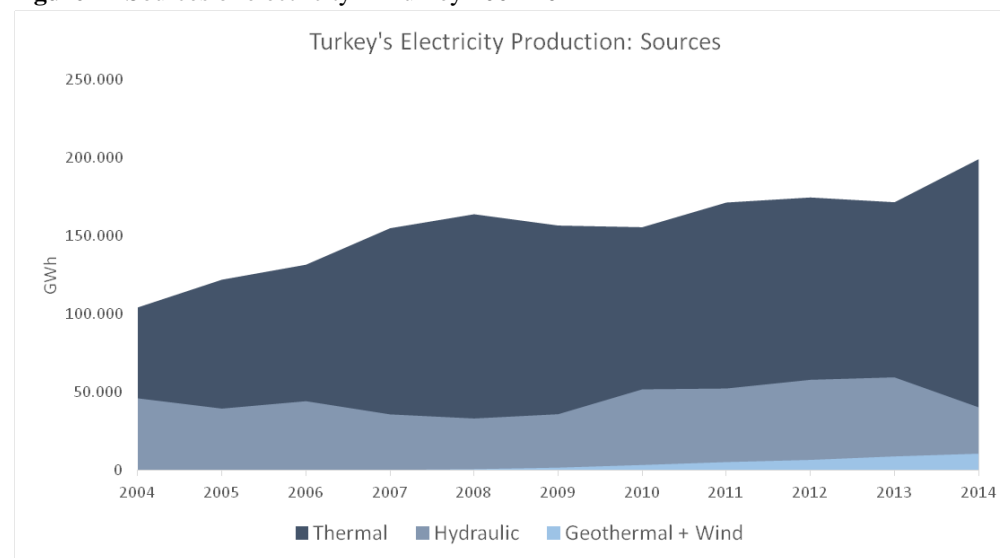
Table 7 Electricity in Turkey. Key Statistics (GWh)

	Production	Import	Export	Consumption
2004	150,698	464	1,144	150,018
2005	161,956	636	1,798	160,794
2006	176,300	573	2,236	174,637
2007	191,558	864	2,422	190,000
2008	198,418	789	1,122	198,085
2009	194,813	812	1,546	194,079
2010	211,208	1,144	1,918	210,434
2011	229,395	4,556	3,645	230,306
2012	239,497	5,826	2,954	242,370
2013	240,154	7,429	1,227	246,357
2014	250,435	7,805	2,696	255,545
2015 (end of March)	63,143	2,146	861	64,428

Source: ETKB 2015

What are the sources of electricity production in Turkey? As to 16.14 percent (in 2014).

Figure 24 clearly shows, most of Turkey's electricity is produced by thermal power plants and the share of thermal plants is growing. In 2004 104,464 GWh of electricity was produced by thermal plants and 46,084 GWh by hydraulic plants. Geothermal and wind energy was insignificant (with a share of 0.10 percent) in 2004 and produced only 151 GWh electricity. In the 10 years following 2004, geothermal and wind energy's share grew to 4.25 percent but it is still not an important source of electricity. The share of thermal power plants, on the other hand, increased from 69.32 percent to 79.62 percent. In 2014 thermal plants produced a total of 199,404 GWh of electricity; while hydraulic plants produced only 40,396 GWh. The share of hydraulic plants was reduced from 30.58 percent (in 2004) to 16.14 percent (in 2014).

Figure 24 Sources of electricity in Turkey 2004-2014

Source: ETKB 2015

Since thermal power plants have an increasing role in Turkey's electricity production, it is important to look at the primary resources used in thermal plants.

There are four types of resources used in thermal power plants:

- Renewable resources and waste.
- Natural gas and liquefied natural gas (LNG).
- Liquid fuels (fuel-oil, diesel-oil, liquefied petroleum gas (LPG), and naphtha).
- Coal (hard coal, lignite, asphaltite and imported coal).

The most important resources are coal and natural gas (see **Figure 25**).

Figure 25 Primary resources of thermal electricity production

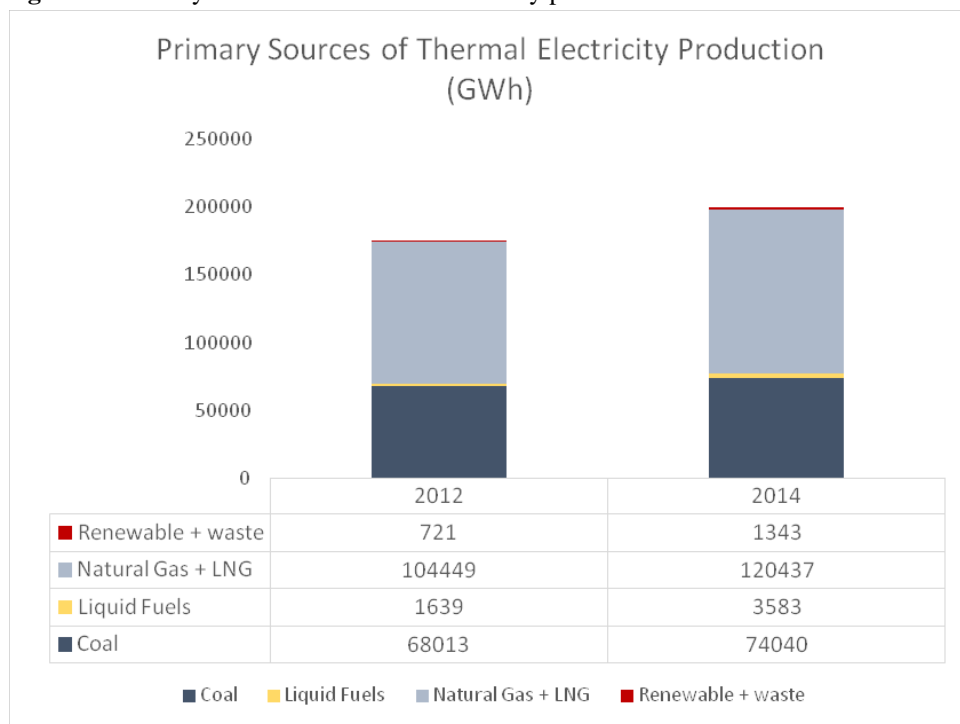
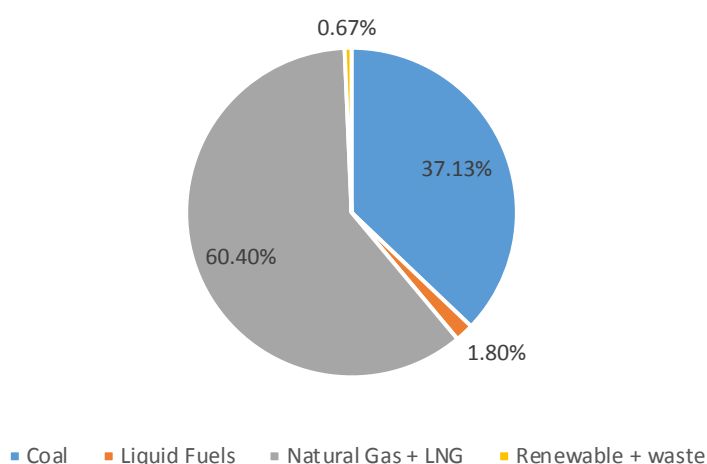


Figure 26 Share of Coal in Thermal Electricity Production in 2014

Share of Coal in Electricity Production 2014



Source: ETKB 2015

Coal enabled Turkey to produce 68,013 GWh of electricity in 2004 and 74,040 GWh in 2014. Nevertheless, its share in thermal electricity production decreased to 37.13 percent from 38.89 percent (see **Figure 26**). Thus, compared to natural gas, coal lost its share in thermal electricity production.

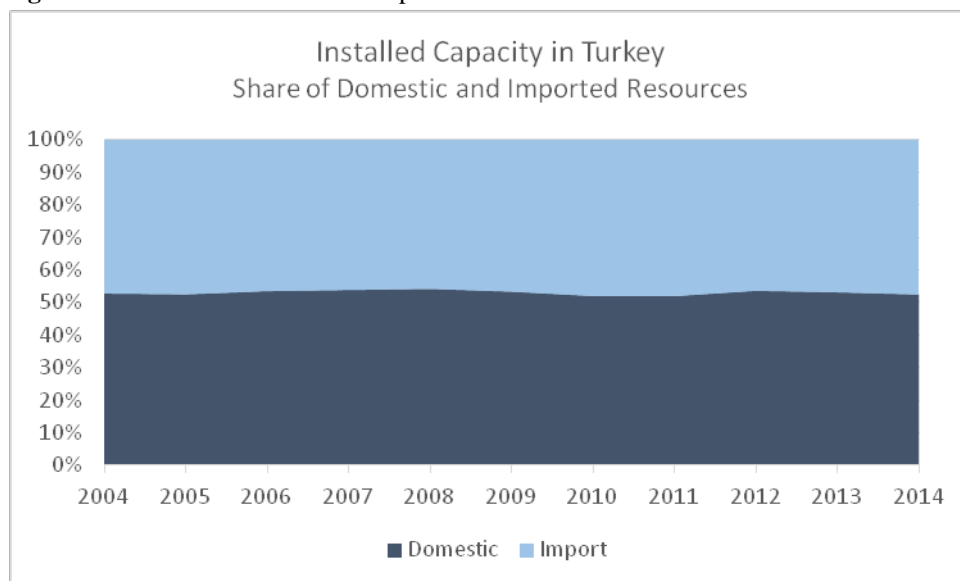
Nevertheless, Turkey aims at increasing the utilization of coal in electricity production (TKİ 2009; ETKB 2014; TKİ 2014).

The distribution of installed capacity in thermal power plants in Turkey gives a more detailed picture of the role of different types of coal in electricity production. Approximately 90 percent of electricity is produced in single fuel thermal plants. Therefore, looking at what kinds of resources that are used in single fuel thermal plants gives us a good overview of thermal electricity production. In 2004, 27 percent of the installed capacity in thermal power was based on lignite, 1 percent on hard coal and 6 percent on imported coal and asphaltite.

In 2014, the share of imported coal and asphaltite increased from 6 percent to 15 percent, while the share of lignite decreased from 27 percent to 20 percent. Thus, not only is the share of natural gas increasing, but the share of imported coal is also becoming more and more important in the production of electricity.

The share of imported resources in Turkey's installed capacity is almost half of the total installed capacity. As **Figure 27** shows this has been the case for a long time. In 2004 share of imported resources was 47.1 percent and as of 2014 it is 47.4 percent. The latest figure from the MENR shows that at the end of March 2015 installed capacity based on domestic resources was 37,486 MW and capacity based on imported resources 32,940 MW. This corresponds to a share of 46.9 percent for imported resources.

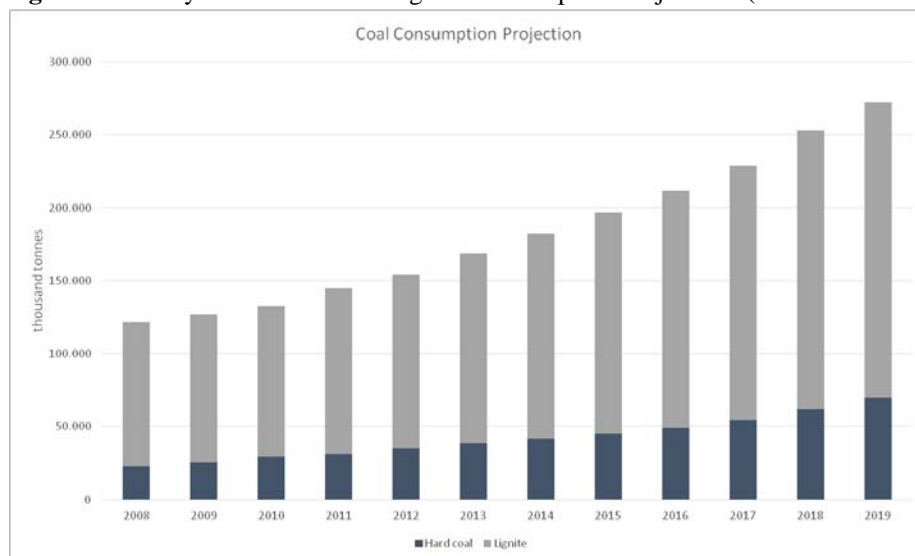
Figure 27 Share of Domestic and Imported Resources



Source: ETKB 2015

4.4.6 Future outlook

TTK's projections concerning hard coal and lignite consumption in its 2014 report are presented in **Figure 28**. According to these projections TTK is expecting an average 8 percent growth in coal consumption until 2019. This is far above the 5 percent annual average increase in consumption between 1965 and 2014. These projections are important because they are likely to influence the economic policy in Turkey. If realized, an 8 percent yearly average growth in consumption would significantly reduce Turkey's ability to meet its energy needs with domestic resources.

Figure 28 Turkey's Hard Coal and Lignite Consumption Projections (thousand tonnes)

Source: TTK 2014

In the 2007-2012 period Turkey took important steps to increase the level of privatization in the electricity and natural gas markets.¹⁸ As a result of these efforts the share of the private sector in these markets increased. In the same period the government supported the production of renewable energy. Coal reserves, through *rödövens* contracts, were made available to the private sector for the purpose of electricity production. The government also initiated a nuclear energy program. In order further to reduce the energy dependency, the government encouraged exploration activities and as a result new lignite reserves were found. In this period, known lignite reserves in Turkey increased from 8.3 billion tonnes to 12.8 billion tonnes (T.C. Kalkınma Bakanlığı 2013, p.22).

The Government's efforts in 2007-2012 also included an incentive program that supported electricity generation using domestic coal. The following news article from Star Newspaper presents a good summary of markets reaction to these efforts.

¹⁸ As explained in Turkey's Tenth Development Plan (2014-2018).

Spotlight: Turkey's coal reserves to fire more power plants

Turkey's power generation sector is embracing the use of domestic energy sources, following the recent revision to the country's investment incentive system that favors utilizing coal and lignite, both abundant in Turkey.

Heavily dependent on imported gas to fuel its growing economy, Turkey has taken steps to promote its vast coal reserves to foreign energy companies via changes to its investment incentives system, making the use of locally-sourced fossil fuels to fire thermal power plants - a very attractive alternative to using imported natural gas.

“Shifting the priority to using local sources in power generation has attracted foreign investors to coal fields in Konya, Eskisehir, Elbistan and Thracia.”, Turkish Miners Association's (TMD) head Mustafa Sonmez commented on the investor reaction to the revamped incentives. “Arabic and Chinese investors are particularly interested in investing in coal-fired power plants in Turkey. Revised incentives make Turkey's huge potential even more appealing in the eyes of foreign energy investors thus provide a boost to the mining sector and Turkish economy overall.”, he noted.

The expansion in Turkey's region-based investment incentives system grants energy investors that utilize domestic sources to generate power the right to benefit from Region-5 level incentives and support instruments, the second most beneficial in the whole regime, regardless of the actual investment location.

[...]

Turkey plans to reach an installed capacity of 90,000 MWs in 2023, coal-fired thermal power plants are expected to constitute 8,000 to 9,000 MWs of this total.” (Star, 2013)

One of the main aims of the Tenth Development Plan is to reduce Turkey's energy dependency. For this reason, it puts special emphasis on coal exploration and production. The plan aims at increasing the efficiency and use of better technology in the coal mining sector. The plan states that lignite produced in the Afşin-Elbistan basin will be used for electricity generation and that mine fields with small reserves will be utilized in regional energy production plants. The plan's main aims concerning energy and coal can be summarized as follows (T.C. Kalkınma Bakanlığı 2013, pp.176–7):

- A special funding method shall be developed in order to utilize the reserves in Afşin-Elbistan basin.
- State-owned mines that are ready to be operated should be transferred to the private sector using *rödövens* contracts.
- Coal exploration activities should be intensified and reserves should be increased.
- Research and development activities that could increase the quality of domestic coal should be increased.
- Incentive programs in support for the production of electricity using domestic coal should be updated.
- State owned thermal power plants should be rehabilitated.
- Surplus energy from thermal power plants should be utilized in regional heating and in agricultural activities.

The tenth development plan makes it clear that the Government is aiming at increasing the share of domestic coal in electricity generation. The plan also makes it clear that private sector will play an important role in energy production in the coming years. Furthermore, the recent Transformation Programmes announced in 2015 state that electricity generation from non-imported coal is planned to be increased from 32 TWh in 2013 to 57 TWh in 2016, signaling a further strain on coal mines.

Summary and Conclusions

Turkey is a fast growing country with rapidly increasing energy needs. In a global perspective, world energy consumption increased approximately 30 percent between 2002 and 2012 while the energy consumption in Turkey increased by 53 percent. Turkey has important energy reserves in the form of coal. It mainly mines lignite and hard coal. While lignite has a lower energy level compared to hard coal, Turkey's estimated lignite reserves are ten times larger than the estimated hard coal reserves.

Turkey has been struggling to increase the domestic production at the same speed as the national consumption has increased. While Turkey in 2014 had become the 12th largest producer of coal worldwide, domestic coal consumption increased 10 fold in the period 1965 and 2014 and Turkey has had to import coal to meet its national needs since 1981. In 2012, the gap between domestically produced and imported coal had increased to a record level of 19.60 million tons.¹ Coal imports have contributed to Turkey's significant current account deficit; according to the World Bank, the Turkish external energy shortfall accounted for about 58 percent of its trade deficit in 2014. In order to meet the energy gap, government in its Tenth Development Plan 2014-2018 has adopted a policy aimed at increasing the production of both hard coal and lignite and the share of domestic coal in electricity generation.

*While natural resources such as coal mines cannot, according to the Turkish Constitution, be subject to private ownership, the state can transfer the right to operate mines to third parties. This is possible on condition that such a transfer comprises the whole entity covered by the original mining license. In the 1970's a practice emerged encroaching on this restriction in way of so called *rödövans* contracts. One of the reasons driving introduction and use of such contracts appears to have been the need for the Government to have an infusion of private capital into costly underground mining operations. While the use of such contracts spread rapidly in the 1980s, the Government's stance to these *rödövans* contracts has been ambivalent. The use of this type of contract only slowly found its way into legislation and was regulated in detail only in 2010.*

The share of private sector's production in hard coal increased five-fold from 2000-2013 and the share of the private sector's production in lignite increased by 50 percent from 2005-2012. One of the four Turkish state owned enterprises engaged in mining is TKİ. A significant shift has occurred in the structure of TKİ's mining operation. In 2013 it had contracted out 98 percent of the underground production to the private sector.

*In the future, the private sector will continue to play an important role in energy production. In addition to reducing energy dependency, putting emphasis on coal exploration and production, increasing efficiency and utilizing better technology in the coal mining sector, the Government policy according to The Tenth Development Plan includes the objective to transfer ready-to-operate state owned mines to the private sector using *rödövans* contracts.*

5. EMPLOYMENT STRUCTURE AND CONDITIONS

Introduction

This section aims to present a perspective on the regional labour market indicators for coal mining sector in comparison to agriculture, industry and services sectors. In what follows below, we analyze the labour market structures on a regional basis relying on the 2012 Household Labour Force Survey (LFS) provided by TURKSTAT, SSI and, other side sources and field visits to mines. Our aim is to provide a picture on the social dimensions based on data and field trips, highlighting the limited outside options for workers in the mines. Using the available data, our key labour market indicators are informality, sectoral employment, unemployment rates, youth unemployment, net monthly average earnings, and hours worked on a regional basis.

5.1 Household labour force surveys

The 2004-2012 household labour force surveys are compiled as rotating panels, each household to be visited 4 times over 18 months period. The number of households visited per month is approximately 14,000. Although labour force surveys date back to 1988, the data before and after 2004 are not comparable for the following reasons. In 2006, TURKSTAT launched address-based surveying for the household labour force surveys and it was uncovered that the total population was about 3.7 million less than what was projected by the censuses. Using the address-based surveys, TURKSTAT updated previous datasets, including 2004 in line with the correct population projections, but not the years before. These surveys include several information such as individuals' labour force status, hours worked, educational backgrounds, sector employed, formal employment status and wage earnings. The surveys are representative for the 26 regions classified under Nomenclature of Territorial Units for Statistics (NUTS) defined by the European Union.¹⁹ In addition to the micro data, we present certain trends using the aggregated statistics provided by TURKSTAT.

5.2 Employment and labour market structure

Coal mining sector constitutes only about 7.9 percent of total employment in Turkey with around 50,000 workers as of 2012 and scattered around 16 out of Turkey's 26 NUTS2 regions. The micro data pertaining to the household surveys of TURKSTAT are available in 26 NUTS2 regions, and 12 NUTS1 regions and unfortunately not in province level. Therefore, in our analysis, we rely on NUTS2 data as the most detailed breakdown.

¹⁹ There is a discrepancy in employment figures in coal mining between the household labour force surveys and annual industry and services surveys which suggest that the annual employment in 2012 was around 65,000. The discrepancy could be due to different sampling methods where the HLFS sample might not be able to capture the exact employment figures due to insufficient observations under a more detailed industry classification.

Table 8 Regional Sectoral Employment²⁰

Nuts2 Regional Classification	Employment			
	Agriculture	Industry	Services	Coal Mining
İstanbul	25,828	1,646,846	2,818,206	1,888
Tekirdağ, Edirne, Kırklareli	104,628	241,857	306,901	6,723
Balıkesir, Çanakkale	214,346	106,519	265,609	529
İzmir	143,613	448,846	830,721	1,316
Aydın, Denizli, Muğla	478,868	200,497	503,425	4,671
Manisa, Afyon, Kütahya, Uşak	515,097	237,967	356,253	9,998
Bursa, Eskişehir, Bilecik	159,061	552,772	589,065	143
Ankara	79,580	361,748	1,159,544	1,468
Konya, Karaman	234,382	181,553	322,981	1,988
Hatay, Kahramanmaraş, Osmaniye	294,923	221,024	406,171	284
Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	171,392	78,845	229,603	246
Kayseri, Sivas, Yozgat	325,667	189,648	266,213	718
Zonguldak, Karabük, Bartın	178,693	85,732	157,799	13,268
Samsun, Tokat, Çorum, Amasya	392,646	151,160	380,879	686
Erzurum, Erzincan, Bayburt	127,504	36,632	141,683	432
Mardin, Batman, Şırnak, Siirt	41,641	72,175	220,638	5,352

Source: TURKSTAT's Household Labour Force Survey, 2012

Notes:

Household labour force surveys are based on rotating sampling with population weights. The sampling might be insufficient for predictions under cross tabing, such as on regional and industrial classification. The figures therefore might be prone to errors and should be read with caution

Table 8 shows that Zonguldak, Karabük and Bartın employs the majority of the coal mining sector, followed by Manisa, Afyon, Kütahya, Uşak region and Tekirdağ, Edirne, Kırklareli region. While those regions are important for production, coal mining employment constitutes only 3.1 percent of the total regional employment in Zonguldak, Karabük and Bartın and around 1 percent of total employment in Manisa, Afyon, Kütahya, Uşak and Tekirdağ, Edirne, Kırklareli regions. In Mardin, Batman, Şırnak and Siirt region, coal mining constitutes 1.58 percent of total employment and in the rest of the remaining regions, the employment share is less than 1 percent. Not surprisingly, industry

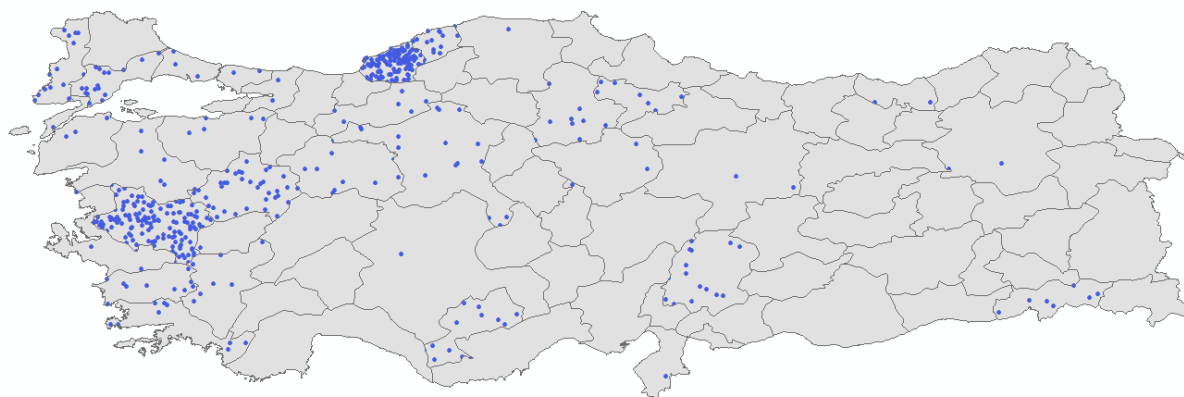
²⁰ **Notes:**

1) Regions i) Kocaeli, Sakarya, Düzce, Bolu, Yalova, ii) Adana, Mersin, iii) Kastamonu, Çankırı, Sinop, iv) Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane, v) Ağrı, Kars, Iğdır, Ardahan, vi) Malatya, Elazığ, Bingöl, Tunceli, vii) Van, Muş, Bitlis, Hakkari, viii) Gaziantep, Adıyaman, Kilis, ix) Şanlıurfa, Diyarbakır, are excluded from the analysis due to insufficient/non-existing observations on coal mining sector

2) TUIK's labour force surveys include both formal and informal employment

and services employs the majority of workers in main metropolitan regions as Istanbul, Ankara and İzmir, while agricultural employment is still the prevalent form of employment in the rest of the regions. **Figure 29** shows the distribution of coal miners at city level in 2013 from SSI data which enables us to see the concentrations around two regional clusters of coal mines: Zonguldak and Manisa.

Figure 29 City level employment in coal mines in Turkey, 2013



Source: Social Security Institution, TEPAV visualization

*Each dot represents 100 workers active in the coal sector. Dots inside city level borders are randomly placed.

In most regions, the average age in the agricultural sector is highest, between 37-50, while the average age in coal mining sector seems to be usually the lowest across 16 regions with the exceptions of i) Bursa, Eskişehir, Bilecik, ii) Hatay, Kahramanmaraş, Osmaniye, iii) Kayseri Sivas Yozgat and iv) Erzurum, Erzincan and Bayburt regions. The three regions including Tekirdağ, Zonguldak and Manisa which employ the majority of coal mining workers across Turkey, seem to employ relatively younger workers, but they do not stand out among the other regions either in terms of average age, or youth unemployment. Unemployment and youth unemployment problem is acute in Mardin, Batman, Şırnak and Siirt region while Manisa, Afyon, Kütahya, Uşak and Konya, Karaman regions have the lowest unemployment and youth unemployment rates.

Figure 30 Average age in three primary sectors and coal mining

Nuts2 Regional Classification	Average Age				Coal Mining	Unemp. Rate %	Youth Unemp. Rate %
	Agriculture	Industry	Services				
İstanbul	48.5	35.0	35.7	39.3	11	14.9	
Tekirdağ, Edirne, Kırklareli	48.8	35.8	38.6	36.3	7	12.5	
Balıkesir, Çanakkale	46.3	37.7	38.0	38.3	5	10.7	
İzmir	47.8	36.0	37.4	33.4	15	20.4	
Aydın, Denizli, Muğla	46.3	36.7	37.3	37.4	8	13.9	
Manisa, Afyon, Kütahya, Uşak	44.3	34.7	36.8	34.6	4	8.5	
Bursa, Eskişehir, Bilecik	46.9	35.1	36.2	47.0	7	12.1	
Ankara	50.0	37.1	36.7	33.2	9	15.7	
Konya, Karaman	42.8	34.2	35.9	38.0	6	9.9	
Hatay, Kahramanmaraş, Osmaniye	45.2	35.0	36.7	47.5	10	16.7	
Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	42.9	36.1	36.9	28.0	7	11.6	
Kayseri, Sivas, Yozgat	43.8	34.9	35.6	48.0	8	12.1	

Zonguldak, Karabük, Bartın	47.9	35.6	37.2	36.9	7	15.5
Samsun, Tokat, Çorum, Amasya	45.5	35.9	37.7	36.0	6	10.7
Erzurum, Erzincan, Bayburt	39.9	35.8	35.9	44.1	6	10.6
Mardin, Batman, Şırnak, Siirt	37.0	32.6	33.0	26.5	21	27.5

Source: TURKSTAT's Household Labour Force Survey, 2012

Notes:

Household labour force surveys are based on rotating sampling with population weights. The sampling might be insufficient for predictions under cross tabbing, such as on regional and industrial classification. The figures therefore might be prone to errors and should be read with caution

5.3 Earnings

Although coal mining constitutes a very small share of total employment in all the regions, the household labour force surveys show that the coal mining sector is among the highest paying sectors. The relative benchmark in fact should be the agricultural wages as most of the miners are located in the rural areas and the alternative mode of subsistence for miners are the agricultural production or migration into the city where the cost of living as well as the unemployment rates are higher. Earnings in coal mining and lignite sectors are on average more than double of the earnings in agriculture across all regions of Turkey, in some regions as high as ten folds such as in Hatay Kahramanmaraş, Osmaniye region. On the other hand, the services sector is in rivalry with the coal mining sector in terms of earnings, however, the services are naturally clustered in urban areas more densely than in rural areas where the mines are located. Therefore, we can speculate that the real earnings, net of living cost differences in coal mining sector should be higher as compared to the services or industrial sector wages.

Table 9 Net Monthly Earnings

Nuts2 Regional Classification	Average Earnings			
	Agriculture	Industry	Services	Coal Mining
İstanbul	688	1150	1535	2144
Tekirdağ, Edirne, Kırklareli	599	911	1229	872
Balıkesir, Çanakkale	591	903	1313	1333
İzmir	489	977	1282	1257
Aydın, Denizli, Muğla	488	758	1149	1279
Manisa, Afyon, Kütahya, Uşak	416	773	1183	1026
Bursa, Eskişehir, Bilecik	512	982	1242	1600
Ankara	760	1309	1654	1088
Konya, Karaman	522	806	1326	815
Hatay, Kahramanmaraş, Osmaniye	292	848	1163	2925
Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	500	981	1340	850
Kayseri, Sivas, Yozgat	581	879	1229	1025
Zonguldak, Karabük, Bartın	670	1000	1224	1554
Samsun, Tokat, Çorum, Amasya	674	827	1232	1218
Erzurum, Erzincan, Bayburt	642	1025	1472	971
Mardin, Batman, Şırnak, Siirt	677	802	1156	670

Source: TURKSTAT's Household Labour Force Survey, 2012

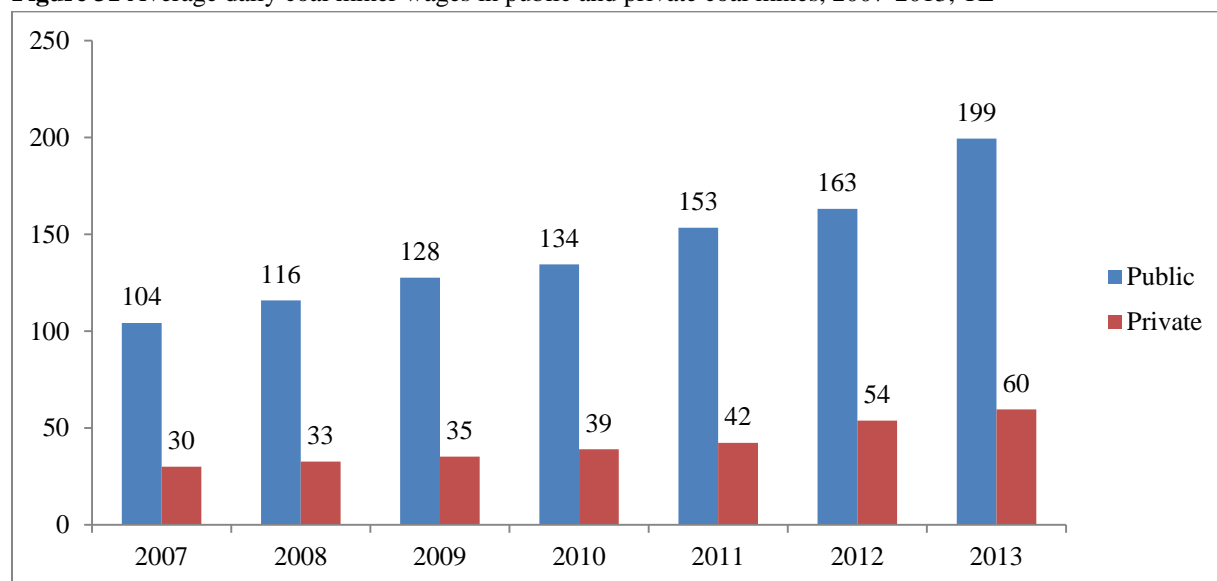
Notes:

Household labour force surveys are based on rotating sampling with population weights.

The sampling might be insufficient for predictions under cross tabbing, such as on regional and industrial classification. The figures therefore might be prone to errors and should be read with caution.

When juxtapose wages of coal miners employed in public or private enterprises are juxtaposed, a significant difference can be observed. Between 2007 and 2013, coal miners working in public mines appeared to be earning more than thrice the wages of miners in the private mines. Even though some of this gap may be attributed to under-reporting by private companies to cut costs on social security premiums, it is well known that miners employed in state operated coal mines have better wages in Turkey. **Figure 31** compares the evolution of coal miner's daily wages between 2007 and 2013.

Figure 31 Average daily coal miner wages in public and private coal mines, 2007-2013, TL



Source: Social Security Institution, Yearly Statistics

Neither official data, nor our field visits unfortunately give us an informative picture on the modes of wage payments in the mining sectors. While the majority of the authorities in the mines we visited reported making electronic payments to workers' bank accounts, we have been also informed by the claim that in some private run mines, the workers are being paid in their bank accounts but then they are asked to refund around 300-400 TL in cash. While it is uncertain how prevalent this practice has been historically across different regions in Turkey, the authorities we interviewed highlighted that some private mines increasingly started relying on this illegal practice due to falling profits after the recent legislation that raised the minimum wage for coal miners.

5.4 Hours worked

Hours worked in Turkey are exceptionally high in Turkey compared to many OECD countries where Turkey is a member. According to OECD statistics, Turkey ranked first with average 47.7 hours worked per week, followed by South Korea with 44.5 hours in 2014. This could perhaps be hardly surprising as Turkey has not ratified some working time standards such as the ILO Hours of Work (Industry) Convention, 1919 (No.1), the Night Work Convention, 1990 (No.171), and ILO Part-Time Work Convention, 1994 (No.175). Even in the agricultural sector where there is very high seasonality, the Turkish labour force surveys indicate that weekly hours worked (average of 16 regions) is an outstanding 41.5 hours. Hours worked are highest in industry with 52.4 hours, followed by 50.9 hours in coal mining and 50.4 hours in services. In general, not only the average earnings but also the

weekly hours worked in the coal mining sector seems to be slightly more favourable as compared to hours in industry and in some regions, hours worked in services despite the fact that working conditions across sectors are incomparable. Naturally, average working hours are much shorter in agricultural sector, but so are the earnings.

Hours worked and overtime are regulated in Articles 41-43 of Turkish Labour Law, Articles 398 and 402 of Law of Obligations and by “the Regulation on Overtime Work and Working Extra Hours” dated 6.4.2004. The Law sets a maximum of 45 hours per week for normal working time. These hours can be distributed in various ways within the week. Hours in excess of 45 hours is considered as overtime (article 41). Maximum daily work time, on the other hand, is 11 hours. Workers working in excess of 11 hours in a day are entitled to increased earnings or. Employee’s consent is obligatory for overtime work. Maximum overtime work in a year is limited to 270 hours (article 41). Overtime, on the other hand is not allowed in underground and underwater environment such as in mining, cable wiring and tunnel construction (article 7 of the Regulation). Similar arrangements are outlined in article 41 of recently introduced Labour Law (Law no. 6552): “*Other than conditions mentioned in articles 42 and 43 of this law, overtime work is not allowed in mine works.*”

The law sets the lower limits of overtime wages as 50 percent more than regular hourly wages. This ratio can be increased in favour of workers and there is no upper limit for this increase. Extra hour wages are paid by increasing regular hourly wages by 25 percent (article 41). In lieu of overtime wages, workers can opt to receive 30 minutes leave for every hour of overtime work and 15 minutes for every hour of work in extra hours. In such cases, workers should apply to the employer in writing and the employer should allow that this leave time to be used within six months (article 6 of the Regulation). However, workers cannot request leave time in force majeure cases and in extraordinary situations. They receive overtime wages in such cases.

Certain amendments were made in the Labour Law after the Soma mining accident. Accordingly, demanding overtime in underground mining operations is prohibited; the daily working time is limited to 7.5 hours and the weekly working time to 37.5 hours. Workers working in underground mines for lignite and hard coal extraction are entitled to double the minimum wage. If the maximum weekly working time of 37.5 hours at mining workplaces is not complied with, the employer is subjected to an administrative fine of 1200 TL.²¹ In cases of violation of the rule that the wages of workers employed at lignite and coal mines not be lower than the amount of two months' minimum wage, an administrative fine of 125 TL is imposed on the employer for every worker and every month.²² Moreover, workers in the mines are entitled to 100 percent increased wages for overtime work (any work in excess of 37.5 hours) in force majeure cases and extraordinary situations (article 41/10).

The highest average weekly hours worked are in Tekirdağ, Edirne and Kırklareli region with a staggering 61.3 hours, followed by Kırıkkale, Aksaray, Niğde, Nevşehir and Kırşehir region. In none of the regions, average hours worked weekly in services and industrial sectors seem to surpass 60 hours. Hatay, Kahramanmaraş, Osmaniye, Zonguldak, Karabük, Bartın and Samsun, Tokat, Çorum, Amasya regions have the lowest weekly hours worked, perhaps reflecting the impact of higher public share in production and more established institutional profiles.

²¹ Article 104 of the Labour Law.

²² Article 102 of the Labour Law.

Table 10 Net monthly earnings
Nuts2 Regional Classification

	Hours Worked			
	Agriculture	Industry	Services	Coal Mining
İstanbul	46.8	51.3	49.5	47.6
Tekirdağ, Edirne, Kırklareli	36.7	48.1	48.1	61.3
Balıkesir, Çanakkale	50.1	51.3	51.1	48.0
İzmir	40.1	48.8	47.5	45.7
Aydın, Denizli, Muğla	41.7	50.8	51.8	52.7
Manisa, Afyon, Kütahya, Uşak	46.1	50.6	48.3	48.0
Bursa, Eskişehir, Bilecik	50.7	49.5	49.8	48.0
Ankara	44.5	51.9	47.7	50.9
Konya, Karaman	40.1	53.5	51.0	53.9
Hatay, Kahramanmaraş, Osmaniye	33.7	50.3	52.4	44.0
Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	35.0	55.1	50.2	60.0
Kayseri, Sivas, Yozgat	37.6	53.7	51.6	56.0
Zonguldak, Karabük, Bartın	31.8	53.7	52.2	46.4
Samsun, Tokat, Çorum, Amasya	40.2	52.4	48.7	45.0
Erzurum, Erzincan, Bayburt	39.2	59.8	50.9	55.6
Mardin, Batman, Şırnak, Siirt	49.7	57.7	55.4	51.8

Source: TURKSTAT's Household Labour Force Survey, 2012

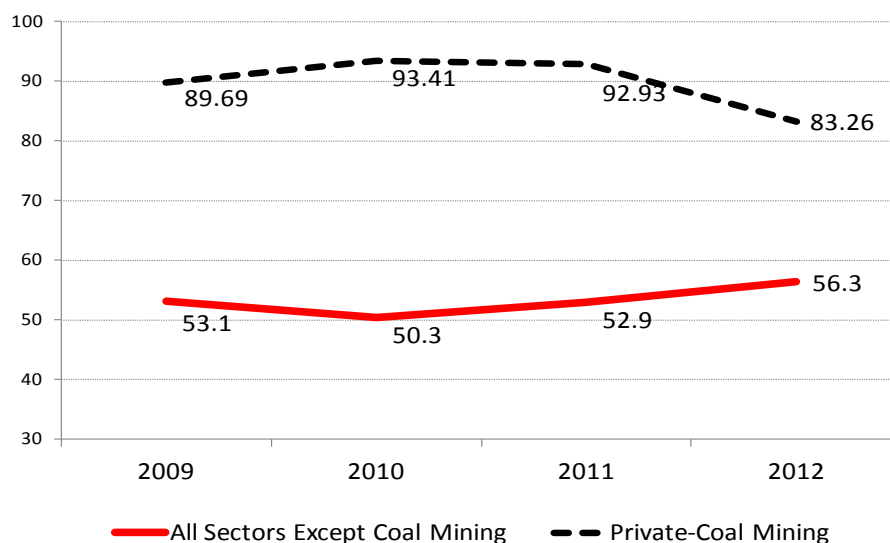
Notes:

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5.5 Prevalence of informal employment structures

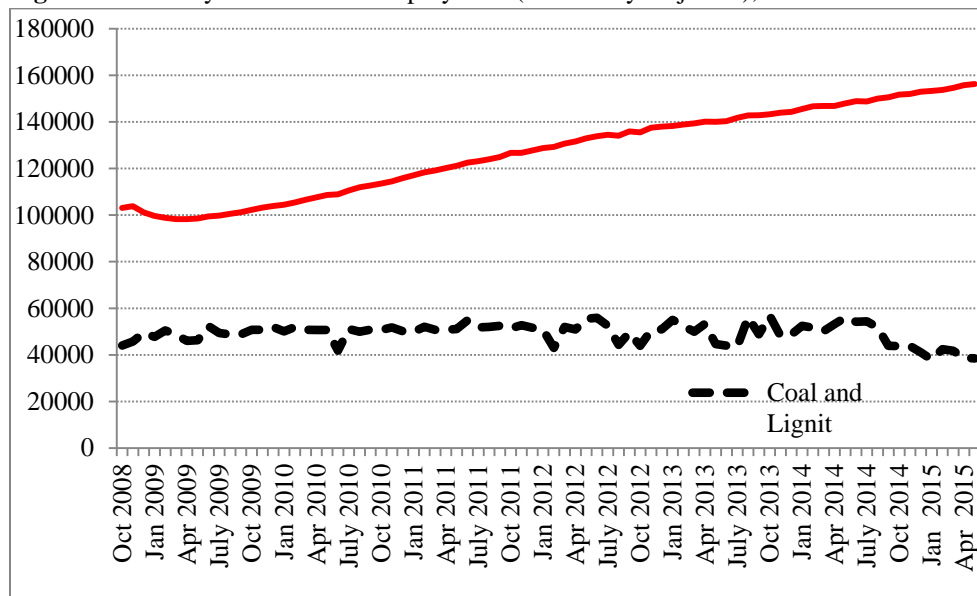
A quick glance at labour force surveys reveals that the informality rates - that is workers without any social record and protection - was recorded as 83.6 percent in agriculture, 28.1 percent in industry, 22.7 percent in services and 13.1 percent in coal mining sector as of 2012.²³ The practices of informality in coal mining therefore seem to be much lower than in other sectors and the Turkey average which is was around 39 percent in 2012. Nevertheless, it is worth noting that while Turkey has gained success in increasing the share of formal employment overall in the economy, the statistics show that the percent of workers employed in *private mines* with social security registration has shown a steep decline between 2010 and 2012, by the order of 10 percentage points.

²³ Due to the insufficient power of survey sampling, cross-tabbing formality rates across regions and sectors might provide unreliable and noisy estimations since the number of observations are too small in such detailed breakdowns. We therefore present the formality rates across sectors in Turkey, rather than in a regional basis.

Figure 32 Percent of Employment with Social Security, 2009-2012

Source: TURKSTAT's Household Labour Force Surveys, 2009-2012

SSI's data on monthly registered employment provides further evidence regarding the declining formality rate in the coal mining sector. The institution provides monthly statistics on sectoral and province level formal employment since 2008.²⁴ While the total number of people working as formally registered to the social security accounts across all sectors has been steadily increasing, this is unfortunately not the case in the coal mining sector. Formal employment also appears to show more volatility starting from 2012.²⁵

Figure 33 Monthly Total Formal Employment (Seasonally Adjusted), 2008-2015

²⁴ SSI's sectoral and total employment figures are not one to one in line with TURKSTAT's figures because the latter includes both the formally and informally employed while former only accounts for those who are registered in official accounts.

²⁵ The figures are seasonally adjusted using the Tramo/Seats method.

Source: Social Security Institution

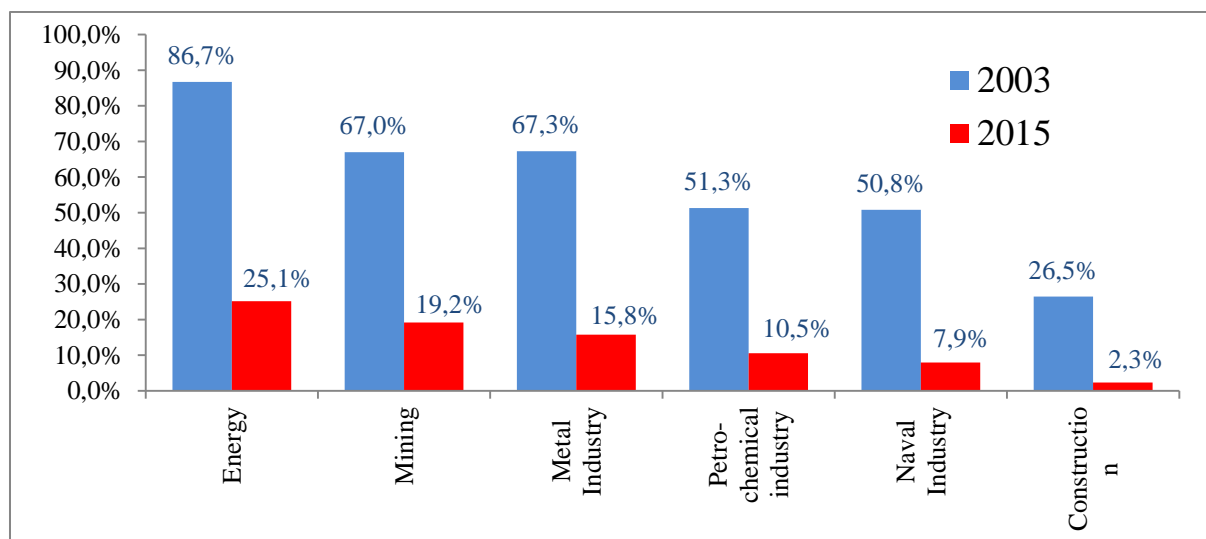
Gang-Masters in Mining: Dayıbaşı System

As a general sign of increasing informal modes of employment, following the Soma tragedy, the informal subcontracting system that was found to be rampant at the privately operated coal mines came into the spotlight. This informal web of relations that are established as a mechanism of recruiting sub-contracted miners is called ***Dayıbaşılık*** and can be translated roughly as a system of overseers or gang-masters. Identical forms of recruitment also exist in agriculture and construction sectors of Turkey, though under different names.

Dayıbaşılık functions as a very strict hierarchical system where a *dayı* brings sometimes hundreds of miners to a coal mine to be recruited. Even though these workers become officially employed by the *rödöfans* contractor, in reality they get separated into teams of 30 to 60 workers which report directly to the *dayı*. There also exist chains of command within each team usually consisting of three to four ranks, with varying salaries. By some accounts, *Dayıbaşıs* may earn up to ten to twenty times of a lowest level worker's wage. This is because, in parallel with the *rödöfans* system which favors maximum production of coal, those that are higher up in the chain of command earn their wages in a premium system that is calculated separately for each team. As a result, there occur immense levels of pressure on the bottom ranks to increase production, often times through cutting corners of occupational safety and health practices. Dissenters to the draconian system are rapidly cut loose, as internal conflict is reported to damage a team's morale and lead to lower levels of production. *Dayıs* can find replacements very quickly due to their local ties, vast networks, and the lack of alternative sources of employment for the locals. The *Dayıbaşılık* system proves elusive and hard to penalize primarily because, on paper, all workers are employed by the rightful operator of the coal mine and all documents appear to be by the book.

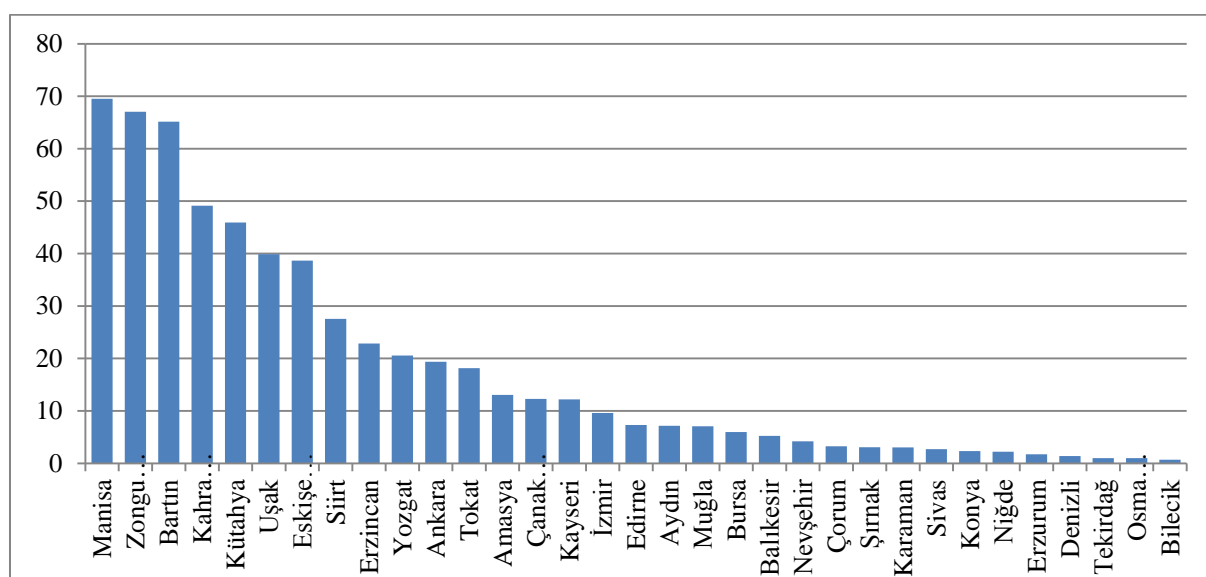
The Parliamentary Commission Report on Soma Incident states that while the subcontracted workers are formally registered in the social security accounts and paid wages by the mining firms, the earnings paid to the miners are reduced and the deductions are paid out to the *Dayıbaşıs*. The report highlights that *Dayıbaşıs* have very strong bargaining powers since they completely control the stock of trained and experienced miners and hence are being awarded and protected by the mining firms (2014; page 1153). The Parliamentary report suggests that in the case of Soma, there were rumors that the firm earmarked about 2,500 TL each month from *Dayıbaşıs*' earnings; 1,000 TL to be paid to Soma Municipality Sport, 1,000 TL for the union membership fees and 500 TL for the solidarity account. Hence the report points out to the possibility of very high *Dayıbaşı* earnings and puts forward as policy recommendation that the bank accounts and property holdings of the people known as *Dayıbaşıs* should be thoroughly investigated.

A criticism that was raised by both the stakeholders in our meetings and by employee representatives from all sectors in general, the unionization rates have been falling steeply in Turkey in the last 10-15 years. The SSI statistics show that while the overall unionization rate was 67 percent in the mining sector in 2003, it dramatically fell down to 19.2 percent by 2015. And this decline was not limited to the mining sector; the levels of unionization declined in a similar way in the energy, metal, petrochemical, naval industries as well as in the construction sector.

Figure 34 Unionization Rates in Selected Sectors, 2003-2015

Source: SSI

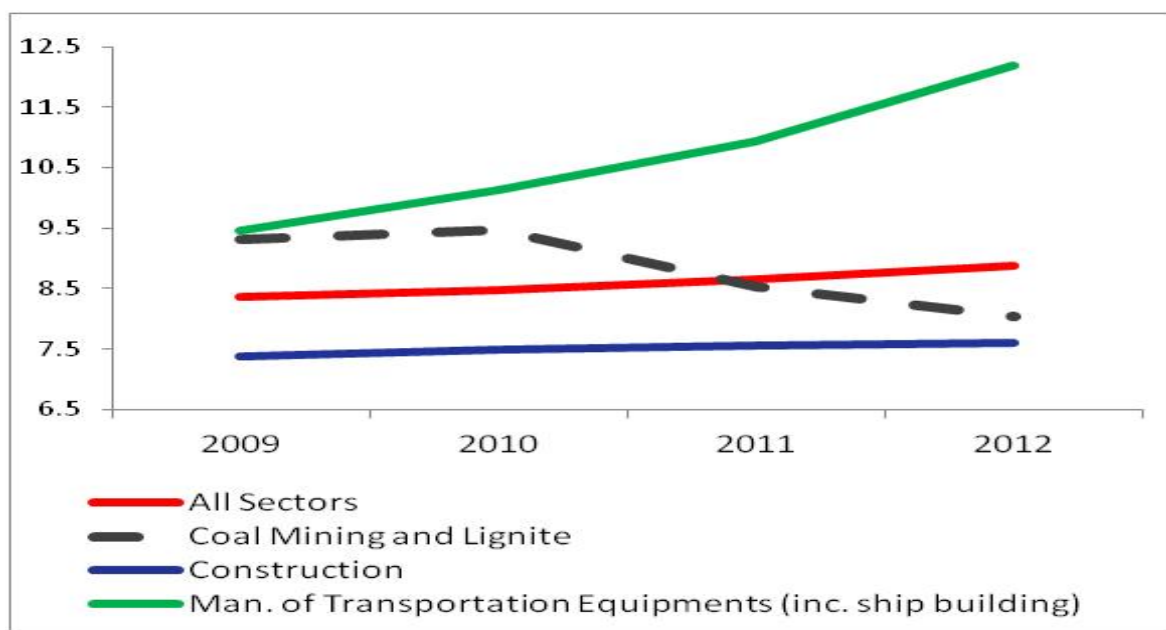
It is worth noting that while the unionization rate has been declining in the mining sector overall, unionization rates across provinces show that in regions where the more established mines are located, rates are as high as 70 percent, such as in Manisa and Zonguldak. Although we lack sufficient data to build a causal argument, low rates in other regions might be associated with the “rush to coal” and increasing prevalence of subcontracting practices in the recent years. While there is inconclusive evidence on the impact of unionization on increased OSH standards in the empirical literature, unionization might help safety standards through different channels, a point which we revisit in Section 6. In the case of Turkey, the relationship between the falling unionization rates and increased fatality rates across sectors remains as a very important research question.

Figure 35 Unionization Rates in Mining Sector by Provinces, 2015

Source: Social Security Institution

There are other general macro trends that provide some support for the “rush to coal” argument. Turkey, with its dynamic young population managed to increase the average years of schooling in the last two decades thanks to reforms such as, notably, raising compulsory education to 8 years. Therefore, the general trend points towards a labor force profile, with improved schooling (see Figure 36) . In coal mining, however, we see a steep decline in this respect in the recent years - which is in stark contrast with improvements in other sectors. Moreover, in the manufacturing of transportation equipment sector, which includes shipyards with high fatality rates, the average years of schooling seems to have increased significantly. In construction sector, which is also a sector with high fatality rates, average years of schooling also in an increasing trend, albeit being significantly lower than the general labour force. What is also striking is that while the average years of schooling in coal mining was higher than the Turkey average up to 2010, it fell below the mean by 2011.

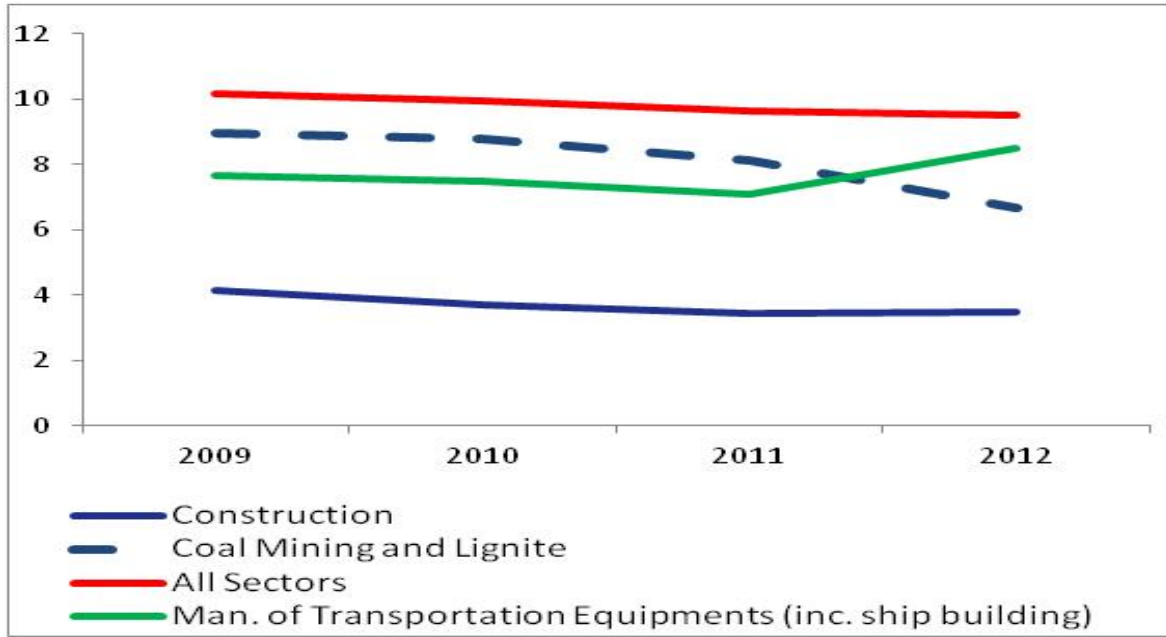
Figure 36 Average Years of Schooling in Selected Sectors, 2009-2012



Source: TURKSTAT's Household Labour Force Surveys, 2009-2012

The flip side of a relatively young population is that the average years of experience of the labor force might decline depending on the demographic structure. This is what we can observe in Turkey as Figure 36 shows.

Coal mining, yet again stands out with a strong declining trend. in comparison with other sectors. The manufacturing of transportation equipment sector once again shows an improving trend, perhaps reflecting also the recent regulations after the Tuzla catastrophe. So the recent trends point out to an average worker profile that has poorer educational qualifications and less years of experience in the mining sector. As we will revisit in section 6, skill mismatches between the tasks required and worker capabilities are documented to have negative impact on OSH, even if the firms undertake full technological investments to improve safety standards, as workers with poor education and training are less likely to handle the complexity of the new technologies.

Figure 37 Average Years of Experience in Selected Sectors, 2009-2012

Source: TURKSTAT's Household Labour Force Surveys, 2009-2012

Summary and Conclusions

In terms of formal employment the hard coal and lignite sectors play a minor role in terms of their shares in total sectoral employment in all regions. Regionally the shares of coal mining in the northern regions of Zonguldak, Karabük and Bartın regions were the highest across Turkey with 3.1 percent while the shares of Mardin, Batman, Şırnak in the south and Manisa, Afyon, Uşak, and Tekirdağ in the west and Kütahya, Edirne, Kırklareli in other parts were around 1.6-1 percent in total sectoral employment. In the remaining regions, employment in mining is less than 1 percent. In the major metropolitan regions; industry and services employs the majority of workers while agricultural employment is still the prevalent form of employment in the rest of the regions. Unemployment and youth unemployment problem is acute in Mardin, Batman, Şırnak and Siirt region with an exceptional 21 percent and 27.5 percent while Manisa, Afyon, Kütahya, Uşak and Konya, Karaman regions have the lowest unemployment and youth unemployment rates, which stood at 4 percent and 8.5 percent and 6 and 9.9 percent.

According to LFS the coal mining sector is among the highest paying sector across Turkey with few exceptions. The average monthly coal mining earnings were the highest in Hatay, Kahramanmaraş and Osmaniye regions (app. 2930 TL) and the lowest in Mardin, Batman, Şırnak and Siirt (app. 670 TL). The latter regions also have high unemployment rates but relatively to the rest of Turkey a lower cost of living. According to the figures of the SSI, earnings in the public mines are at least three times higher than the earnings in the private mines. While the service sector seems to offer earnings comparable to those provided in coal mining, the fact that most mines are located at rural areas make the earnings in the agricultural sector a more suitable benchmark for outside options for the miners. Yet, in almost all regions, coal mining earnings are twice to three times higher than the agricultural earnings, albeit with significantly longer working hours as well as higher risk for exposure to occupational hazards.

The hours of work in Turkey are generally high in an international comparison and working hours in coal mining are no exception. The longest average weekly hours worked are in Tekirdağ, Edirne and Kırklareli region with an average of 61.3 hours, while Hatay, Kahramanmaraş, Osmaniye, Zonguldak, Karabük, Bartın and Samsun, Tokat, Çorum and Amasya regions are recorded to have the shortest working week with around 44-46.4 hours.

According to recent legislative amendments, the daily working time in mining has been limited to 7.5 hours and the weekly working time to 37.5 hours and it is prohibited to demand overtime in underground mining operations. Furthermore, workers engaged in underground mines for lignite and hard coal extraction are now entitled to at least twice the minimum wage.

Different sources of data on the employment structure point out to “rush to coal” problem. The LFS point out to declining average years of schooling as well as years of experience in the mining sector. Another issue that was raised on several meetings with stakeholders is the dramatically declining rates of unionization, not only in the mining but also across all other sectors in Turkey. The LFS also give some indications regarding the levels of informal employment practices - that is workers engaged without any social record and protection. According to the LFS it was recorded as 83.6 percent in agriculture, 28.1 percent in industry, 22.7 percent in services and 13.1 percent in coal mining sector, however in recent years, there has been a decline in the formal employment rates in private mines.

It has been reported, but not officially documented, that the reported levels of informal employment in coal mining would grossly underestimate the actual situation due to the existence an informal subcontracting system called the Dayıbaşılık system. This system is similar to the gang-master system known in other parts of the world. While such forms of recruitment also exist in the agriculture and construction sectors of Turkey, the prevalence and reported impact of the Dayıbaşılık system in coal mining was brought into focus in the aftermath of the tragedy in the mine of Soma Holding Inc. where this practice was alleged to be rampant. As noted above, according to available sources, this system has the particular effect of creating a high pressure on the lowest rung of workers to increase production, which increases the risks for cutting corners in terms of OSH practices. Dissenters to the system are rapidly cut loose, and the operators of this system can easily find replacements due to their local ties, vast networks, and the lack of alternative sources of employment for the locals. The Dayıbaşılık system has proven elusive and hard to penalize primarily because, on paper, all workers are employed by the rightful operator of the coal mine and all documents appear to be by the book.

6. LEGISLATIVE FRAMEWORK FOR MINING

Introduction

In the following, the normative context in which the coal mining industry operates is examined. In order to shed light on the frameworks for OSH in all the stages of the coal mining value chain this section breaks down the duties, responsibilities and obligations of all actors (i.e., the state, employers, workers, and worker organizations) across different contractual arrangements in the coal mining sector laws and regulations in effect. This examination will include a review of the particular exploitation regimes which has allowed for private entities to become involved in these activities (including the rdvans system). It should be noted however, that, with the exception of state enterprises and subsidiaries, further rdvans contracts in underground mines have been banned as of February 18, 2015. This section also includes a brief review of the regional and international normative framework including reference to the most recent guidance provided by the ILO supervisory regarding the application of the ILO Conventions.

6.1 Overview of the normative structure

The normative structure governing the OSH in the coal mining sector in Turkey has a national and an international dimension. In terms of *general national laws and regulations* Turkey has, over the past fifteen years, been engaged in a process of reform, harmonizing its national OSH system both with relevant EU and ILO standards regarding national as well as enterprise level requirements for prevention and risk assessment. The EU Directive 89/391 and the ILO Occupational Safety and Health Convention, 1981 (No. 155)²⁶ have been central in this context. This process was initiated in 2003 with the incorporation of basic legal OHS arrangements into the Labour Law (Act No. 4857) (Labour Law) and was followed up with the adoption of the new stand-alone OSH Law in 2012. The overhaul of related regulations and by-laws was recently concluded. This process also created a basis for Turkey to be able to ratify relevant ILO Conventions including not only Convention No. 155 but also the Occupational Health Services Convention, 1985 (No. 161)²⁷ as well as, more recently, the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187).²⁸ Turkey ratified the Labour Inspection Convention, 1947 (No. 81) already in 5 March 1951.

The *exploration and exploitation* in the mining industry is governed by Act No. 3213 of 1985 (the Mining Law). While this Act originally was adopted some 30 years ago it has been regularly amended, most recently 18 February 2015 by Act No. 6592 (Amendment Law). The recent overhaul of the bylaws to the OSH Law included a revision of the Regulation on occupational safety and health in mining enterprises (No. 28770) was adopted 19 September 2013 (Mining Safety Regulations). It contains in a generally applicable body of provisions with further specific requirements regarding surface mining, underground mining, and mine extraction through drilling. This regulation makes express reference to EU Directive 92/104/EEC (03/12/1992)- Minimum Requirements for improving the safety and health protection of workers in surface and underground mineral/extracting industries, and Directive 92/91/EEC (03.11.1992) - Minimum requirements for improving the health and safety protection of workers in the mineral extracting industries through drilling. The Mining Safety Regulations have also been amended - most recently as of 10 March 2016. In the same month Turkey

²⁶ Ratified 22 April 2005. Entry into force 22 April 2006

²⁷ Ratified 22 April 2005. Entry into force 22 April 2006.

²⁸ Ratified 16 January 2014. Entry into force 16 January 2015.

ratified the ILO Safety and Health in Mines Convention, 1995 (No. 176)²⁹. Some of the amendments made were to ensure compliance with this Convention.

ILO Conventions are subject to a system of regular supervision based on reports of the Government³⁰ and comments by representative organizations of employers and workers.³¹ This supervision is intended to serve as guidance to the parties on how to ensure a proper implementation of the Conventions and gives an additional insight into the substantive content of the relevant Conventions. As will be further discussed below,³² the ILO supervisory bodies have commented on the application by Turkey of Conventions Nos. 81, 155 and 161 in November 2014.³³ The case of Turkey's application of Convention No. 155 was also examined at the ILO Conference in June 2016.³⁴

6.2 The legislative framework for mining

6.2.1 General context and competent authority

As noted previously, all kinds of substances naturally found on earth and in springs that have an economical and commercial value³⁵ are owned by the State, not by the owners of the land where they are found. The State thus also has the exclusive right to explore, extract and operate facilities related to mineral resources. In addition to the Constitution, the Mining Law and the Mining Regulations, relevant legislation includes a series of other regulations.³⁶

The competent authority is the Ministry of Energy and Natural Resources (MENR) which is responsible for preparing and implementing energy policies, plans, and programs in co-ordination with related government institutions, as well as for issuing secondary legislation concerning mining activities such as regulations and communiqués. MENR has two main General Directorates the General Directorate of Mining Affairs (MiGEM) which is authorized to issue mining licenses and to implement applicable legislation and the General Directorate of Mineral Research and Exploration (MTGM) which conducts scientific and technological research on mineral exploration and geology. As will be further detailed below, the competent authority in terms of OSH is the Ministry of Labour and Social Security (MoLSS).

In terms of distribution of responsibilities in the different stages of mining operations between these two ministries, the basic principle is that MENR is responsible for mines during the licensing processes until the start of operations and MoLSS (and the LIB) for mining operations in action. This

²⁹ Ratified 23 March 2015. Entry into force 23 March 2016.

³⁰ Questions arising under these reports should be examined in consultation with representative organizations of employers and workers in accordance with Turkey's undertakings pursuant to the Tripartite Consultation (International Labour Standards) Convention, 1976 (No. 144).

³¹ <http://www.ilo.org/global/standards/applying-and-promoting-international-labour-standards/lang-en/index.htm>

³² See subsection 5.8.2.

³³ http://www.ilo.org/dyn/normlex/en/f?p=1000:11110:0::NO:11110:P11110_COUNTRY_ID,P11110_CONTEX T:102893,SC

³⁴ http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_375764.pdf

³⁵ The exploration and exploitation of petroleum, gas, geothermal and water resources are excluded from the scope of the Mining Law and is regulated elsewhere.

³⁶ Relevant secondary legislation includes the Regulation on the Implementation of Mining Activities (Implementation Regulation) No. 27 751 of 06.11.2010 (A revision of these regulations is currently being considered, the Regulation on Mining Activity Permits (Permits Regulation) No. 9013 of 2009, the Environmental Impact Assessment Regulation No. 29186 of 29.11.2014, the Workplace Opening and Operation Licenses Regulation No. 25902 of 10 August 2005 and the Occupational Health and Safety at Mining Workplaces Regulation No. 28770 of 19 September 2013.

principle is not entirely clear cut, however. For example, Art 29³⁷ of the Mining Law (which is under the authority of MENR) gives authority to (presumably MiGEM) to suspend operations if threats to life or property have been noted and not remedied within a six months grace period. How this authority is exercised in practice is not clear nor whether this authority is carried out in cooperation with MoLSS. Furthermore, according to a recent amendment to the Mining Law a new Article 10 was added which provides that regulations on the implementation of the Mining Law shall be enforced by the MENR and that the opinion of the MoLSS shall be taken for the acceptability of regulations that are related to OSH and that concern mandatory structural and technical issues that need to be incorporated in the operational project.³⁸

Of particular relevance in context of this study are the organizational structures under which mines are operating including subcontracting arrangements as well as those which allow for involvement of private entities under so called “*rödöfans sözleşmesi*” or *rödöfans* contracts. These will be outlined below, after a summary review of the licensing procedures.

6.2.2 License procedures

6.2.2.1 Exploration licenses

Applications for exploration licenses are handled by MiGEM which will notify the applicant of sites available for exploration in the requested area within two months of the date of application. The first year in the exploration process is a *pre-exploration* period. Within this period a pre-exploration activity report must be submitted to MiGEM. Otherwise the pre-exploration license will be cancelled. Pre-exploration license holders can apply for a subsequent two-year *general exploration* license. The general requirement is again to report to MiGEM by the submission of a general exploration activity report, subject to a cancellation of license. Such license holders are then eligible for a four year *detailed exploration license*. During this period yearly reports of the exploration results must be submitted to MiGEM.

Mine workers engaged in exploration activities are covered by the OSH law.³⁹ It is not entirely clear however whether and to what extent MoLSS and LIB carry out inspections of sites at this stage. However, an additional level of protection for the workers has been introduced with recent legal amendment requiring applicants for exploration licences to take out an “Obligatory Individual Accident Insurance for Mine Workers” against the risk of accidents for their personnel. Before such a policy can be granted, policy insurance experts normally carry out a risk based examination of the workplace. The examination is repeated within 6 months after the start of the insurance policy. If the entity does not meet the minimum requirements, the request of insurance policy is rejected and MiGEM will be notified and the exploration activities can be suspended.⁴⁰

The requirements for signing such a policy also includes demonstrating compliance with the Regulation Concerning Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/AT) dated 30 December 2006, No. 26392 prepared in line with the EU Directive 94/9/EC (ATEX directive)(ATEX regulations).⁴¹ The purpose of this Regulation is to determine the principles regarding the safety rules and conformity assessment procedures for equipment and

³⁷ It should be noted that this Article was recently changed.

³⁸ Amendment of 4 February 2015 No. 6292/23 art.

³⁹ According to Art 3 (1) h) of the OSH law “workplaces” are defined as “any organization in which material and non/material elements and workers are organized in order to produce goods and services [...]”

⁴⁰ Decision No. 2015/29259 of the Council of Ministers 6 February 2015 No: 29259.

⁴¹ In line with recent amendments, however, these requirements have been relaxed until 31.12.2019. Amendment of 24 June 2015 to Decision No. 2015/29259 of the Council of Ministers 6 February 2015.

protective systems used in an explosive atmosphere. According to the related EU directive, Member States shall take all appropriate measures to ensure that the equipment, protective systems and devices are placed on the market and put into service only if: they have been properly installed and maintained and used for their intended purpose: they do not endanger the health and safety of persons and, where appropriate, domestic animals or property. This regulation came into force in Turkey in December 2006. The Ministry of Science, Industry and Technology is responsible for monitoring the use of the equipment in question in the domestic market. The Council of Ministers decided on 4 August 2015, No. 29435 that the requirement to replace inappropriate equipment and protective systems with appropriate ones was postponed to 31/12/2019 both for underground mines which have a potentially explosive environment due to firedamp and/or flammable gases or dust as well as aboveground facilities of such coal mines. In line with this relaxation, compliance with the ATEX Regulations has been relaxed in the policy requirements too.

6.2.2.2 Operating license

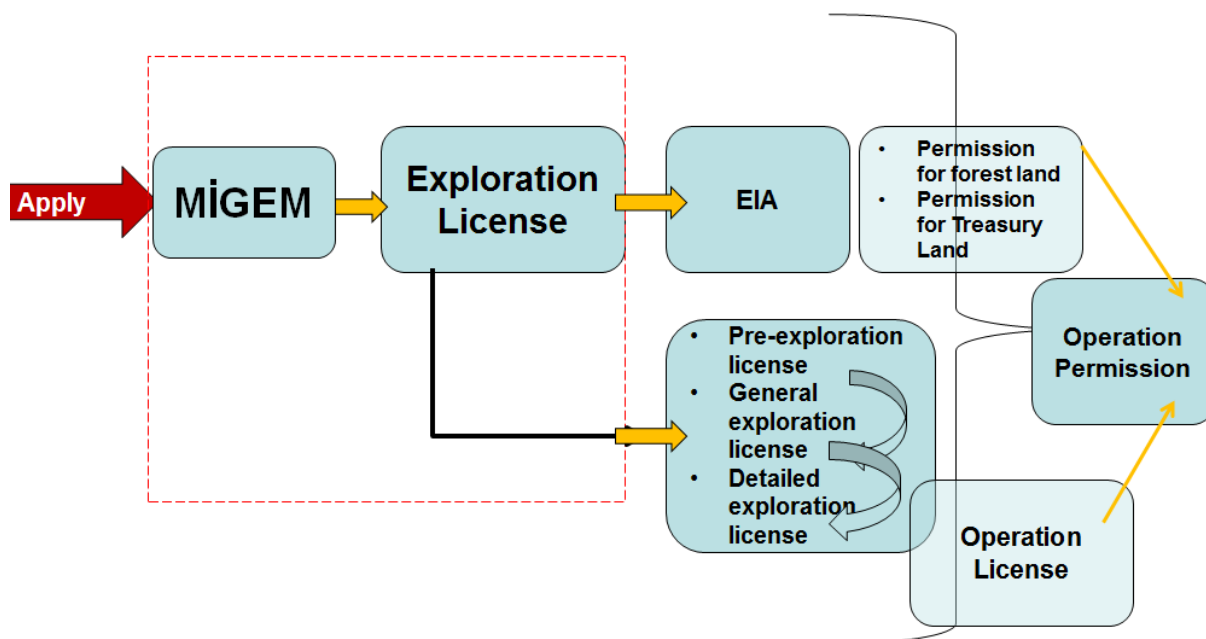
The subsequent stage in the licensing process is to apply for an *operating license*. To get an operating license the applicant must submit project documentation to MİGEM which should include relevant documentation proving the technical and financial feasibility of the project including a suitable guarantee for the fulfillment of its undertakings. The applicant must also pay the fees laid down in the law. It is not clear whether the grant of an operating license is dependent on a technical site inspection by MiGEM in law and in practice or whether the procedures for granting operation licenses are based on submitted (written) documentation only.

Extraction activities must be carried out in accordance with the project as granted and changes in the production methods in open or underground pits must be reported to MiGEM before implementation. Otherwise, the operations can be suspended. According to a new amendment of the Mining Law (February 2015), any such information regarding changes in production methods etc. notified to MiGEM must be shared with MoLSS. By another amendment, in addition to the suspensive authority of MiGEM, MoLSS has also been granted an authorization to suspend operations where there is overproduction and production which is not in compliance with the production and manufacturing plans.⁴²

The minimum duration of an operation license for coal mines is 10 years which can be extended. A license duration extending beyond 50 years requires an approval of the Council of Ministers.

⁴² New paragraph 7) to Article 25 of the OSH Law.

Figure 33: Licensing Process for Coal Mines in Turkey



6.2.2.3 Workplace opening and operation permit

The start-up of a business venture always require the obtention of an *workplace opening and operation permit*, which is handled by the local municipalities where the business venture would be operating.⁴³ When an operating license has been obtained an application for a workplace opening and operation permit must be submitted. Getting such a permit will depend on the obtention of certain authorizations depending on the scope and location of the activity. Underground mining projects may also be subject to the EIA regulations⁴⁴ which may include the conduct of an Environmental Impact Assessment (EIA). Whether or not the EIA regulations will apply, also depends on the size and scope of the operation. However, if an EIA has been carried out, it would appear that the applicant will be granted a workplace and operation permit upon simple submission of an application. Inspections of such ventures fall under the authority of MoLSS and the Labour Inspectorate (and MiGEM based on Article 29 of the Mining Law), although the local authorities retain a right to monitor the business ventures as needed. In practice this appears not to be done.

If no EIA has been carried out the venture will be subject to a technical control by the local municipalities within one month of operation. It is not entirely clear whether special expertise is required by the municipalities at the provincial level who carry controls of mines. But this technical control should include (but not be limited to) a control of compliance with relevant OSH requirements in the Mining Laws and Regulations.

Workplace opening and operation permits are granted subject to the results of the control. If a non-compliance with legislation or any other deficiencies are noted in the course of the control the applicant is given 15 days to remedy the deficiencies. If the deficiencies have not been remedied within this period, the workplace opening and operation permit can be cancelled and the workplace closed down.

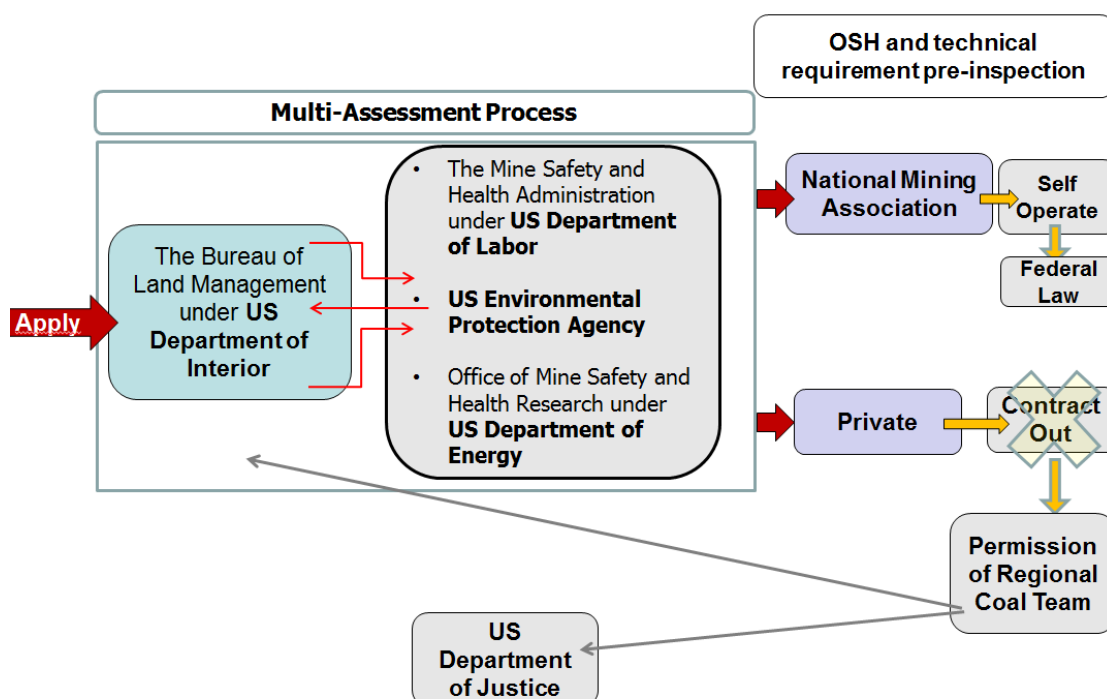
⁴³ The Workplace Opening and Operation Licenses Regulation No. 25902 of 10 August 2005.

⁴⁴ Regulation No. 29186 of 25 November 2014.

6.2.2.4 The Licensing Process of Coal Mines in the USA

Against this background, and by way of comparison, it is relevant to have a brief international outlook and refer to the licensing process in the USA. In the USA the regulatory authority of federal coalmines is the US Bureau of Land Management. Before a licensing tender is issued, the coalmine itself will undergo a rigorous assessment on its suitability for production. As regards the evaluation of the feasibility of a license for a coalmine, several factors are taken into account, including the impact of extraction on the environment and the regional economy and whether the production process will meet OSH criteria and an assessment is made whether the risk of production coal exceeds the market value. In this process the Bureau of Land Management applies a multi-dimensional premise inspection mechanism taking into account OSH and other criteria in coordination other entities such as the Mine Safety and Health Administration under the US Department of Labor, US Environmental Protection Agency, Office of Mine Safety and Health Research under the US the Department of Energy, etc. The subsequent actual licensing procedures are initiated on a competitive base. If an application is made for a subsequent transferal of the operation license of a mine site to a second or third party, this application is also subject to the US Bureau of Land Management's strict evaluation process. On issues regarding the legality of a contract, the US Bureau of Land Management may also refer to the US Department of Justice. In addition, in some cases, regional entities may also be involved in the process. In such cases, the Bureau of Land Management will be in contact with other government agencies, and consults regionally with local governments and citizens through a federal state advisory board known as a Regional Coal Team (RCT).

Figure 35: Licensing Process of Coal Mines in USA



6.2.3 Transfers of licenses

6.2.3.1 Legality of *rödövans* contracts

As noted previously there is a prohibition against the transfer of ownership over mines and national resources to non-state parties. This has contributed to the development of a practice to transfer the

right to operate a licensed mine to third parties. Such agreements are commonly referred to as “*rödöfans sözleşmesi*.” In principle there are no legal obstacles to carrying out such contracts, but this practice has been criticized by some as being unlawful on the ground that it would violate the principle that mining rights cannot be divided. It has, however, been legally recognized since 1990 with the introduction of a requirement to notify the execution of such contracts to MİGEM. Furthermore, the use of such contracts was explicitly provided for in the Mining law for a brief period 2004-2005 (albeit restrictively allowed only for TTK), but in 2005 this provision was removed. Five years later, in 2010, the Mining law was amended to provide that *rödöfans* contract holders are responsible for compliance with labor law and OSH rules and regulations (Art 21) and a definition of such *rödöfans* contracts was introduced in the Mining Regulation.⁴⁵ Accordingly a *rödöfans* contract is defined contracts which are signed between a licence holder and another party (or institution) for the purpose of enjoying the operating and exploitation rights of mines in a licenced site, by conferring these rights exclusively to the third party or institutions for the entire site or parts thereof. This clarified that such transfers of operating and exploitation rights is possible. The execution of *rödöfans* contracts is thereby officially recognized.

6.2.3.2 Executing a *rödöfans* contract

The conditions for executing *rödöfans* contracts are regulated by the Mining Law and related Regulations. Legally they are similar (but not identical) to a *usufructary lease*.⁴⁶ As specified in the Mining Law (Article 7), the effect of a *rödöfans* contract is that the administrative, financial, legal and OSH responsibilities of the license holder arising from the Labor Code are transferred to the *rödöfans* holder but the license holder maintains the responsibilities arising from the Mining Law. While the requirement to notify MİGEM of executed *rödöfans* contract has been in effect since 1990, MİGEM takes no part in the transferal process and a prospective *rödöfans* party is not subject to any quality requirements. Applicants in a tender for *rödöfans* contracts must just present an operation project. The monitoring of the operation of a site where the license holders rights have been transferred under a *rödöfans* contract are the responsibility of MoLSS. But, *in the process of licensing mining activities to third parties*, neither MENR nor MoLSS are responsible for monitoring OSH requirements.

6.2.3.3 The substantive content of *rödöfans* contract

The actual substantive content of *rödöfans* contracts can vary depending on the scope of operation project and on the amount of the coal reserve. For example, TKİ as a license holder, leases coal mines with reserves amounting to 15-20 million tons to serve power plants in the area. Rent (royalty) from production is taken as percentage per kW of electricity produced in the system. Such leasing agreements are normally for 6 years. The operation licenses of medium-sized coal mines with reserves of 15 to 20 million tons, are usually covered by a large mining area of TKI, and are transferred to a third party under procurement contracts. Under these types of agreements, TKI requests that the amount of coal to be produce be specified in the project and then simply purchases it. Under contracts for small-scale coalmines with reserves of between 1-3 million tons, the third party pays a royalty, which is determined in relation to the coal it sells.

⁴⁵ Mining activities Implementing Regulation No 27751 of 6.11.2010. Article 4: “Rödöfans sözleşmesi: Ruhsat sahalarındaki madenlerin üretilerek değerlendirilmesi amacıyla üçüncü kişilere veya kuruluşlara tasarruf hakkı sağlamak üzere ruhsat sahasının tamamı ya da bir kısmı için ruhsat sahiplerinin bu kişilerle yapmış oldukları sözleşmeleri.”

⁴⁶ Usufruct is the legal right of using and enjoying the fruits or profits of something belonging to another. <http://www.merriam-webster.com/dictionary/usufruct>

6.2.4 The actual use of *rödövens* contracts

While from a legal perspective, a *rödövens* contract is similar to a usufructuary lease, in actual practice however, and as determined in court practice, *rödövens* contracts have also been used for other purposes. In Turkish law it is the actual content of an agreement that primes and not its formal designation. According to court the actual relationships established by agreements labeled as *rödövens* contracts reflect the following four distinct types of legal relationships:

- (i) transfers of workplaces,
- (ii) the establishment of a subcontracting relationship between a primary employer-and a subcontractor,
- (iii) an agreement to supply workers, or,
- (iv) a usufructuary lease.

6.2.4.1 Transfers of Workplaces

Transfers of workplaces and the establishment of subcontracting relationships are regulated in Articles 2 and 6, respectively, of the Labour Law and compliance with these requirements is a condition for establishing lawful relationships. An agreement for the transfer of workplace refers to a transfer of a workplace or part of a workplace to another employer through a legal transaction. An employer may transfer their workplace to another employer through a sale, a lease or by the establishment of a usufructuary right. However, all the elements constituting the workplace must be transferred to the contractor in order for it to be considered as a transfer of workplace. For example, a transfer limited to the machines of a mining workplace or limited to the workers employed at a mine does not constitute a transfer of workplace.⁴⁷

In the event of a transfer of workplace:

- All employment contracts, as well as the existing rights and obligations that are in force at the date of transaction are transferred to the new operator.
- In terms of rights that are based on length of employment (notice pay, severance pay, annual leave rights etc.), the new operator is bound to apply the starting date of employment with the original employer.
- All debts and obligations that occurred prior to the date of transfer of workplace and that are due at the date of transfer become the joint responsibility of the transferor and the contractor. However, the transferor's responsibility is limited to two years after the date of transfer of workplace.

6.2.4.2 Subcontracting

The *rödövens* contracts that are in effect in coal mines may constitute a subcontracting relationship.⁴⁸ Similarly as in other parts of the world, subcontracting is practiced across all industries in Turkey. The institution of subcontracting serves to meet the need for personnel, not only in mining but also in the construction and shipbuilding industries as well as in government institutions. The setting up of subcontracting relationships is, however, a mechanism which appears to be particularly subject to abuse as it unfortunately frequently is used as a mechanism to reduce the wages paid to workers and to subject them to worse labour conditions, avoiding obligations related to social security, preventing the exercise of trade union and collective bargaining rights, avoiding taking OSH measures and

⁴⁷ *Süzek*, 183 et al. *Ulucan*, 65 et al.

⁴⁸ *Akın*, 202-208.

preventing the enforcement of some provisions of the labor law.⁴⁹ As a result, the establishment of subcontracting relationship has been subjected to limitations in the law and practice.⁵⁰

Subcontracting is tightly regulated in Turkish law. According to the Labour Law a legally valid subcontracting relationship is formed when the following criteria have been fulfilled:

- The subcontracting agreement is not aimed at decreasing legal liabilities.⁵¹
- The subcontractor is not a former worker of the primary employer.
- The subcontracted workers are employed only at the workplace of the primary employer,
- The work conducted by the subcontractor is be auxiliary work conducted at this workplace or is part of the primary work which requires technological specialization.⁵²

The last requirement calls for some special attention. Auxiliary work refers to work that is not an integral part of the production and that continues only as long as the primary work continues.⁵³ For example, duties such as catering services or transportation of extracted minerals qualify as auxiliary work. In contrast, work that requires technological specialization refers to work, which is outside the primary employer enterprise's specialization portfolio and thus requires additional expertise.⁵⁴ In the Labor Law, the rule is that an employer performs production with its own workers and the exception is where most of the work is conducted by the subcontracted workers. However, in practice in Turkey, this balance is often not maintained.⁵⁵

6.2.4.3. Supply of workers

Agreements to supply workers are not accepted forms of employment and are considered illegal, while subcontracting is legal under certain conditions as stated above. Subcontracting relationships can be of different kinds. In a lawful subcontracting relationship, the subcontractor conducts the work it was entrusted by the primary employer independently. However, in the case of supply of workers, the work entrusted by the primary employer may not be conducted independently by the subcontractor and the primary employer has a say in the performance of work and supervision of the subcontracted workers.⁵⁶ In other words, the workers receive orders and instructions from the primary employer and are engaged not only in the work entrusted by the primary to the subcontractor employer, but also other types of work at the workplace.

In cases where it is has been established that the relationship between the parties is for the supply of workers, the Court of Cassation has ruled that such arrangements are not allowed under Turkish law,

⁴⁹ *Süzek*, 154.

⁵⁰ The preamble of the Labour Law it is stated that "...Utilization of subcontractors in a workplace is both a necessity of the work life and a relationship with solid legal basis. However, after 1980s, with the impact of economic conditions, there have been significant increases in the numbers of subcontracting practices. As a result of this increase, prevalence of occasions where workers' individual and collective rights deteriorated also increased, as can be observed from disputes that were submitted to the courts. Even though the Supreme Court's judicial activism in interpreting and punishing collusive subcontracting practices had significant positive impact, it is also deemed necessary to regulate the principal employer – subcontractor relationship in light of the Supreme Court's rulings to ensure widespread compliance and prevent abuses..."

⁵¹ "Muvazaa" in Turkish.

⁵² Necessary conditions for establishing a subcontracting relationship is regulated in Article 2 of Labour Law and Article 4 of Regulation on Subcontracting Relations No. 27010 dated September 27, 2008.

⁵³ *Eyrenci/Taşkent/Ulucan*, 34.

⁵⁴ The Article 11 of the Regulation on Sub-Employment defines work that requires specialization as follows: "Work that requires specialization due to technological reasons as required by the enterprise or the work; work that is one of the integral elements of the production of goods or services and requires a specialization other than the own specialization of the enterprise due to the characteristic of work."

⁵⁵ *Süzek*, 147.

⁵⁶ *Baycık*, Rödövens (Royalty Contract) 11.

as the relationship between parties is deemed collusive. The subcontracted workers are considered to have been workers of the primary employer since the beginning.⁵⁷ In the event a court rules that a relationship of supply of workers is in place, workers are considered as workers of the principal contractor. As such, they have the right to pursue an action of debt if there are discrepancies of payment with other workers of the principal employer. Furthermore, following such a ruling, the primary employer also becomes responsible for damages resulting from occupational accidents. Even though the principal employer has no option but to comply with such a ruling, it may choose to terminate the worker's contract as a reaction to the ruling. Still, in such a case, the principal employer is obliged to pay the worker's severance pay and other rights.

6.2.4.4 Usufructuary Lease

The essential legal characteristic of a *rödövans* contract is (or should be) that of a usufructuary lease. Usufructuary leases are regulated by Articles 357 and 357 of the Law of Obligations. These articles do not address OSH related duties and responsibilities. Therefore, in the event that a *rödövans* contract has been considered to be a lawful usufructuary lease, *the parties thereto are considered as separate and independent employers*. It has been acknowledged by the Court of Cassation⁵⁸, that a *rödövans* agreement signed by employers which does not include a subcontracting or a supply of workers relationship constitutes a usufructuary lease relationship. However, in such cases, the relationship is considered as a workplace transfer if the license holder previously was engaged in production activities at the workplace that it transferred through the *rödövans* contract and transferred the workplace with the workers to the receiver of the *rödövans* contract. However, the relationship would be considered a usufructuary lease if the mine had been transferred without a prior record of operation by the license holder.

6.2.5. Recent amendments in the mining laws and regulations

Over the course of the past 12 months there have been several amendments affecting the mining operations in Turkey and the safety and health of miners. The most recent amendment to the Mining Law was issued on 4 February 2015 with Law No. 6592. It provided for comprehensive changes to the Mining Law and procedures relating to mining activities including changes to the license fee system and royalties. The following amendments were introduced:

- The MENR's approval is now required for the execution of *rödövans* agreements.
- Underground coalmines operated by private companies are prohibited from executing *rödövans* agreements. State owned enterprises and their subsidiaries are exempt from this amendment.
- All underground mining activities are now to be conducted under the permanent supervision of a mining engineer.
- The administrative, financial and legal liabilities concerning Labour Law and OSH shall be assumed by the *rödövans* holder. However, this situation shall not relieve the license holders of their liabilities under the Mining Law.
- An additional Article 10 provides that regulations on the implementation of the Mining Law shall be enforced by the MENR and that the opinion of the MoLSS shall be taken for the acceptability of regulations that are related to OSH and that concern mandatory structural and technical issues that need to be incorporated in the operational project.⁵⁹

⁵⁷ Y9HD, 26.05.2014, 13199/16663.

⁵⁸ Y11HD, 4.3.2002, 8457/1813, Y14HD, 151.2008, 12869/51. Y21HD, 21.6.2005, 791/6574.

⁵⁹ Amendment of 4 February 2015 No. 6292/23 art.

According to an amendment of Article 29 of the Mining Law MoLSS shall be consulted for the acceptability of regulations that are related to OSH and that concern mandatory structural and technical issues. There is some uncertainty as to the implications of this amendment, whether and to what extent this would imply any change regarding the respective responsibilities of MENR and MoLSS regarding technical aspects of mining operations. The Mining Safety Regulations have also been amended⁶⁰. The amendments include the following:

- An exchange of refilling stations for oxygen self-rescuers is to be carried out.
- The obligation to set up a monitoring system for workers at mines which is envisaged by the ILO Convention No. 176 is made compulsory for underground work.
- Belt conveyors must be fireproof.
- Additional new measures were introduced against the risk of self-combustion at mines.
- Emergency plans should be reviewed and rescue trials repeated every six month. The slope of inclined ramps used for the transfer of workers should not exceed 18 degrees. In cases where this is not possible mechanical handling is made compulsory.
- Procedures for the monitoring the functioning of the ventilation systems in coal mines and measures in this regards are defined in greater detail.
- Oxygen self-rescue equipment must be in compliance with national standards.
- Employers are now required to obtain more data on how gassy the coal is and propensity to flooding in the mine and include this information in their OSH report.
- Runway fortifications must be made up of non-flammable material in coal mines.
- Mines must be fitted with lifelines in order to facilitate evacuation of miners in case of an emergency.

An obligation to provide for rescue chambers was introduced as an amendment to the OSH law on 23 April 2015, but the implementation of this requirement in accordance with national and international standards is to be further outlined in regulations to be developed within one year.

Most recently, on 4 August 2015, an amendment was made affecting a regulation related to the implementation of the Regulation Concerning Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/AT) dated 30 December 2006, No. 26392 prepared in line with the EU Directive 94/9/EC (ATEX directive). The purpose of this Regulation is to determine the principles regarding the safety rules and conformity assessment procedures for equipment and protective systems used in an explosive atmosphere. According to the related EU directive, Member States shall take all appropriate measures to ensure that the equipment, protective systems and devices are placed on the market and put into service only if: they have been properly installed and maintained and used for their intended purpose: they do not endanger the health and safety of persons and, where appropriate, domestic animals or property. This regulation came into force in Turkey in December 2006. The Ministry of Science, Industry and Technology is responsible for monitoring the use of the equipment in question in the domestic market. However, as the use of this equipment also may affect the OSH of workers, LIB/MoLSS (LIB) takes these requirements into account during inspections carried out. In the period 2010-2013 LIB suspended operations on 93 occasions for the use of equipment that was not compatible with the ATEX regulations. According to statistics for August 2015, the operations of 65 underground coal mines had been suspended due do not using proper equipment or protective systems. As there are in total approximately 190 underground coal mines in Turkey, this means that nearly 70 percent underground mines had been stopped for imminent danger for worker's health. With the decision of the Council of Ministers on 4 August 2015, No. 29435 the

⁶⁰ Regulation to Amend the Regulation on Occupational Safety and Health in Mining Workplaces No. 29291, of 10 March 2015.

requirement to replace inappropriate equipment and protective systems with appropriate ones has been postponed to 31/12/2019 both for underground and opencast coal mines. In cases of uncertainty regarding the proper implementation of this decision the Ministry of Science, Industry and Technology is required to consult with the Ministry of Energy and Natural Resources and MoLSS.

6.3 The national OSH Framework

6.3.1 General overview

Turkey's fundamental framework related to OSH is the Law on Occupational Safety and Health No. 6331⁶¹ (OSH Law) and the Labour Law (No. 4857) (Labour Law). The OSH law regulates the general duties and responsibilities of employers and workers related to OSH as well as the management of OSH at the highest level including through a National Occupational Health and Safety Council (NOHSC). Provisions on inspection and administrative sanctions complement those in Chapter 7 of the Labour Law. Chapter 4 of the Labour Law regulates questions related to organization of work.

In line with the EU Directive 89/391 as well as Convention No. 155, the OSH law expands the scope of the OSH provisions and now covers all works and workplaces in both the public and private sectors, employers of these workplaces and their representatives, and all workers including apprentices and interns. It provides for a preventive policy approach to OSH based on risk assessment⁶² which is intended to ensure a continuous improvement of OSH conditions at the workplaces. In order to enable a targeting of the need for OSH services, workplaces are categorized in three hazard classes. The OSH law further regulates the gradual implementation of the system to ensure the availability of OSH expertise in all enterprises. This OSH expertise is to be provided, inter alia, by Occupational Safety Experts (OSE) on the one hand and by Occupational Physicians (OPH) on the other.⁶³ Special rules apply for micro enterprises (including the possibility to obtain Governmental assistance). Failure to comply with the requirements to have a risk assessment in very hazardous industries such as mining is a ground for suspending operations.⁶⁴ The health of workers is to be monitored at regular intervals and the law provides for rules regarding recording of occupational accidents and diseases. Employers are required to prepare (as well as provide training in relation thereto) emergency plans for first-aid, fire/fighting, evacuation of people as well as for serious and imminent hazardous circumstances. Workers should have a voice and should be actively involved in OSH matters directly as well as through their representatives – elected or selected by the employer.⁶⁵ Enterprises with 50 workers or more are required to set up OSH committees and employers are required to implement their decisions. Employers are required to inform workers about relevant OSH matters as well as to provide them with the appropriate training upon hiring as well as at regular intervals throughout their employment. Workers have the right (without loss of pay or any other sanctions) to remove themselves from workplaces where there is an imminent and serious danger. In workplaces with multiple employers, OSH activities must be coordinated. The OSH law also provides for administrative sanctions through fines.

⁶¹ Entry into force 30.06.2012.

⁶² Further regulated in Regulations No. 28512 of 30 December 2012.

⁶³ The obligation to employ OSEs and OPs was introduced already by an amendment to the Labour Law but was originally an obligation only for enterprises with more than 50 employees. With the OSH Law this requirement was extended to apply to all enterprises.

⁶⁴ This newly introduced provision does not, however, include a quality assessment of the risk assessment presented. As the law presently stands, this means that the presentation of any risk assessment can stop a claim for suspension of operations.

⁶⁵ Article 20 of the OSH Law.

6.3.2 OSH obligations, rights and duties in mining

As noted above, the OSH Law lays down employer obligations for providing a healthy and safe working environment for workers.⁶⁶ The requirements include providing training and information to workers, adjusting security measures to changing conditions, making risk assessments and forming emergency and evacuation plans. The OSH Law and the supervision of the implementation is the mandate of the MoLSS.

Workplaces are classified according to their hazard levels. All mining activities are classified as very hazardous.⁶⁷ The general obligations under the OSH law provides for additional obligations for workplaces with these levels of hazard classification and workers' employment in hazardous or very hazardous workplaces is subject to a health report stating their eligibility for the working conditions.

In addition to these general OSH requirements, the Mining Safety Regulations lay down further detailed requirements regarding mining workplaces and employer responsibilities. These include that mining sites should be designed, operated, and maintained properly to protect workers' safety; employers must provide safety instructions which are comprehensible; employers must prepare an OSH report, which should be updated as necessary. The report should include a risk assessment (including psycho-social risks) and a plan for how to comply with the legal requirements and safety measures. Employers must take all necessary measures to handle explosions, develop an emergency plan and keep escape vehicles ready, as well as maintain a proper communication and signal system within the mining site.⁶⁸

In Annexes to these Regulations, additional minimum requirements for open cast mine sites, underground mine sites and sites where minerals are extracted through drilling are outlined.⁶⁹ The requirements include provisions calling for permanent supervision of mining activities by mining engineers. The required number of specialized engineers varies according to the number of workers and the type of mining activity in question, but at least one mining engineer must be employed during mining operation activities in licensed areas. License holders are also required to employ engineers from other sciences in addition to the mining engineer. It should be noted, however, under the Mining Law, this permanent supervisor is responsible for a licensed area (and not a mine) and a licensed area can comprise of many different mines.

These specific and detailed regulations do not, however, limit the general obligations of the Employers under Articles 4 and 5 of the OSH Law including the obligation to ensure the safety and health of workers in every aspect related to the work and to work towards a continuous improvement of OSH conditions at the workplace.

Ensuring a safe and healthy working environment is a task which calls for cooperation between all relevant stakeholders, which, at the enterprise level includes, in particular, the employers, workers and their representatives. In the following the distribution of the OSH related duties, rights and obligations will be examined, particularly in the light of the different types of *rödöväns* agreement previously identified.

⁶⁶ Existing legislation regulates in detail the OSH requirements for mines in operation. The OSH law applies to workplaces which are defined as "any organization in which material and non-material elements and workers are organized together to produce goods and services [...]." It is thus not entirely clear which OSH requirements that apply to mines and workers engaged in the exploration stage. It could be argued that as specific regulations regarding OSH requirements to be taken into account at this stage have not been adopted, the general rules according to the OSH law should apply.

⁶⁷ Workplace Hazard Classification List, published in the Official Gazette on 29 March 2013.

⁶⁸ Specifications of which is listed in a detailed manner under the Mining Safety Regulation Annex 3.

⁶⁹ Annexed to this report

6.3.2.1 Employers' duties and responsibilities

According to Article 4 of the OSH Law employers have the duty to ensure the safety and health of workers. Article 3 (1) of the OSH Law defines an *employer* as “any natural or legal person or any institution and organization which is not a legal entity who has an employment relationship with the worker.” Article 23 of the OSH Law further provides that “Where there is more than one employer in the same work environment, the employers shall cooperate in the implementation of measures related to [OSH]. The employers shall work in cooperation to prevent occupational risk and offer protection against such risks and inform each other and workers’ representatives on these risks.” It is therefore important to identify who the employer is in the context of the different types of contract prevalent in the mining industry. As noted previously, *rödöväns* contracts have not been legally regulated in detail and it is through practice that the four types of relationships can be distinguished. These are 1) a transfer of workplace, 2) a subcontracting relationship between a primary employer and a subcontractor 3) an agreement to supply workers, or, 4) a usufructuary lease. In addition it is relevant to take into account the situations when subcontracting relationships are considered collusive, i.e. not considered to be legally valid subcontracting relationships.

6.3.2.1.1 Obligation to Conduct a Risk Assessment

As required by the Article 4 c) of the OSH Law the employer is required to carry out a risk assessment. Details regarding how to carry out this obligation are provided in a Regulation.⁷⁰ Most often employers carry out this obligation by means of a risk assessment team.⁷¹ In coal mines, the risk assessment should be renewed every two years. However, when there are changes in equipment, technologies, production methodology, etc., the risk assessment should be partially or completely renewed. Failure to carry out this obligation is normally sanctioned with an administrative fine, but in the case of very hazardous workplaces such as mines, metal works and construction sites it can also be a ground for suspending operations.

If the legal relationship established between parties via a *rödöväns* contract is a usufructuary lease or transfer of workplace, risk assessments should be carried out by the *rödöväns* holder. This obligation occurs at the moment of employment of the first employee, i.e., when an individual or company becomes an employer according to law. However, the law does not specify a deadline for the employers to carry out this risk assessment. If the legal relationship established between parties via a *rödöväns* contract is a valid sub-contracting relationship, the sub-contractor (*rödöväns* holder) should conduct the risk assessment. It follows from Article 15 of the Regulation on Risk Assessment that the subcontractor should provide the license holder with a copy of the assessment and that the main employer (license holder) then should perform its risk assessment taking the risk assessment/s of the sub-contractor/s into account.⁷² The principal employer is responsible for ensuring that the sub-contractor has addressed the measures identified as a result of the risk assessment/s. If the legal relationship established between parties via a *rödöväns* contract is a collusive sub-contracting relationship or an agreement to supply workers, the license holder remains obliged to conduct the risk assessments. This is because, in a collusive sub-contracting relationship and in agreement to supply

⁷⁰ Regulation No. 28512 issued 29.12.2012. In a risk assessment, the dangers arising from the workplace or outside of it, factors that turn these dangers into risks, the possibility that the mentioned risks would materialize, their degree of frequency and any damages they may cause are rated. According to the result of the risk assessment the employer should determine the methods of work, working hours, OSH measures to be taken as well as the tools, instruments, equipment and personal protective items to be used.

⁷¹ A risk assessment team includes the employer or its representative, occupational safety experts and workplace physicians, support personnel, worker representatives and unit representatives, namely, the workers that work in a specific unit of the workplace and are able to know any risks present in that unit.

⁷² Further detailed in Article 15 of the Regulation on Risk Assessment.

workers there is only one actual employer, it is also that employer's responsibility to carry out the risk assessment. It should be noted that in practice, the quality and relevance of risk assessments are poorly followed up. More stringent requirements in this respect would be needed.

6.3.2.1.2 Obligation to Take All Necessary Measures

The general duty of employers ensure the OSH of workers under Article 4 (1) of the OSH Law is detailed in other parts of the OSH law as well as in relevant regulations including those for OSH in mines.⁷³ According to Article 4.1. a), this obligation requires the employer to take the necessary measures. This obligation should be seen as a progressive obligation where account must be taken to changing conditions, including scientific and technological developments.⁷⁴ Such an interpretation would be in line with the international obligations undertaken by Turkey under Convention No. 156.⁷⁵

If the legal relationship established between parties via a *rödövans* contract is characterized as a usufructuary lease or a transfer of workplace, the *rödövans* holder is obliged to take all such measures. If the legal relationship established between parties via a *rödövans* contract is a valid sub-contracting relationship, every employer is obliged to take all measures related to OSH for its workers in relation to its own work and according to Regulation on Mining Safety the license holder has the obligation to coordinate their implementation.⁷⁶

At mining workplaces where a valid sub-contracting relationship has been established, and the main contractor and sub-contractor have a joint working area, it has been argued in the literature that the distribution of responsibilities between the primary and the sub-contractor should be based on a system of "shared risk".⁷⁷ As experience demonstrates, such a system does not function in practice. OHS calls for a holistic approach with clear lines of responsibility.⁷⁸

⁷³ As noted above, this obligation was rendered concrete via regulations issued on the basis of the OSH Law. The OSH measures to be taken at mines have been regulated in detail (Regulation No. 28770 of 19 September, 2013). Article 5 outlines the general OSH obligations of employers at mining workplaces and also includes more detailed regulations concerning the minimum OSH measures in underground mines above the ground and via drilling, respectively.

⁷⁴ *Süzek*, 878. *Eyrenci/Taşken/Ulucan*, 336. *Baycık*, İşverenin Yükümlülükleri (Employer Obligations), 43. *Baycık*, *Rödövans* (Royalty), 1923 et al. *Narmanlıoğlu*, 323-324. *Mollamahmutoğlu*, 753. Y9HD, 18.11.1991, 10815/9243, Y9HD, 9.11.1998, 7518/7851. YHGK, 16.6.2004, 21365/369. Y10HD, 4.3.2008, 6310/2821.

⁷⁵ See inter alia, para 57 of ILO: *General Survey concerning the Occupational Safety and Health Convention, 1981 (No. 155)*, the *Occupational Safety and Health Recommendation, 1981 (No. 164)*, and the *Protocol of 2002 to the Occupational Safety and Health Convention, 1981*, Report of the Committee on the Application of Conventions and Recommendations (articles 19, 22 and 35 of the Constitution), Report III (Part I B), Geneva, 2009, available at:

http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_103485.pdf

⁷⁶ Similarly Article 12 of Convention No. 176 provides that "Whenever two or more employers undertake activities at the same mine, the employer in charge of the mine shall coordinate the implementation of all measures concerning the safety and health of workers and shall be held primarily responsible for the safety of the operations. This shall not relieve individual employers from responsibility for the implementation of all measures concerning the safety and health of their workers."

⁷⁷ *Baycık*, 1927-1930.

⁷⁸ This is a key feature of the approach to OSH in Convention No. 155 and 176. The comments on the CEACR on Turkey's application of Convention No. 155 also addressed this issue. See 5.6.2 below. See also the DuPont Bradley Curve. <http://www.dupont.com/products-and-services/consulting-services-process-technologies/brands/sustainable-solutions/sub-brands/operational-risk-management/uses-and-applications/bradley-curve.html>

6.3.2.1.3 Obligation to Ensure Compliance

According to sub-clause b Article 4 (1) of the OSH Law, the employer is also required to control whether required OSH measures have been taken and to ensure that any non-conformity is overcome.⁷⁹ The employers' duties are thus not limited to carrying out risk assessments and taking measures, but also include ensuring compliance. Workers not complying with the required measures should be disciplined as needed. The Court of Cassation has confirmed that an employer who does not fulfill this control obligation can be held responsible if there is a workplace accident attributable such lack of control.⁸⁰ For example, the employer is required to check whether the workers have their dust and gas masks with them at the entrance of the mine as well as that they actually wear them underground. In the same way, it should never be deemed sufficient to hang a "no smoking" sign at explosive material storehouses. The employer should also control that nobody actually smokes in these parts. If the legal relationship established between parties under a *rödöfans* contract is characterized as a usufructuary lease or transfer of workplace, this type of control should be carried out by the *rödöfans* holder. If the legal relationship established between parties is a legal sub-contracting relationship, every employer is obliged to control its own workers. If the legal relationship established between parties is a collusive sub-contracting relationship or an agreement to supply workers, the license holder is obliged to fulfill the obligation to ensure compliance.

6.3.2.1.4 Obligation to Provide OSH Training

According to Article 17 of the OSH Law and relevant Regulations⁸¹ the employer is required to provide training of workers on OSH matters.⁸² Workers unable to document that they received professional training may not be employed at coal mine workplaces in the very hazardous class. The training needs to be repeated at least once a year for work in coal mines. Workers who have had occupational accident or disease shall receive additional training on reasons for the accident or disease, ways to protect themselves and safe working methods. Furthermore; workers who are away from work for any reason for more than six months shall receive refresher training before returning to work. If the legal relationship established between parties via a *rödöfans* contract is a usufructuary lease or transfer of workplace, the training should be provided by the *rödöfans* holder. If the legal relationship established between parties is a legal sub-contracting relationship, every employer is required to train its own workers. If the legal relationship between parties is established as a collusive sub-contracting relationship or an agreement for the supply of workers, the license holder is obliged to fulfill the obligation to provide training.

6.3.2.1.5 Obligation to Conduct Health Surveillance

According to the Article 15 of the OSH Law the employer is obliged to monitor the health surveillance conducted of workers before employment, in case of changed assignments and at regular intervals as recommended by MoLSS taking into account of the danger class of the workplace. Workers to be employed in hazardous and very hazardous enterprises may not start employment without a health report indicating their suitability for the work at issue. The health of workers in coal mines should be monitored every year. If the legal relationship established between parties under a *rödöfans* contract is

⁷⁹ For detailed information about the obligation of the employer to perform controls, see 879 et al.

⁸⁰ Y9HD, 7.11.1979, 5905/8813. Y10HD, 23.3.2010, 17190/4177. Y10HD, 20.9.2010, 4985,11673.

⁸¹ Regulation on the Procedures and Principles of Training for Workers on Occupational Safety and Health No. 28648, published 15.05.2013.

⁸² The employer should inform the workers about work accidents and occupational disease risks at the workplace, the measures with which these risks can be prevented as well as the rights and responsibilities of workers about OSH as required by its employer to provide training. The OSH training at mining workplaces should encompass the signs of work accidents and occupational diseases, what needs to be done if one of the risks materializes, the use of fire-protection, first aid and work equipment, the use of dust and gas masks, helmets and safety lamps and warning signs.

characterized as a usufructuary lease and/or transfer of workplace, the health surveillance needs to be carried out by the *rödöväns* holder. If the legal relationship is established as a legal sub-contracting relationship, every employer is obliged to conduct the health surveillance of its own workers. If the legal relationship is established as a collusive sub-contracting relationship or supply of workers, the license holder is obliged to fulfill the obligation to have health surveillance conducted.

6.3.2.1.6 Obligation to provide OSH services

The obligation to provide OSH services at the workplace regarding OSH is an obligation that may be shared between the parties of a *rödöväns* contract depending on the type of relationship and type of obligation at issue. The requirement for employers to provide OSH services at the workplace is an obligation for all workplaces, even if only one person is employed. However, the scope and extent of this obligation varies in relation to the danger class of the workplace and the number of workers employed. After a certain threshold there is a requirement to establish a workplace OSH unit.⁸³ In accordance with specific regulations, the scope of the services to be provided by the occupational physicians is calculated in minutes per workers.⁸⁴ The employer is required to comply with the instructions and recommendations on OSH related matters which are provided by the OSE:s and OPH:s. Such instructions and recommendations should be documented in writing and kept at the workplace. If an accident occurs, this documentation should be taken into account to determine the responsibilities of the parties. The question of the roles and functions of OPH:s and OSE:s vis-à-vis the employer was one of the issues raised by the ILO supervisory bodies in relation to the application by Turkey of Convention No. 161.⁸⁵ The CEACR stated that the appointment of OSEs and OPH:s, as well as other technical or professional bodies to assist the employer in relation to OSH matters, “could not replace or limit the employers’ responsibility according to Article 16 of Convention No. 155 to ensure that workplaces were safe and without risk to health.”⁸⁶

6.3.2.1.7 OSH Committee

At a workplace with at least fifty workers and where work that lasts more than six months is continuously performed, the employer is required to set up an OSH Committee. The required composition of the OSH Committee is regulated separately and should be composed of the employer or its representative, the OSEs, the OPH, a person charged with conducting the social or administrative and financial affairs, worker representative or chief representative, master, headworker or foreman, if any and a civil defense expert, if any. The Committee should hold a meeting at least once a month in coal mining workplaces.⁸⁷ Where there is more than one employer in the same workplace who set up more than one committee, these employers shall inform each other of the decisions of the committees which might affect one another.

6.3.2.1.8 Worker Representatives

As required by the OSH Law, the employer is obliged to appoint a worker representative working to ensure participation of workers in the organization of the workplace for OSH.⁸⁸ The worker representative is a worker who is authorized to take part in activities related to OSH, monitor work,

⁸³ Article 8 (6) of the OSH Law and further regulated under the Regulation on Occupational Safety and Health Services.

⁸⁴ Insert reference to the regulations for OSE and OP:s (NB separate regulations and different requirements)

⁸⁵ See further below, Section 5.6.3.

⁸⁶ Since the introduction of the system to have OSE:s to advise employers, a practice seems to have evolved to shift the responsibility (or at least part thereof) away from the employer on to the OSE:s. This seems confirmed by the fact that at more OSE:s than employers have been criminally charged and jailed in the aftermath of occupational accidents.

⁸⁷ Regulation No. 18. 01. 2013 No. 28532.

⁸⁸ *Baycık, Çalışanların Hakları (Worker Rights), 113 et al.*

ask for measures to be taken, make proposals and represent the workers on similar topics (see further below). A workers representative may also be a trade union representative who also takes part in risk assessment committees and OSH committees.

6.3.2.1.9 Obligation to Employ a Permanent Supervisor and Technical Worker

As noted above, a new requirement has been introduced regarding the permanent presence of a mining engineer in the context of mining activities.⁸⁹ The number of specialists depends on the operation technique, size and structural status, and engineers from other professional disciplines may also be required. This requirement is sanctioned with an administrative fine of 30.000 TL and a possible suspension of activities. It should be noted, however, under the Mining Law, these permanent supervisors are responsible for a licensed area (and not a mine) and a licensed area can comprise of many different mines. The authorities and responsibilities, appointment procedures and principles, training and working procedures and principles of the permanent supervisors and technical workers shall be further detailed regulated in a regulation to be issued by the Ministry. As required by the Articles 131 and 139 of the Implementing Regulation on Mining Activities, the person to appoint technical workers and the permanent supervisor is the license holder.

6.3.2.1.10 Obligations of Rödövens Contract Parties to Organize the Workplace

If the legal relationship established between parties through a *rödövens* contract is characterized as a usufructuary lease, the obligation of the *rödövens* holder to organize the workplace should be determined independently from the license holder and according to the number of workers employed by the *rödövens* holder. However, the license holder must employ a permanent supervisor and technical personnel for the entire licensed site. If the legal relationship established between parties through a *rödövens* contract is characterized as a supply of workers or collusive sub-contracting relationship, the cumulative number of workers employed by the license holder the *rödövens* holder will be determinative for the obligations to organize the workplace. In this case, the license holder is obliged to organize the workplace. In cases where there a *rödövens* agreement is a valid subcontracting relationship which has lasted for more than six month, the main contractor and the subcontractor shall ensure cooperation in the enforcement of the decisions; where only one of the contractors have set up a committee, the other party should designate a representative to sit in the committee that has been set up. If both the main and the sub-contractor employ more than 50 workers, they should set up separate committees. In such a case, employers are responsible for communicating decisions to each other, though the responsibility of coordination lies with the main contractor. In the event that both workers have less than 50 workers but together more than 50 workers are employed, a joint committee where delegates are appointed in consensus. Where only one of the employers employs more than 50 workers, only that employer forms a committee, and the other employer is responsible for sending a representative to this committee in order to ensure coordination when implementing decisions.⁹⁰

6.3.3 Workers' rights

In addition to the right to be trained outlined above, workers' rights include the right to participate, the right to protection in situations of removal from imminent and serious danger, and the right to complain about and report on the employer on OSH matters.

⁸⁹ Amended by Law number 6592 of 4.02.2015

⁹⁰This matter was regulated in the Law number 6331 and the Regulation on OSH Boards.

6.3.3.1 The Right to Participate

According to Article 18 of the OSH Law employers are required to consult workers and their representatives on relevant OSH matters. Workers and their representatives have the right to provide all kinds of opinions and submit proposals regarding OSH, state opinions, take part in discussions and declare opinions about the effects of working conditions, application of a new technology and selection of work equipment on OSH.⁹¹ Employers shall also consult with workers or their representatives regarding the introduction of new technology and the implications this may have in the OSH at the workplace.

6.3.3.2 Situations Involving Serious and Imminent Danger

Article 13 of the OSH Law regulates situations involving serious and imminent danger. Workers may request that the OSH Committee examines such conditions. The OSH Committee must be convened without delay to decide on actions to be taken. Employers are required to take the decided action immediately. If the OSH Committee agrees with the worker that there is serious and imminent danger, the worker may refrain from further work until necessary measures have been taken without loss of pay. The employer is also required to continue the payment of insurance premiums. In the event of serious imminent and unavoidable danger,⁹² workers are entitled to remove themselves from the workplace without having to consult the OSH Committee. Workers may not be placed at a disadvantage for exercising this right. If necessary measures are not taken to remedy the situation workers are entitled to terminate the employment contract immediately.⁹³ In such a case, workers can demand compensation for damages incurred. The employer is required to prepare an emergency action plan about how to leave the area in cases where the serious and imminent danger cannot be prevented and issue necessary instructions.⁹⁴

6.3.3.4 The Right to Submit a Report

According to Article 18 (3) of the OSH Law, workers and their representatives are entitled to report to the competent authority if they consider that the measures taken and the means employed by the employer are inadequate for the purposes of ensuring OSH. Workers and their representatives may not be placed at any disadvantage for exercising this right. Furthermore, according to Article 93 of the Labour Law labour inspectors are required to keep the identity of persons that submit a complaint or report confidential. Violations of the right according to Article 18 (3) of the OSH Law is sanctioned with a fine and the award of damages.

6.3.3.5 Duties of Workers

The rights of the workers in relation to OSH are coupled with certain duties and obligations. Article 19 of the OSH Law prescribes that workers are required: not to jeopardize the health and safety of themselves and other workers; using the instruments, equipment and other production tools and their safety devices at the workplace in line with the rules; not arbitrarily removing or changing the safety devices; use the personal protective equipment submitted to them correctly and as per rules; cooperate with the employer and worker representatives in overcoming any deficiencies identified during an inspection and in assuring OSH in their own work areas; and, immediately notify the employer or worker representative when they encounter a serious and imminent danger at the workplace and when

⁹¹ Baycık, İş Sağlığı ve Güvenliği (Occupational Safety and Health), 7-8.

⁹² On this issue please see Section 6.7.2 below

⁹³ This right cannot be exercised by public officials.

⁹⁴ For detailed information about this obligation, see. *Caniklioğlu*, 75-76 and *Ocak*, 149-150.

they spot a deficiency in the protection measures in line with the training they have received at the workplace and the instructions provided for them by the employer.⁹⁵

Workers are also required to cooperate with the employer and OSE:s, the OPH:s, other healthcare staff, first aid experts, support workers in charge of search, rescue and evacuation appointed by the employer regarding OSH as well as worker representatives and to abide by every measure taken by the employer.⁹⁶ Workers are also required to attend training provided by the employer.

The employer may impose disciplinary actions, determined in collective bargaining agreements and their attachments, employment contracts and their attachments or in the bylaw, on workers that do not abide by the measures taken. If the worker is a public servant or another public official, a disciplinary investigation may be initiated against him/her. The employer may terminate the employment contract, with immediate effect without paying a severance pay, if a worker is found responsible for jeopardizing job safety.⁹⁷ While public servants and public officials are protected from such immediate termination for a valid reason, they may be subject to disciplinary investigations for breaches of OSH measures. Rules of contributory negligence apply if damages for a work accident or occupational disease are claimed by a worker who was negligent or faulty.

6.3.4 Rights and Duties of Workers' Representatives

Workers' representatives are an essential part of an efficiently functioning OSH system both at the national and at the enterprise level and they contribute to ensuring that appropriate OSH measures are effectively implemented. At the national level trade unions of workers and public officials are members of the National OSH Council. In this context, trade unions may influence the decisions to be taken and play a role in determining the OSH of the country via proposals they would make in this Council. Trade unions may also make a contribution to assuring OSH by means of OSH units they could create within their own body.⁹⁸

Their general right to participate⁹⁹ is further regulated in some detail in the OSH Law. Article 20 regulates the number of worker representatives at a workplace. This number varies according to the number of workers employed. Where there is more than one representative, a chief representative shall be elected among them. Workers' representatives have the right to ask the employer to take appropriate measures and submit proposals to mitigate hazards or to remove sources of danger. Where there is an authorized trade union represented in the enterprise, the trade union representative shall act as workers' representative. According to Article 17 (1) workers' representatives are entitled to appropriate training to enable them to fulfill their responsibilities.

It is specifically provided that worker representatives shall be consulted regarding: the assignment of OSE:s, OPH:s, and other staff in the enterprise; the identification of protective equipment and protective and preventive measures required as a consequence of risk assessment; and on other issues related to prevention. The duties of worker representatives include the provision of relevant OSH information to workers and the planning and training to be provided to workers.

⁹⁵ Baycık, İş Sağlığı ve Güvenliği (Occupational Safety and Health), 10.

⁹⁶ Süzek, 893.

⁹⁷ Sub-clause 25/II-1 of the Labour Law. See also Y9HD, 4.11.2008, 30651/30368; Y9HD, 21.12.2009, 12861/36369; YHGK, 16.6.2009, 9-210/274, Kazancı Hukuk Mevzuat ve İçtihat Bilgi Bankası (Kazancı Legal Regulation and Case Law Data Bank) (10.05.2015).

⁹⁸ Representative organizations of employers and workers also have the right to comment on the implementation of ratified ILO Conventions.

⁹⁹ See section 5.6.2.1 above.

More generally, and sometimes through collective bargaining agreements, trade unions can contribute by concretizing certain legal requirements.¹⁰⁰ Provisions can be included regarding the quality and types of required protective equipment or regarding principles to be applied for fire-fighting and first aid. Provisions can be included which will contribute towards ensuring that applicable OSH measures are adapted to changing circumstances.¹⁰¹ Collective bargaining agreement may also regulate the level of compensation to be paid by an employer that does not fulfill their OSH obligations, deterrent compensations to be paid without awaiting the court ruling in case of a work accident at the workplace and workers that file a suit for this reason may be provided job security.¹⁰² Trade unions may also assist in the collection of data including risk analyses conducted per sector, share them with other workplaces; thereby facilitating the identification and prevention of sectoral risks.¹⁰³

6.3.5 Recent amendments of OSH legislation

This adoption of the OSH law was followed by an overhaul of all related regulations and by-laws. While this process recently was completed, the subsidiary legislation has been subject to further adjustments since the Soma mining accident 13 May 2014. The amendments include the following specific points:

- Pressure for overproduction is now deemed a reason for suspending work. Employers who do not comply with a decision to stop work can be imprisoned.
- The companies in the mining sector which have had fatal accidents are prohibited from public procurements for two years.
- The administrative fines that are envisaged in the OSH Law have been reinforced and new sanctions have been introduced for some actions.
- OSH obligations have now been integrated into public procurement legislation and are part of the requirements in public procurement contracts.
- OSH has been introduced as a compulsory part of the curricula at relevant departments of universities.
- The competences and responsibilities of the OSEs have been redefined and their job security has been strengthened.
- If work has been suspended for a breach no fine will be imposed for the same breach.

6.4 Regional and international standards

While based on different implementation systems and articulated in different ways, the OSH standards' system developed in the context of the EU and the ILO are convergent and are based on the same fundamental principles of prevention, risk assessment and active tripartite involvement both at the national and enterprise levels. Virtually all EU member states are either bound by Convention No. 155, 161, 187 or 176 and the EU was an active supporter and participant in the development of Convention No. 187.¹⁰⁴

¹⁰⁰ *Akın*, Sendikaların Katkısı (Contribution of Trade Unions), 110.

¹⁰¹ *Süzek*, 925-926.

¹⁰² *Süzek*, 926.

¹⁰³ *Akın*, 114.

¹⁰⁴ The EU OSH policy of 2007-2012 included an express invitation to all EU members to ratify Convention No. 187.

As noted previously it has been a policy orientation of the Turkish Government over the past ten years to harmonize its national OSH system with relevant regional and international standards.¹⁰⁵ Although Turkey not yet is a member of the EU, the harmonization process with the EU Acquis has been subject to assessment by the EU in yearly progress reports.

As part of this process of reform of its OSH system, Turkey has also chosen to become formally bound by relevant and central ILO standards regarding national as well as enterprise level requirements for prevention and risk assessment. Its long-standing ratification of the Labour Inspection Convention, 1947 (No. 81) has recently been complemented by the ratification of the ILO Occupational Safety and Health Convention, 1981 (No. 155) the Occupational Health Services Convention, 1985 (No. 161) as well as the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187).¹⁰⁶ Most recently Turkey ratified ILO Safety and Health in Mines Convention, 1995 (No. 176).¹⁰⁷

Turkey's obligations under ILO Conventions have been assessed in the context of ILO's regular supervisory mechanism which is based on reports submitted at regular intervals¹⁰⁸ by the Government. Social partners may comment thereon. Reports on the implementation of Conventions Nos. 81, 155 and 161 and comments by the social partners submitted in relation thereto¹⁰⁹ resulted in comments by the supervisory bodies of the ILO in 2014 and 2016.¹¹⁰ The Government's response to the comments made is due this year (1.9.2015).

The ensuing descriptions of relevant international standards provide short overviews of important elements of these instruments, but should not be considered comprehensive summaries.

6.4.1 EU Directive 89/391

The aim of this EU OSH Framework Directive is to introduce measures to encourage improvements in the safety and health of workers at work. It applies to all sectors of activity, both public and private, except for specific public service activities, such as the armed forces, the police or certain civil protection services. It is of fundamental importance as it the basic safety and health legal act which lays down general principles concerning the prevention and protection of workers against occupational accidents and diseases. It contains principles concerning the prevention of risks, the protection of safety and health, the assessment of risks, the elimination of risks and accident factors, the informing, consultation and balanced participation and training of workers and their representatives. On the basis of this "Framework Directive" a series of individual directives have been adopted. The Framework Directive with its general principles continues to apply in full to all the areas covered by the individual directives, but where individual directives contain more stringent and/or specific provisions, these special provisions of individual directives prevail.¹¹¹

¹⁰⁵ *Akın*, 38-39.

¹⁰⁶ While this Convention has entered into force this year, the ILO CEACR will only be able to examine the application of Turkey of this Convention after examination of the first report which is due in September 2016.

¹⁰⁷ Ratified 23 March 2015 together with the Safety and Health in Construction Convention, 1988 (No. 167). Both these instruments will enter into force 23 March 2016.

¹⁰⁸ Every two years for fundamental and governance Conventions (including Convention No. 81), and every five years for other Conventions. The supervisory body the CEACR may ask for reports more frequently.

¹⁰⁹ Including from TISK, DISK, KESK, HAK-İŞ, and TÜRK-İŞ.

¹¹⁰ The case of Turkey's implementation on Convention No. 155 was examined in the Conference Committee on the Application of Conventions and Recommendation of the International Labour Conference in 2015.

¹¹¹ A summary account (as well as a link to the full text) of the the Directive is available at <https://osha.europa.eu/en/legislation/directives/the-osh-framework-directive/1>

6.4.2 Occupational Safety and Health Convention, 1981 (No.155)

6.4.2.1 Main substance of the Convention

Convention No. 155 a dynamic and flexible international instrument and it is central among ILO's OSH Conventions. When it was adopted in 1981 it constituted a paradigm shift away from an approach simply based on protection towards an approach fundamentally based on prevention and risk assessment. It calls for the adoption of a coherent dynamic national OSH policy, as well as action to be taken by at the national levels by governments and at the enterprise level to promote OSH and to improve working conditions. This policy shall be adapted to national conditions and practice. The Convention lays down basic principles and required OSH mechanisms to be applied and set up at the national level. The national policy approach is prescribes requires the parties to the Convention to formulate, implement and periodically revise a national policy on OSH. The fundamental element of this national policy approach is that it is progressive and dynamic and calls for a periodical revision. It is crucial to ensure that the effectiveness of implementation is assessed and that areas for further improvement are identified. Such a periodical review also ensures that the policy keeps pace with socio-economic and technological changes. Convention No. 155 is based on active tripartite involvement throughout the system. It also regulates how the voice of employers, workers and their representatives can be heard at the national level – including by protecting workers from undue consequences for whistleblowing actions and for having removed themselves from situations representing imminent and serious danger.¹¹²

6.4.2.2 Recent comments by the CEACR

The general comments concerned the functioning of the national policy process and the need to assess the effectiveness of the measures undertaken in the context of the National Action Plan They also concerned the effective involvement of the social partners in the national policy process. The Government was invited to refrain from interfering violently in lawful, peaceful and legitimate trade union activities addressing health and safety concerns and to engage in genuine dialogue with all social partners. As this was the first occasion to comments on the newly adopted OSH Law, further information was requested regarding the required collaboration between two or more undertakings engaged in activities simultaneously at one workplace, in particular at mining workplaces.¹¹³ The supervisory bodies also questioned how Articles 13 and 19 (f) of the Convention were reflected in the OSH Law and requested the Government to take the necessary steps to modify its legislation accordingly. As regards, more specifically, the mining, metal and construction sectors, the Committee noted the alleged “persisting deficiencies” in the OSH system according to the social partners in particular concerning: the prevention of occupational hazards; the lack of supervision of the working environment and of effective labour inspection and the absence of recognition and notification of work-related diseases.

6.4.3 Occupational Health Services Convention, 1985 (No. 161)

6.4.3.1 Main substance of the Convention

Convention No. 161 provides for the establishment of enterprise-level occupational health services which are entrusted with essentially preventive functions and which are responsible for advising the

¹¹² The 2002 Protocol to Convention No. 155 calls for the establishment and the periodic review of requirements and procedures for the recording and notification of occupational accidents and diseases, and for the publication of related annual statistics. It omplements Convention No. 155 and can therefore only be ratified by parties to Convention No. 155. The 2002 Protocol has not yet been ratified by Turkey.

¹¹³ This question is regulated in Article 17 of Convention No. 155 and further details are provided in Paragraph 11 of the Occupational Safety and Health Recommendation, 1981 (164). See also the discussion in paras. 174-180 of the General Survey.

employer, the workers and their representatives in the enterprise on maintaining a safe and healthy working environment. This Convention is progressive and flexible, but is strict in terms of its basic requirements.

6.4.3.2 Comments by the supervisory bodies

In addition to a general comment regarding the envisaged scope of the national health services and the need to ensure that a national policy on occupational health services be formulated in consultation with the social partners, the CEACR requested the Government to provide further information on the respective roles and functions of the OSEs and OPH:s in the OSH law while underscoring that the appointment of OSEs, as well as other technical or professional bodies to assist the employer in relation to OSH matters, could not replace or limit the employers' responsibility according to Article 16 of Convention No. 155 to ensure that workplaces were safe and without risk to health. It was also important to ensure that the occupational health services were professionally independent from employers, workers and their representatives. The need to reflect the multidisciplinary nature of occupational health services in the composition of staff was also noted.

6.4.4 Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)

This Convention is closely related to Convention No. 155 and it can be said that it complements it. It has the same aim as Convention No. 155 as Convention No. 187 aims at promoting a preventative safety and health culture and progressively achieving a safe and healthy working environment. Convention No. 187 is however more specific in the requirements regarding the active involvement required by Governments and how to operate the OSH management systems model at the national level. It requires ratifying States to develop, in consultation with the most representative organizations of employers and workers, a national policy, national system, and national programme on OSH. The national policy shall be developed in accordance with the principles of Article 4 of the Convention (No. 155), and the national systems and programmes shall be developed taking into account the principles set out in relevant ILO instruments. A list of relevant instruments is contained in the Annex to the Promotional Framework for Occupational Safety and Health Recommendation, 2006 (No. 197). National systems shall provide the infrastructure for implementing national policy and programmes on OSH, such as laws and regulations, authorities or bodies, compliance mechanisms including systems of inspection, and arrangements at the level of the undertaking. National programmes shall include time-bound measures to promote OSH, enabling a measuring of progress. Convention 187 draws up a general framework for the way in which the national policy, system and program regarding OSH shall operate. Accordingly, every member state needs to discuss with the employer and worker organization with the highest representative qualification and create a national policy, program and system, which should be continuously improved to prevent work accidents and occupational diseases. As this Convention recently entered into force, the supervisory bodies have not yet had occasion to examine its implementation in Turkey.

6.4.5 Safety and Health in Mines Convention, 1995 (No. 176)

Turkey ratified the Safety and Health in Mines Convention on 23.03.2016. It will enter into force 23.03.2016 and the ILO supervisory bodies have therefore not yet had the occasion to provide any comments on the implementation of this instrument in Turkey.

The Safety and Health in Mines Convention, 1995 (No.176) is the first comprehensive ILO OSH standard specific to the mining industry. It is designed to address the special hazards faced by mineworkers. The Convention is based on the principle of prevention and attaches great importance to the different roles and responsibilities given to Members, Employers and Workers.

Members are thus required, similar to the relevant provisions in Conventions Nos. 155 and 187, to formulate, carry out and periodically review a coherent policy on safety and health in mines, as well as create a legal framework that ensures the application of the Convention's provisions. The Convention, furthermore, defines central elements that need to be regulated by law and regulations, including Members' obligations to designate competent authorities that monitor and regulate the various aspects of safety and health in mines in each Member State.

The responsibilities of Employers form another important element in the Convention, which provides that they shall assess risks and address these in line with a clear hierarchy of measures, determining that the use of personal protective equipment should only be considered as a last option. The specific measures to be taken by employers under the Convention encompass issues such as the design of a mine, safe working procedures, emergency preparedness, provision of training and collection as well as dissemination of OSH-relevant information.

The rights and duties of workers and their representatives under the Convention dovetail with the obligations posed on employers and ensure that cooperation between workers and employers as required by the Convention can effectively assist in improving OSH in a mine. Important workers' rights under the Convention include the right of workers to 'remove themselves from any location at the mine when circumstances arise which appear, with reasonable justification, to pose a serious danger to their safety or health' as well as the right to collectively select safety and health representatives. The Safety and Health in Mines Recommendation, 1995 (No. 183) supplements the Convention.

6.5 Implementation and enforcement systems

6.5.1 The national enforcement system

6.5.1.1 Generally

The Mining Law is under the authority of the MENR while the enforcement of the Labour and the OSH law and regulations are under the authority of MoLSS. In this Section focus is only on the labour inspection system under the authority of the MoLSS. The distribution of responsibility between the MENR and the MoLSS is not entirely clear. Some recent amendments to the Mining Law – including the amendments to Articles 10 and 29¹¹⁴ - to would seem to add some further uncertainty as to the situation before and after the amendments.

The national labour inspection system under the authority of MoLSS is regulated in Chapter 7 the Labour Law and in the implementing Regulations No. 23940 of 2000. These provisions have been complemented with Section Four of the OSH Law. Labour inspection is carried out by labour inspectors, who are authorized to audit and inspect and who meet the need in terms of number and qualifications, in accordance with the Regulations.

The structural organization of inspectors was recently changed. The inspectorate used to have 10 local inspection boards. Two years ago, 5 small boards were closed, and the remaining five were reinforced. Now, there are inspectorates in Ankara, İstanbul, İzmir, Bursa and Adana. As reflected in the statistics over labour inspections, this re-organization has affected the inspections in a positive way.

Labour inspectors are divided into two categories. There is labour inspectors that are graduated from faculties teaching social sciences and labour inspectors selected from among graduates of engineering

¹¹⁴ See above under Section 5.4.2

and medicine faculties. The latter inspect compliance with OSH laws and regulations.¹¹⁵ Mine inspections are carried out by a group of inspectors at least one of whom is a mining engineer while the others generally are mechanical and/or electrical engineers. Inspections are performed within the framework of annual programs organized by the Labour Inspection Board (LIB) Presidency. In addition to announced or scheduled inspections, an *ad hoc* team of inspectors will be appointed to investigate accidents. However, Turkish legislation does not provide for the appointment of LIB inspectors in specific sectors.

Based on to Article 15 of the regulations the duties of the inspectors can be summarized as follows:

- i. Examining the labour conditions as well as production and construction processes at workplaces,
- ii. Listening to the employer, workers or persons related to the matter at or outside the workplace, asking them questions, asking them for the required information and obtaining their signed statements,
- iii. Identifying whether the documents stipulated in the legislation to be kept or made available are maintained at workplaces, asking the employer or their representative for these documents and making copies and summaries as necessary,
- iv. Examining the machinery, tools, instruments, devices, equipment, etc. used at the workplace as well as raw materials that are used for production or processing and their processed versions,
- v. In cases of breaches of the Labour Law related to the age, sex and health status of workers, the workers at issue should be constrained from continuing their work..

The tasks of the inspectors also include providing employers and workers with technical information on the application of legislation provisions and making recommendations.¹¹⁶

Labour inspections can either be scheduled or unscheduled inspections and examinations. An unscheduled inspection is an inspection conducted in case of a complaint or a work accident. Scheduled inspections are conducted at workplaces based an evaluation and prioritization of problems in the working life.¹¹⁷ According to Article 17 of the Labour Inspection Regulations workplace inspections shall be conducted at short intervals to the extent allowed by possibilities.

6.5.1.2 Suspending operations

Pursuant to Article 25 of the OSH Law¹¹⁸ if the authorized inspector identifies one of the reasons detailed below that call for stopping an operation, the inspector should prepare a report regarding the required suspension and that should be submitted to the LIB at latest the following day. The president of the LIB sets up a delegation of three inspectors¹¹⁹ to decide whether to suspend the operation on the basis of this report. If the delegation decides to do so, this decision is to be communicated within one day at latest to the governorate for execution of the decision. A copy of the decision should be communicated to the Provincial Directorate for Labour and Employment Agency and included in the company's file. The governorate is required to execute the sanction within 24 hours at latest by means of law enforcement. In all this procedure takes at least five days.

¹¹⁵ *Süzek*, 854.

¹¹⁶ *Süzek*, 855.

¹¹⁷ *Süzek*, 856.

¹¹⁸ And the implementing Regulation on Suspending an Operation at Workplaces of 2013

¹¹⁹ Prior to the OSH Law, the sanction to suspend operations and closing down a workplace was regulated in the Labour Law and was decided by a commission of five people including two inspectors, one worker, one employer representative and the Regional Director.

The law also provides for stopping an operation in cases of emergency.¹²⁰ Accordingly, the labour inspector who identifies the danger communicates the situation to the president of the LIB and requests the related local authority to stop the operation be stopped until a decision has been taken by the board. The local authority should execute this decision by means of the law enforcement authorities.¹²¹ The employer can file an objection to the decision to stop the operation within six working days to the competent labour court. Such an objection does not prevent the execution of the decision to stop the operation. The first criterion for imposing the sanction of suspending operations at workplaces is the identification by the inspector that there is a vital danger at the workplace. The absence of a risk assessment is a ground for stopping operations at workplaces such as mines.¹²²

The sanction of suspending operations can also be imposed in cases where modes of work that would pose a life-threatening danger due to coercion in the production process by acting against the work schedules in cases of work in the 'very dangerous' class.¹²³

In practice *rödöfans* contracts may contain provisions for a discount on the *rödöfans* fee to be paid by the *rödöfans* contract holder company ranging between 10 percent-25 percent (as per the amount of extracted mine) *rödöfans* for the extra amount of mine extracted if it extracts more mine than the annual designated amount. In addition to these provisions, an additional discount at an annual rate of 2-3 percent could be provided on the *rödöfans* fee that it would pay if there are no fatal work accidents during excessive production.¹²⁴

If order to be able to lift the decision and restart the operation again, the employer must notify the Provincial Directorate for Labour and Employment Agency in writing that corrective action has been taken. prepare a report specifying what will be done, how many workers, how many days are required in order to remedy the situation. This report is analyzed by the inspectorate who gives the employer a time limit and a limit for the number of workers to be used. This decision is then communicated to the local authority who lifts the ban temporarily. The local authority is responsible for monitoring the employer. The employer will notify the local directorate when he has taken the required remedial action as a ground for lifting the ban. Upon receiving this notification, the directorate conveys this request to the MoLSS. A delegation of three inspectors formed by the LIB will verify whether the required remedial action has been taken and should reder a decision in seven days. If the suspension can be lifted this matter is notified to the governorate and the Provincial Directorate for Labour and Employment Agency to which the workplace is affiliated. The governorate should execute the decision within 24 hours.

In accordance with a recent amendment non-compliance with decisions to suspend operations is criminally sanctioned 3-5 years prison sentence.¹²⁵

In the case of a decision to suspend operations the employer has to continue to pay the wages of workers that become unemployed due to that decision or to provide these workers with a new job as

¹²⁰ *Süzek*, 931.

¹²¹ According to sub-clause (g) added to Article 30 of the OSH Law on 23.4.2015, the considerations requiring emergency stop of operation at mining workplaces and the measures to be taken until the decision to stop the operation is taken is to be further regulated. Such a regulation has not yet been issued.

¹²² This sanction is regulated in a list attached to the Communique on Workplace Danger Classes regarding Occupational Safety and Health dated 2012.

¹²³ This sanction was introduced by an amendment to the OSH Law on 23.4.2015.

¹²⁴ This was introduced in 23.4.2015

¹²⁵ This sanction introduced in the OSH Law on 23.04.2015.

per their profession and status on condition that their wage is not reduced.¹²⁶ This obligation is sanctioned with a fine of 1000 TL per month for every worker.¹²⁷

6.5.1.3 Administrative fines

If the danger is not life-threatening, yet imminent, the labour inspector should immediately start the administrative fine procedure. Administrative fines are regulated in Article 26 of the OSH Law and determined for every unfulfilled obligation, every non-appointed person or every month. These sanctions are imposed by the Provincial Directorate for Labour to which the workplace is affiliated on condition that their justification is stated. The fines are payable within thirty days as of their notification. An application may be lodged to the criminal court of peace against the sanction imposed within fifteen days. An administrative monetary fine has been brought about which needs to be imposed separately on employers that do not establish a tracking system that shows the current location of workers and their entry-exit points at underground mining workplaces. In such a case, an administrative fine of 500 TL is imposed for every worker.¹²⁸

6.5.1.4 Giving a Notice to Eliminate Non-Compliance

If the danger is neither life-threatening nor imminent, the labour inspector has the discretion to give the employer notice to eliminate non-compliance with legislation or to directly implement a sanction.¹²⁹ A notice can be given to an employer for only one time for an appropriate period of time in order to eliminate non-compliance with legislation.

6.5.1.5 Other Sanctions

For mining workplaces where a fatal work accident has occurred, an employer whose fault was established in a court ruling is prohibited from taking part in public tenders for a period of two years.¹³⁰

6.5.2 International standards

6.5.2.1 Main substance of the Labour Inspection Convention, 1947 (No. 81)

Turkey has been bound by the ILO Labour Inspection Convention, 1947 (No. 81) since 1952. The objective of this Convention is the establishment of a system of labour inspection responsible for securing the enforcement existing legal provisions relating to conditions of work and the protection of workers in industrial workplaces.

The principal functions of the system of labour inspection are to secure the enforcement of legal provisions, particularly through inspection visits, as well as the investigation of complaints and material, technical and administrative examinations; provide technical information and advice to employers, workers and their respective organizations; and to bring to the notice of the competent authority defects or abuses not covered by existing legal provisions.

The structure of the labour inspection system should consist of a central authority and services placed under its supervision and control. Moreover, the competent authority is required to make appropriate arrangements to promote cooperation between the inspection services and other government services and public or private institutions engaged in similar activities; and collaboration between officials of the labour inspectorate and employers and workers or their organizations. Human and material

¹²⁶ *Süzek*, 931.

¹²⁷ This sanction was added to the OSH Law on 23.04.2015.

¹²⁸ This sanction was added to the OSH Law on 23.04.2015.

¹²⁹ *Süzek*, 858.

¹³⁰ This sanction was added to Article 25/A of the OSH Law on 23.4.2015.

resources sufficient for it to discharge its duties shall be placed at the disposal of the labour inspection system. The inspection staff shall be composed of public officials whose status and conditions of service are such that they are assured of stability of employment and are independent of changes of government and of improper external influences.

Labour inspectors may not have any direct or indirect interest in the enterprises under their supervision; must be bound, on pain of appropriate penalties or disciplinary measures, not to reveal any manufacturing or commercial secrets or working processes which may come to their knowledge in the course of their duties; must treat as confidential the source of any complaint, just as they must refrain from giving any intimation to the employer that a visit was made in consequence of a complaint; and have to submit, at least once a year, reports on the results of their inspection activities to the central inspection authority.

The central inspection authority has to publish an annual general report on the work of the inspection services under its control, and communicate the report to the International Labour Office. These reports should contain information on the laws and regulations covered, as well as statistics of the workplaces liable to inspection and the workers employed therein and, finally, statistics regarding inspection visits, violations and penalties imposed, industrial accidents and occupational diseases.

For the effective discharge of their inspection functions in workplaces, labour inspectors also have to be empowered with the right to: enter freely at any hour of the day or night any workplace liable to inspection, and by day any premises which they may have reasonable cause to believe to be liable to inspection; carry out any examination and to interrogate the employer, her or his representative and the staff of the enterprise; right to take or remove for purposes of analysis samples of materials and substances used or handled, subject to the notification of the employer or her or his representative; enforce the posting of certain notices required by the legal provisions.

Labour inspectors must also be empowered either directly or indirectly by applying to the competent authority for this purpose, to make orders to eliminate the defects observed in plant, layout or working methods which may be liable to constitute a threat to the health or safety of the workers.

These measures shall take the form of orders to be carried out within a specified time limit to secure compliance with the legal provisions relating to the health and safety of the workers, or measures with immediate executory force in event of imminent danger to the health or safety of the workers and these rights are to be exercised subject to any right of appeal to a judicial or administrative authority which may be provided by law.

In principle, any violation of the legal provisions covered by the Convention may result in legal proceedings, unless the labour inspector decides to opt for a warning or advice. Adequate penalties, including penalties for obstructing labour inspectors in the performance of their duties, have to be provided for by national laws or regulations and effectively enforced.

6.5.2.2 Recent comments by the CEACR¹³¹

In addition to general comments regarding the number of inspectors, the frequency and thoroughness of labour inspection, and the need for an effective cooperation between the inspection services and the

¹³¹ The most recent comments by the CEACR were based on information provided by the Government in December 2013. The report was submitted too late for examination during that year, however, and was therefore examined only in December 2014. In that context the Committee noted the observations submitted by TÜRK-İŞ in January 2014 as well as the observations made on the application of Convention No. 155. See footnote 105 above

judicial authorities, the Committee, with reference to observations from a trade union, requested the Government to provide information on the status and conditions of service of the different categories of labour inspectors so as to ensure, in practice, their independence of changes in government and undue external influences. The Committee also made comments related to labour inspections in the mining sector. In that context the Committee noted the alleged widespread non-compliance with preventive OSH requirements. The Committee also noted allegations that administrative fines for non-compliance with OSH obligations were not dissuasive. The Committee requested detailed information regarding the inspections carried out, the preventive and enforcement activities of the labour inspectorate as well as the authority responsible for labour inspection in the mining sector and the number of labour inspectors specializing in this area. as well as With specific reference to OSH conditions in subcontracting situations, and noting the allegations from the social partners the Government was requested to provide detailed information regarding the preventive and enforcement activities of the labour inspectorate concerning the enforcement of Osh provisions for workers in subcontracting situations. In terms of labour inspection in the informal economy, the Committee noted with interest that in the context of a dedicated action plan an information system had been set up to allow access to relevant information from multiple institutions.

Summary and Conclusions

In the preceding section an overview of the two major sets of legislation determining practices in mining have been presented and the (not entirely clear-cut) division of responsibility between MENR and MoLSS. A brief overview of relevant regional and international standards is also provided. The recent ratification of Convention No. 176 will have a direct bearing on the mining industry once it enters into force in March 2016, but should already now be taken into account in the context of the further development of Turkey's policy in this area. A number of issues brought up in the review of the normative context underscore the need to carry out such a review and to develop, in close consultation with the social partners a comprehensive national policy regarding mining. It would seem particularly important to ensure a closer and regular collaboration between the MENR and MoLSS to enable a coordinated response to the need for an efficient continued development and use of Turkey's natural resources all while ensuring optimal levels of safety and health of all the workers engaged in the mining sector given its importance and strategic importance in the Turkey's economy.

A coordinated national approach to the sector would also enable the Government and to ensure an improved implementation of the legislative framework which is in place including by strengthening the monitoring and enforcement capacities of the LIB. A particularly important issue not only for the LIB but also for other relevant actors, is the development of methods to combat illicit and unsound labour practices such as the Dayıbaşılık system, the use of which appears to be particularly widespread in the mining sector.

An important theme in the present context concerns the use (or rather misuse) of the rödövens contracts. Originally conceived to serve the purpose of enabling private entities to be engaged in mining which is under the sovereignty of the State, this system appears, to a large extent, to have been used to mask subcontracting practices. Subcontracting is tightly regulated in Turkish legislation in order to avoid this system to distort the labour market. As a result of the practices related to the rödövens contracts as well as the regular application of subcontracting arrangements, the employer lines of responsibility, in particular regarding OSH have become blurred and fragmented. This situation prevents not only a proper application of relevant legislation and an effective management of OSH at the workplace, but also the effective monitoring and supervision of relevant rules and regulations. While national courts have extended efforts to determine the actual relationships behind

contractual arrangements designated as rödöväns agreement, a more comprehensive effort seems called for. Another line of action may be to devise measures to ensure an efficient application of the requirements to coordinate OSH services under Article 23 of the OSH Law.

Building an OSH system on prevention calls for a constant attention to potential, as well as actual risks at the workplace. Every workplace is different and conditions change every day. Those who are closest to those changing conditions are the workers. In a well-functioning OSH system based on prevention, tapping the knowledge of workers and ensuring they have a voice should be part of a regular practice to enable a proper and continuous assessment of the risks at a workplace. Furthermore, as provided in Article 13 of the OSH law, workers have the right to protect their lives in situations of imminent and serious danger. In order to this right not to be illusory, concerted efforts need to be taken to ensure that workers can exercise this and other rights at the workplace, assisted as appropriate by their representatives.

Since the mining tragedies in 2014 the Turkish Government has adopted a number of regulatory changes which are expected to lead to certain improvements in the organization of work and operation practices as well as in relation of OSH. On the whole, however, these changes give a mixed message.

- *Action has been taken to improve working conditions in the underground mines by limiting the working hours and increasing the salaries. No action appears to have been taken, however, to address the informal employment practices in spite of the profound impact they appear to have on the working conditions in underground mines.*
- *The widespread misuse of rödöväns contracts has had a negative effect on the working and OSH conditions in mines and underground coalmines operated by private companies are prohibited from executing such contracts. This ban is limited in scope, however, as state owned enterprises and their subsidiaries are exempt from this amendment. As a continued use of rödöväns contracts is foreseen in the Tenth Development Plan of Turkey a more comprehensive approach should be considered to regulate this practice to ensure it serves its purpose.*
- *While pressure for overproduction now is deemed a reason for suspending work, the practical application of this provision is not clear as it does not regulate the relevant benchmarks nor provides any indication of how this provision is to be monitored.*
- *The competences and responsibilities of the Occupational Safety Experts (OSEs) have been redefined and their job security has been strengthened. Reports have appeared, however, that criminal sanctions are imposed on OSEs. The ILO supervisory bodies has asked the Government to provide further information on the roles and functions of the Occupational Safety Experts (OSE:s) provided for in the new OSH Law all while emphasizing that their roles and functions should in no way affect the responsibility of the employers in terms of OSH.*
- *While Turkey has implemented the EU Directive 94/9/EC (ATEX directive) - both in law and in practice - limiting, inter alia, the use of flammable material in mines, a decision was taken by the Council of Ministers on 4 August 2015 to postpone the further implementation of national legislation in this respect.*

7. ECONOMIC DETERMINANTS FOR MINING

Introduction

The aim of this report is to understand the determinants of OSH practices in Turkish coal mining and the influence of contractual arrangements in the coal mining sector on OSH. Having presented the basic facts concerning the Turkish mining sector in the previous section, the next step in our inquiry is to populate a checklist of possible determinants of OSH practices in the coal mining sector. In order to do this, we start our discussion from the economics of OSH. Economics provides us with a valuable framework for identifying possible determinants of OSH. This in turn opens up the way for a thorough empirical analysis. This section provides the theoretical background for the statistical analysis presented in the next section. It also provides a background for researchers who would like to study the determinants of OSH practices in Turkish coal mining.

7.1 Possible determinants of OSH practices

Obviously, OSH practices are influenced by many factors that interact at several levels. Even something seemingly simple such as compliance with safety standards is influenced by long list of factors including history, culture and economic conditions. Abundance of causal factors that influence OSH practices and complicated OSH regulations make it difficult to pinpoint the exact determinants in particular contexts. Nevertheless, it is possible to identify some key factors. We could list the most obvious determinants of OSH practices as follows:

- Governance and regulation (e.g., regulatory approach, emphasis on OSH, role and competence of labor inspectorate, priority of and data on OSH, role of insurance agencies, etc.).
- OSH management practices (e.g., employer's responsibility, risk management, number and competence of OSH professionals, participation, education/training/experience of employers and workers/workers).
- Labor relations, unions and employers organizations (e.g., worker/worker voice, social dialogue and cooperation, labor law, flexibility of the labor market, employer union relations, etc.).
- Economic factors (e.g., national and international economic conditions, unemployment, informality, OSH compliance costs, etc.).
- Other factors such as research on OSH, public awareness, etc.

- Particular characteristics of the working environment and the type of work.

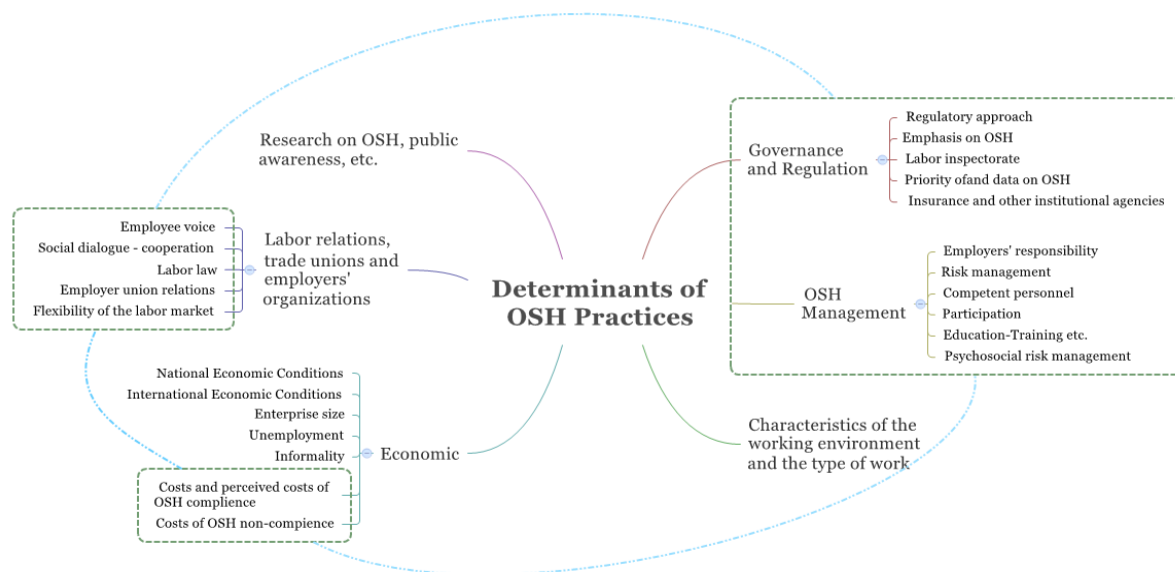


Figure 38. Determinants of OSH Practices

Figure 38 attempts to summarize the aforementioned factors. Firstly, note that all of these factors interact in several ways. This list of determinants is neither exhaustive nor final. It merely provides a starting point.

Nevertheless, this picture **Figure 38** does not help us understand the main driving force of OSH practices: Human beings! OSH related behavior of employers, workers/workers, safety professionals, people working for regulatory authorities, inspectors, etc. is the main driving force of OSH practices. Individuals sometimes abide by the rules, but sometimes they do not. And when they do not, this may have pervasive detrimental OSH related consequences. In order to understand how the aforementioned determinants of OSH practices work and interact, we need to understand how individuals respond to *incentives* created by these factors. Psychology and economics are two disciplines that can help us understand how people behave and interact in an OSH context. In this report we attempt utilize an economic perspective in order to get a grasp of possible determinants of OSH practices in the Turkish coal mining sector.

7.2 Overview of the economic perspective

Dorman (2000) suggests that economics could serve three purposes for OSH. (i) “Identifying and measuring the economic costs of occupational injury and disease can motivate the public to take these problems more seriously.” (ii) “ Understanding the connections between the way firms and markets function and types of OSH problems that arise is crucial for the success of public policy.” (iii) “Economic analysis can help show when safeguarding working conditions is complementary to other social goals, and it can illuminate the tradeoffs when it is not” (Dorman 2000: 1-2). This is a fair characterization of what economics can do for OSH. However, it fails to mention that even though we cannot measure all costs and benefits in monetary terms, people nevertheless take these costs and benefits into account. In addition to the three purposes listed above, economics also helps us

understand and analyze why people do what they do—even if no monetary costs and/or benefits are involved.¹³²

Economists commonly start their analysis from a “fictional” environment (a highly abstract model) where all markets work efficiently. In this environment, employers, workers and regulators are assumed to take all relevant costs and benefits into account and behave accordingly. This exercise may be alienating for non-economists because it requires one to think of all decisions in terms of cost and benefits. For example, the decision to work in a hazardous environment is a decision that takes the costs of accidents and ill-health into account together with benefits such as higher wages offered by the employer.

Despite the fact that non-economists may consider economic models of OSH as being misrepresentative of actual market conditions and of human thinking, they help us identify the relevant costs and benefits that should be taken into account in order to better understand the determinants of OSH practices. For example, a general complaint concerning compliance with OSH regulations is that some firms evade compliance because it is too costly. As explained below, the economic point of view helps us understand this behavior. Similarly, some people work in hazardous work places even though they are aware of the health and safety risks involved. Economic analysis helps us understand why this is the case by way of considering the decision to accept a job offer as involving cost-benefit analysis. Of course, in reality markets are never perfect, workers may be ill-informed and employers may not be rational. Nevertheless, understanding how rational and fully informed employers, workers and regulators behave under perfectly complete market conditions, also help us in figuring out what would happen if these conditions do not hold. In what follows, the reader should keep in mind the basic economic model is intended as a benchmark case that will help us analyze the determinant of OSH practices.

From the economic point of view, employers or firms could be represented as agent who has to decide how to allocate their scarce resources between preventive activities and production activities. Both activities incur costs to the firm, but they also have benefits. Preventative activities are costly but they also increase safety and reduce accident and health costs. Investment in safety, however, also has an opportunity cost. If a firm does not invest in safety, could free up some of its scarce resources and could increase production and profits. Thus, how much any firm decides to invest in preventive activities could be conceived as a matter of cost benefit analysis.

Workers, too, need to decide whether to work at risky jobs, or whether to follow good OSH practices at work, or not. In doing so they are using scarce resources. Undertaking risky tasks has costs, including health costs, lost future income etc. But it may have benefits too if wages in risky industries are sufficiently higher. Similarly, preventive activities may be costly, inconvenient, time consuming, painful etc. But they have also have benefits. When a worker is deciding whether to accept a risky job, or whether to abide by OSH rules, s/he is making an economic decision.

One basic principle of economics is that “people respond to incentives”. When the costs of benefits of doing something changes, people change their behavior accordingly. An important aim of OSH rules and regulations is to change these costs and benefits, (and also how these costs and benefits are perceived) in order to improve OHS. Policy makers expect that a fine for doing X will reduce the

¹³² Note that this is not to say that economics can explain everything. However, note that behavioral economics (a research field that combines insights from psychology and economics) is a prominent and promising field which is likely to improve policy relevance of economic models (Madrian 2014; Chetty 2015; Demeritt & Hoff 2015).

number of people who are doing X. Similarly, they expect that providing tax-benefits and/or non-monetary gifts for doing Y will encourage people to do Y. Since OSH policy changes workers' and firms' incentives, improving OSH rules and regulations requires at least a basic understanding economics of OSH. The next section briefly presents a simple economic model that will guides us in discussing the determinants of OSH practices.

7.3 Benchmark Model for OSH

Economists work with highly abstract models. Understanding how model results relate to model assumptions is important in understanding their policy implications. The benchmark model we discuss in this section is representative of the economic models used in the literature (e.g., Oi 1972; Henderson 1983; Levine et al. 2012; Thaler & Rosen 1976; Dorman 1996). This benchmark model makes a long list of assumptions that we need not discuss here. However, the following assumptions of the model are important: The model assumes that markets are competitive, individuals and firms are fully informed (about safety and health risks), rational and identical (i.e., have identical preferences). In order to study how individuals and firms would respond to safety and health risks, the model assumes that industries differ only in safety risks and that firms could alter safety risks by investing in preventative activities. Moreover, the model assumes that there are no OSH related regulations, no externalities, and no unions. Obviously, the assumptions of the model are far from reality. Nevertheless, let us briefly discuss how OSH practices would look like in this “fictional” environment.

An important result of the benchmark model is that in this environment, risky jobs would pay better wages. That is, there would be *compensating wage differentials*. To understand this result, consider the following. If the wage rate was equal in all industries, and if everyone knew about safety risks, workers would prefer to work in safe industries—assuming that undertaking risky tasks has no additional benefits. In other words, if workers are rational and if they consider occupational accidents and injuries as being costly, they would not work for risky industries *unless* they are compensated for risks. Firms are also rational and they are profit maximizers. How much of each good is produced will be determined by the behavior of firms operating in each industry. Again if wage rates were equal in all industries, firms operating in risky industries would have difficulty in attracting workers. Thus, if economic agents are rational and the markets are competitive, economic theory predicts that risky jobs should pay higher wages. Hence the *compensating wage differential*. (Dorman 1996; Oi 1972; Smith 1976; Thaler & Rosen 1976; Smith 1979a; Pouliakas & Theodossiou 2013; Dorman 2000).¹³³

The second important result of the benchmark model concerns, opportunity costs faced by firms. In the context of our simple model, given the compensating wage differentials, not only firms need to decide how much to produce, but also they need to decide how much to invest in preventive activities.

¹³³ A casual look at wages and safety in the real world would suggest that people who work at very risky jobs are also the ones who are paid the lowest wages. How does this fit with the theory of compensating wage differentials? In our model, workers are similar in all aspects but in risk averseness. In reality, workers differ in many respects. However, remember that the theory tells us that there will be compensating wage differentials *ceteris paribus*. That is, the theory predicts that workers that have the same characteristics (skill, education, experience, etc.) will be paid more in risky jobs. So, highly educated individuals who work at safe jobs may get higher wages than less skilled workers who work at risky jobs. This does not pose a problem for the theory. Nevertheless, the observation that risky jobs are commonly the least paid jobs could also imply that there is another type of friction in labor markets: Existence of non-competing worker groups. Workers may be divided into different groups and could not compete with each other—perhaps because of their personal characteristics, family background, income group, education, etc. Existence of non-competing groups would surely influence the distribution of income. But within each group, the theory of compensating wage differentials would still hold if workers belonging to the same group could compete for safe and unsafe jobs. “Then given that distribution of income, the market result will be Pareto efficient. [...] It is unlikely that there would be any more of a role for OSH regulation in this world than in the perfectly competitive world” (Dickens 1984: 137).

Suppose that the risks in Industry A *can be reduced* with the efforts of employers. In such a case firms can be considered as producing two things: (i) economic goods, and (ii) safety, or uninjured workers (Oi 1972). By investing more in safety, a firm can increase safety and hence the number of uninjured workers; however this will come at a cost of reducing the number of economic goods it produces. However, note that increasing safety may also have benefits. Accidents are costly for firms. Because of accidents risks they need to pay higher wages to their workers (compensating wage premiums). Hence, increasing safety could reduce their labor cost. Replacing injured workers are also costly. Fewer accidents could reduce this cost too. Moreover, accidents increase labor turnover, fixed employment costs such as training, and production costs. Thus, increasing safety has the benefit of reducing these costs. Given the aforementioned assumptions concerning market conditions and rationality of economic agents, firms will take the costs and benefits of increasing safety into account and adjust their production of economic goods and uninjured workers accordingly. If a firm decides to increase safety, it is because it is more efficient to do so in the sense that the cost of paying higher wages is higher than the costs of safety prevention, and vice versa.

The argument for compensating wage differentials has important implications OSH policy. This simple benchmark model suggests that, if left alone, markets would ensure compensating wage differentials, the economy would produce a combination of X and Y that maximizes individuals' welfare, and arrive at the optimal level of industrial safety. Note that firm behavior also depends on the preferences of individuals (which determine the demand for their goods). If individuals (who are also workers) prefer to consume goods produced by the risky industry, it is because they receive more utility from this consumption than they would receive from higher safety (see Dorman 1996: Chp. 2). For these reasons, behavior of firms and individuals will bring the market to an optimal level of industrial safety.

The surprising result of the benchmark model is that under its assumptions, OSH regulation cannot make anyone better off. In fact, OSH regulations reduce welfare and may not be effective. However, note that this conclusion is derived from the unrealistic assumptions of the model. Thus, understanding the conditions under which OSH regulations will be effective, requires us to study how the results of the model would change if we alter its assumptions. For example, we could ask what would happen if individuals are not fully informed about safety risks, or if markets are not competitive. By changing its initial assumptions, the benchmark model helps us study each divergence in isolation. Before doing this, let us summarize the basic lessons from the benchmark model:

- *Compensating wage differentials.* Risky jobs are likely to pay higher wages.
- *Opportunity costs.* Although it may not be evident at first sight, this simple model suggests that workers, firms and public authority face opportunity costs. For any firm, increasing safety has the opportunity cost of decreasing the production. For the workers, on the other hand, choosing a safe job, implies giving up the opportunity to earn a higher wage in the risky industry. For the public authority, in addition to the explicit costs of regulation, there is also the possible cost of lost welfare due to the introduction of the regulation.
- *Regulations may come at a cost.* OSH regulations come with a cost and the cost of regulation, including the opportunity costs, should be taken into account. For this reason, economists generally suggest that the goal of OSH policy should be to minimize “the *sum* of accident costs and accident prevention costs” (Oi 1972: 670; also see Calabresi 1970).
- *Preferences are important.* The model also suggests that optimal safety level depends on the preferences of individuals, or on how much the society values the commodities that are produced by the risky industry. If, for example, individuals have a strong preference for a commodity that is produced by the risky industry, optimal market level of industrial safety

will be low in comparison to the case that individuals have strong preference for the products of safe industries. Similarly, if government policies aim at increasing the production of a risky industry (e.g., increasing the production of the coal mining sector), the tradeoff between safer jobs and more production will be more important in determining OSH practices.

Economics tells us that if the real world were similar to simple model world presented above, there would be little or no need for regulation. However we know that assumptions that characterize this simple model world are highly unrealistic. Now let us look briefly examine when and how OSH regulations (e.g., safety standards) are required by way of considering divergence from this benchmark model, one at a time.

7.3.1 The case of fatal accidents

The analysis above assumed that accidents were non-fatal and that workers and firms can evaluate the costs of accidents. In reality, OSH concerns include the case of fatal accidents and for fatal accidents it is much more difficult to assess cost and benefits. Although economists conceptualize death risk similarly to non-fatal accident risk, and try to put a monetary value for life (e.g., see Thaler & Rosen 1976; Dorman 1996; Viscusi & Aldy 2003), existence of fatal accidents complicates the picture presented by the benchmark model. Measuring the value of life is problematic in many fronts. Most important of all, there is fundamental difficulty in putting a price to life and death (Dorman 1996). Although these difficulties do not invalidate the arguments concerning compensating wage differentials, or opportunity costs, existence of fatal accidents suggests that individuals and firms could not judge the costs and benefits of OSH related activities accurately. Thus, the benchmark model's result concerning the inefficacy OSH regulations may not hold in reality. This relates to a more general and policy relevant determinant of OSH practices: information and rationality.

7.3.2 Information and Rationality

Our benchmark model assumed that the workers are fully informed about the accident risk and accident costs. Would the economy arrive at the optimal industry safety, if this were not true? Although some economists suggested that this will not change the results of the model (e.g., Oi 1972), economists generally find information problems as an important source of friction (e.g., see Viscusi 1983; Chelius 1974; Dorman 1996). In a survey, Pouliakas and Theodossiou (2013: 186-8) list many ways in which workers may suffer from an informational disadvantage.

- Firstly, because accidents may occur rarely, and it may take time to detect occupational diseases, workers may not be able to take accident and health risks into account. Leigh (1991) and Robinson (1991) cite surveys that indicate that workers may not be fully aware of accident and health risks.
- Secondly, absence of legal advice could cause ignorance concerning accident and health risks.
- Thirdly, there is ample evidence from psychology and behavioral science that there are systematic biases in risk perception.
- Moreover, psychology and behavioral economics emphasizes many cognitive biases that indicate that workers may not behaving rationally in the economic sense (Colin & George 2004; Camerer 2003; Just 2013; Zamir & Teichman 2014; for a discussion of rationality in the context of OSH see: Pouliakas & Theodossiou 2013; Dorman 1996).

Informational problems are should be added to our checklist of possible determinants of poor safety and health in the work place. One aim of OSH policy should be to remove these frictions by way of informing workers concerning occupational accident and health risks. This is especially relevant for OSH policies concerning Turkish coal mining. Because informational problems may bring the market

to a suboptimal safety level, ensuring that workers are informed about health and safety risks, their rights, and making information publicly available is crucial.

There are some other divergences from our benchmark model which could amplify the effect of informational problems.

- **Different attitudes towards risk and heterogeneous firms.** The benchmark model assumes that all workers and firms are identical. What would happen if this assumption does not hold? In theory allowing for different attitudes toward risk does not violate the theory of compensating wage differentials (e.g., see Ehrenberg & Smith 2012; Borjas 2013). However in *practice*, it may be difficult to choose the appropriate wage-risk level and wage-plus-safety package for employers. If risk attitudes differ “the optimum wage-plus-safety package for one worker may be completely inappropriate for another” (Dorman 1996: 45). Thus, in practice this may further complicate OSH practices if present together with other imperfections, such as informational problems.
- **Assignment of liability.** We have assumed that workers bear their own accident costs. Would the main outcome of the model change if we change this assumption? Whether the workers or employers pay accident costs does not change the results of the benchmark model—as long as this the only divergence from model assumptions. Similarly, the existence of an insurance market would not disturb the equilibrium as long as it is fair (i.e., the premium rate is equal to the risk) (Dickens 1984; Oi 1972). This being the case, under the conditions of imperfect rationality and asymmetrical information, assignment of liability may be important determinant of OSH practices.
- **Labor market frictions.** The benchmark model assumes that workers are free to move between industries without a cost. Together with other assumptions this makes compensating wage differentials possible. However, labor market has frictions and moving between industries is costly. Again, from a purely theoretical perspective, if the *only* divergence from model assumptions were labor market frictions, this would not change the outcome of the model. Note however that compared to the case with perfect information and no friction, existence of friction and misinformation produces an inferior outcome. Thus, regulation could be effective, if it restores the free market equilibrium (Dorman 1996: 42).

7.3.3 Existence of unions

The benchmark model assumes that workers act independently. What if they are members of union that has the power to negotiate the terms of the contract for risky jobs? The answer, of course, depends on how unions behave and how they negotiate (Dorman 1996). The empirical literature presents some mixed results (Viscusi & Aldy 2003). In general, there is some evidence that union members seem to enjoy higher risk premiums for non-fatal injury risks than non-union workers in USA. It could be argued that because union workers have more information and bargaining power, they enjoy higher risk premiums than nonunion workers. However, studies of other countries, do not provide enough evidence that this is the case (Viscusi & Aldy 2003: 43-50). The way in which unions are organized and differences in labor market characteristics in different countries may explain these mixed results concerning compensating wage differentials. Nevertheless, to the extent that unionization increases workers’ bargaining power and improve their information concerning safety (indicating higher wage premiums for union workers), it could also affect safety. For example, a recent study concerning U.S.A. between 1993-2008, finds that unionization predicts “a robust decline in both traumatic injuries and fatalities” (Morantz 2013). Although, how unions effect OSH needs further study, it appears that unionization is an important determinant of OSH practices.

7.3.4 Monopsony power

Competition among firms is an important determinant of compensating wage differentials in the benchmark economic model. If there is no such competition, wage differentials may cease to exist, or may not be optimal, leading suboptimal levels of safety. One example for this is the case where a single firm is the only firm in a region. If there is only one firm, and if workers are not identical in terms of their risk preferences and cannot move to other regions in order to search for work, firms may choose a safety level that may not be optimal. Thus, OSH regulation could improve welfare. Moreover, Dickens (1984, p.138) argues that even if the safety level is optimal at a given employment level, it is possible that a OSH regulation may improve welfare. In a game theoretical setting Kahn (1991) studies the effect of monopsony and the entrance of additional firms to the market. He finds that the number of firms may have important consequences on OSH levels. As a result Kahn states that OSH regulation that aims at reducing monopsony power (e.g., increasing the mobility of workers, training etc.) could increase welfare. He nevertheless suggests that minimum safety standards may make it difficult for other firms to enter the market (because it increases safety costs). Hence, such a policy may go against the aim of reducing monopsony power. Overall, the appropriate policy would depend on the context.

Note that, the discussion of monopsony power assumes that workers have the flexibility to choose not to work. If not working is not an option (and if it is too costly to seek work in other regions), it is difficult to argue that the firm will have an incentive to invest in safety (Leeth 2011: 12). Thus, under the conditions of imperfect competition, restricted labor mobility and asymmetric power relations between firms and workers, OSH regulation may improve welfare—provided that costs of regulation do not exceed its benefits.

In sum, the level of competition in the market, existence of monopoly power and availability of alternative jobs seem to be important determinant of OSH practices and the safety level.

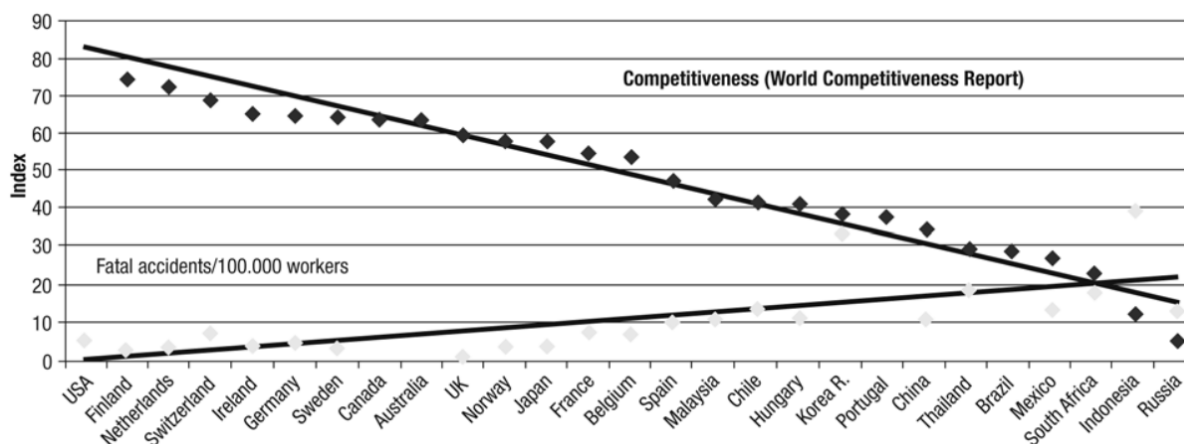
7.3.5 Externalities and Social Costs

The simple economic model of OSH assumes that there are no externalities. For example, the model assumes employers and workers bear all relevant accident and health costs. There are many ways in which this assumption may be violated. Firstly, accidents and health problems are likely to create costs for other workers and even to other firms. Secondly, occupational accidents and health problems have social costs. In the model employers and workers do not take social costs into account. “If the contractual parties do not internalize all of the damage costs of workplace injuries or diseases in their OSH decisions, the social costs of risk reduction will exceed the marginal costs faced by individual agents. In this case, economic theory predicts that a less than optimal degree of OSH is likely to prevail in the economy” (Pouliakas & Theodossiou 2013: 183).

In fact, evidence suggests that the costs of occupational accidents and health problems exceed the total of individual costs. European Commission (2004: 14) report estimates that accidents at work “have caused costs of 55 billion euros in EU15 in 2000”. Although there is a wide margin of error due to limitations of this study, it is important to note that this cost “corresponds to 0.64 percent of the GDP of about 8500 billion euros for EU15 in 2000” (p. 18). Taking into account that this figure does not include the costs of other work-related health problems, it gives an idea about how large the OSH related costs are. According to the estimates of ILO (2003) “about two million people are killed by their work every year” (p. 1), about 160 million people suffer from work related non-fatal diseases (p. 8), “total number of work accidents worldwide is 270 million a year” (p. 9, also see Hämäläinen et al.

2006).¹³⁴ These occupational accidents and health problems add up to over \$1,250,000 million a year worldwide; i.e., 4 percent of the world GDP in 2001 (ILO 2003: 15). The same ILO report also shows (see Figure 39) a clear link between competitiveness and safety (Takala 2005; ILO 2003).

Figure 39 Competitiveness and Safety



Source: ILO 2003: 17

7.3.6 Government intervention

Economic models of OSH commonly ignore institutional factors. Rules and regulations concerning OSH surely influence the incentives of firms and workers and hence OSH practices. We have seen above that the introduction of safety standards or regulation reduces welfare of individuals and produce suboptimal results given the assumptions of our model. However, safety regulation is a fact of life. One cannot analyze OSH practice if one ignores the institutional framework. For this reason, let us have a closer look at how OSH rules and regulations change incentives concerning OSH. There are two ways in which government regulation may influence OSH practices in our model. Firstly, government may introduce some rules. Worker compensation insurance system is one example of this. Secondly, safety standards may be introduced in order to determine the minimum amount of safety that firms have to produce.

- Worker compensation.** Worker compensation insurance can be organized in many ways and the different rules for worker compensation will produce different incentives for workers and firms. Let us consider a simple system where the worker is compensated by the employer for medical costs and lost income in the event of a workplace accident. If compensation scheme is efficient then compensating wage differentials would disappear. If this were the only effect the results of our model would not change. But it is not. Worker compensation effects workers and firms in many other ways. For example, since the worker is compensation for every incident, workers maybe more inclined to file claims of injury. Moreover, because the compensation is guaranteed, workers would have an incentive to stay as a claimant longer. Last but not the least, workers compensation could have a negative impact on workers' incentives for self-protecting. Similarly, firm incentives would change. Since firms bear the worker compensation costs, they would have an incentive to invest in safety (in order to reduce compensation costs), but they would also have an incentive to resist filing claims. In

¹³⁴ "Mining accounts for only about 1 per cent of the global workforce, but it is responsible for up to 5 per cent of fatal accidents at work (at least 15,000 per year, or over 40 each day)." (ILO 2003: 11)

sum, worker compensation would affect the number of accident injuries, number of claims, claim duration and costs (Ruser 2009: 313-332). However, because workers and firms have conflicting incentives, it is difficult to determine the total effect of worker compensation on safety.

- **Safety standards.** A second way in which the government could affect OSH practices is by establishment and enforcement of safety standards. As mentioned before, under the conditions specified by our model, introduction of safety standards produces suboptimal results. Nevertheless, safety regulations may increase industrial safety—even though they might decrease welfare. Establishment of safety standards with appropriate fines and enforcement is likely to change firm behavior. Firm behavior is influenced by expected safety fines and expected injury risks (Ruser & Butler 2009). The former is also affected by the number and efficacy of inspections. Thus, increasing the number of inspections is likely to increase safety. On the other hand, this could have a negative effect on workers' safety incentives in that workers may become less safety conscious. Viscusi's model that focuses on the effect of inspections suggests that "although the provision of a safer work environment will be offset in part by diminished safety-enhancing actions by workers, only in the exceptional instance of very severe penalties will regulation be potentially counterproductive" (Viscusi 1979: 136). Nevertheless, a common criticism of OSH regulations is not that fines are too high, rather that they are too low and inspections are not frequent enough (Ruser & Butler 2009; Viscusi 1979). It is appropriate here to look at the empirical literature in order to get a better understanding of what is at stake here.
- **Effectiveness of OSH inspections and penalties.** Empirical results are also somewhat mixed concerning the efficacy of inspections and penalties. Earlier studies find little or no correlation between inspections and injury rates (Ruser & Smith 1991; Viscusi 1979; Smith 1979b; McCaffrey 1983; Viscusi 1986). However, later research supports the thesis that inspections are effective in reducing safety. For example Haviland et al. find that OSH inspections correlate with decline in injury rates (Haviland et al. 2010; Haviland et al. 2012; Gray & Mendeloff 2005; Gray & Scholz 1993). There is also some evidence that improvements in safety do not come at the expense of employment, sales, credit ratings, or firm survival (Levine et al. 2012a: 907; also see Levine & Toffel 2012; Levine et al. 2012b).¹³⁵ Moreover, note that inspections without penalties have no effect on safety and that inspections are found to be more effective for nonunion plants (Gray & Mendeloff 2005).¹³⁶
- **Minimum wages.** Although it is not directly related to OSH, another government intervention is the introduction of a binding minimum wage. Since minimum wage policies are common, it is appropriate to ask what our simple model-theoretic framework would imply concerning OSH and the optimal level of safety. Dickens tries to answer this question argues that "OSH will be underprovided if a job is subject to a binding minimum wage and there are costs to providing an optimal level of safety" (Dickens 1984: 139). The reason for this as follows. In theory some workers would accept to work for lower wages provided that the job is safe. Binding minimum wage legislation prevents employers from paying lower wages to their employees. Because their wage costs increase, they invest less in safety. Under these conditions there is room for improvement. For example, OSH standards can improve welfare.

¹³⁵ Note however that most of these studies emphasize that inspections are not effective in increasing safety in very small (fewer than 20 workers) and very large (more than 250 workers) workplaces.

¹³⁶ Another question is whether OSH inspections reduce or increase productivity. While some studies find a correlation between lower productivity and inspections (Gray 1987), other results indicate that inspections may be increasing productivity (Dufour et al. 1998).

Let us recap: In the benchmark model, OSH regulations influence welfare negatively given the assumptions of model. However, impact of an OSH regulation on safety is somewhat ambiguous, because rules and regulations affect workers and employers in different ways. Nevertheless, introducing safety standards and moderate enforcement to the model is expected to improve firms' safety production. Empirical research, on the other hand, is concerned with the real world where many of the assumption of the model do not hold. Empirical research does not provide undisputable evidence on the efficacy of OSH regulations concerning inspections and penalties. Yet, recent studies suggest that in the real world OSH inspections may have a positive effect on safety. Lastly, note that while theoretical research puts a great emphasis on optimality, empirical research is mostly concerned with the efficacy of OSH regulations.

7.3.7 Economic incentives

We learn valuable lessons from the economics of OSH. In fact, even the simple model discussed here teaches us that (i) one should take into account the costs and benefits into account, (ii) there is a tendency for compensating wage differentials that we are likely to observe in many occupations, and (iii) policy makers should be alert to offsetting effects of policy. However, the real world is different from the simple highly abstract models of economists in many respects. We have seen that not all of the aforementioned divergences from model assumptions harm the theory of compensating wage differentials. The optimal safety argument, however, is more difficult to save in some cases than in others. Moreover, in addition to aforementioned divergences, assumptions, economic models commonly ignore the following factors:

- Macroeconomic conditions
- Relative importance of risky industries in the economy
- Psychological factors that could influence safety related behavior
- Different types of risks and costs
- History, culture, institutions, and legislation
- Existent OSH regulations
- Incentives of other actors, such as regulators, inspectors, public officials, etc.
- Subcontracting, outsourcing, non-standard contracts
- Existence of small firms
- Informality in product and labor markets
- Corruption
- Etc.

Formal and informal institutions of the country (e.g., justice system, safety regulations, workplace conventions, safety culture etc.) determine how governments, regulators, firms, safety professionals, and workers react to OSH risks and how they interact with each other. From an economic perspective, institutions set the rules of the OSH game for all parties involved and determine the costs and benefits for everyone. In other words, institutions determine the rules, available options, and the payoffs for the OSH game. Other factors listed above are also important in determining the structure of OSH related incentives.

Figure 40 attempts to summarize *some* of the factors that could influence the incentives of firms, workers, regulators, and safety professionals. Although general, the figure contains some elements that are relevant for the mining industry—e.g., such as energy policy, type of the mine etc. Institutional determinants such as OSH policy, rules and regulations, culture, justice system set the stage. However, these macro level determinants are not the only factors that individuals take into account. Moreover,

incentives they face are also shaped by other determinants, such as economic factors, experience, education, size of the enterprise etc.

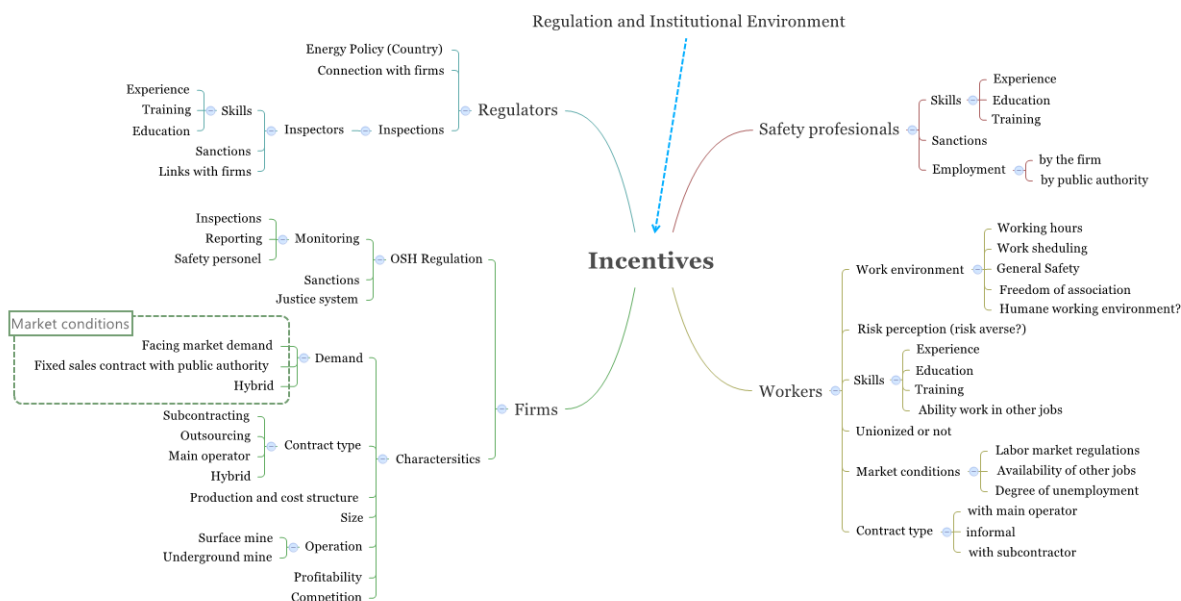


Figure 40 Incentives

The first thing to emphasize in Figure 40 is the number of actors. For each actor, some of the important factors that influence the costs of benefits of OSH related behavior are listed. Economic models commonly focus on employers and workers/workers. But in the real world OSH practices are influenced by the decisions and actions of many other actors. Regulators, public officials, safety professionals, inspectors are all relevant actors from the perspective of OSH policy. The figure does not list all actors in order to keep the picture simple. Secondly, different actors face different costs and benefits. These costs and benefits in turn determine how they behave. For example, consider safety professionals. Competence of safety professionals determines how well they do their job. However, their competence may also influence their incentives. An inspector without appropriate knowledge of the working environment is less likely to report a safety problem—even if s/he correctly detects the problem—because it may be costly to file a wrong complaint. Safety professionals' behavior will also be influenced by rules and regulations concerning their occupation. For example, if there are no appropriate sanctions for misconduct, they would be less likely to take their job seriously in reporting safety violations. Similarly, workers' behavior is influenced by many factors. If there is a high degree of unemployment, they would be less likely to quit their job, or file a complaint concerning safety violations. Or, if they have short term contracts, they may not file a complaint in order not to lose their chance to renew their contract. Macroeconomic policies may influence firms and regulators' incentives. For example, if the government has set targets concerning production (e.g., of coal), they may be reluctant to implement existent OSH regulations in order not to slow down production. Or, if the firm is producing mainly for the public sector, both regulators and employers may be reluctant in following OSH rules and regulations. Availability of relevant information (concerning costs and incentive schemes), complexity of the OSH regulatory framework and the convenience of the compliance process are some of the other factors that may influence economic incentives. We need not discuss all factors listed in the figure here. The lesson is that economic incentives are influenced by a complex set of factors. In order to understand the determinants of OSH practices in a particular industry at a given period of time, one should be alert to all of these factors. Asking how economic incentives

could be influenced by the particular list of factors for the particular case at hand is a good guiding principle for research.

The next section extends the above discussion in the context of coal mining by way of presenting a brief overview of the literature.

7.4 Possible determinants of OSH practices in Turkish mining

A stripped down version of the economic incentives map (Figure 40) is presented below (Figure 41). All of the factors that influence economic incentives are likely to have an effect on mining accidents. The literature on mining accidents focuses finding correlates of mine accidents with the available data. Because of limited data availability, factors such as incentives of inspectors and/or safety personnel do not receive much attention in the literature. This section aims at presenting a brief overview of the literature concerning correlates of mine accidents. We start with those factors that have received the most attention and then move to others (such as energy policy, labor market frictions etc.).

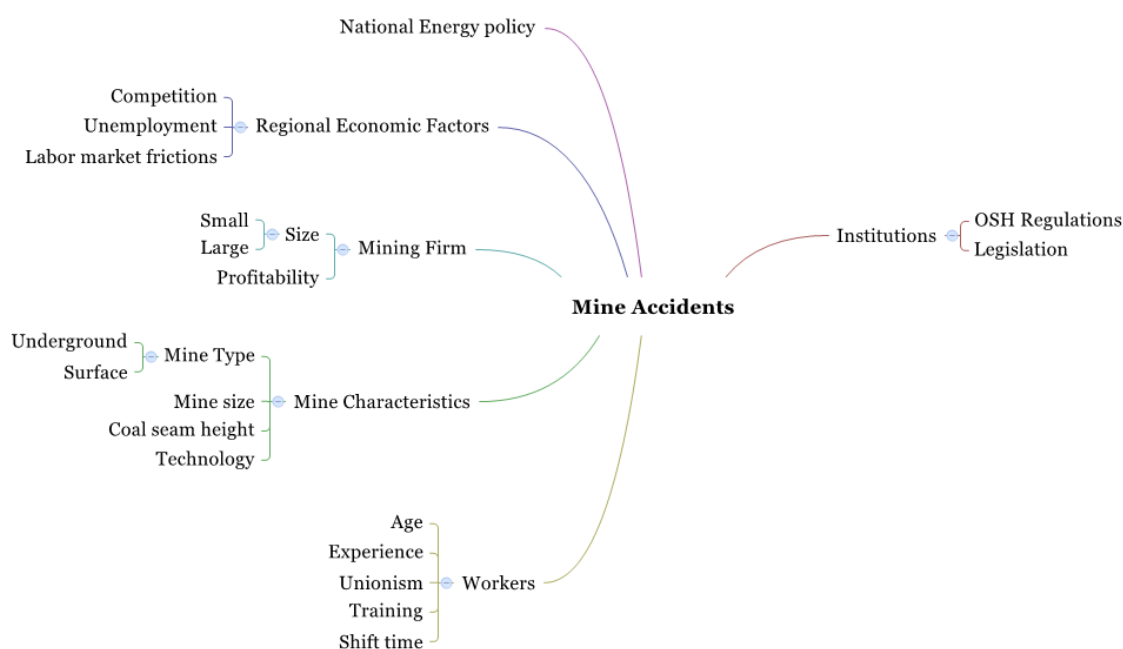


Figure 41 Correlates of Mine Accidents

7.4.1 Properties of the mines

Properties of the mine, extracting technique, whether the mine is a surface mine or an underground mine have important consequences for OSH. Surface mines are generally considered as being underground mines (e.g., see Worldcoal.org 2015; Bliss et al. 1977; EPA 1977). The following tables (Table 11 & Table 12) from the U.S. Environmental Protection Agency's report summarize the differences in accident rates between underground and surface mines. Despite the fact that this is an old document, it is informative.

Table 11 Coal Mining Accident Rates

Coal Mining Accident Rates	
	<i>Disabling Injuries/Million Worker-Hours</i>
Underground Coal Mining	35.0

Surface Coal Mining	10.0
Overall Industry Average	9.8

Source: (EPA 1977, p.2)

Table 12 Types of Coal Mining Accidents

Types of Coal Mining Accidents	
<i>Accident</i>	<i>Percentage</i>
Underground (total)	80
Roof, rib, and face falls	50
Fires and explosions	10-12
Transportation (coal haulage)	10-15
Surface (total)	20
(Fall of high wall, equipment misoperation, electrical system malfunctions)	

Source: (EPA 1977, p.2)

Although it is generally accepted that underground mines are more risky than surface mines, literature paid little attention to how other characteristics of mines influence accident rates. One of the important exceptions is by Pfleider and Krug (1973; cited in Bennett & Passmore 1984). Pfleider and Krug try to determine whether mining system and accident rates have any relationship. They failed to find a meaningful relationship between the mining technique and mine fatalities (Bennett & Passmore 1984, p.40). Whether the mine is using continuous mining equipment or conventional equipment did not make any difference (in terms of safety) for captive mines (i.e., mine producing coal for the use of the mining company). However, continuous mining equipment was found to make a difference (safer) for non-captive mines. Although, Pfleider and Krug (1973) presents a valuable study, it is outdated. Mining technology progressed immensely since 1973 and it is doubtful that mining technology has no effect on safety. Nevertheless, new technology has two opposing consequences: On the one hand it increases safety in previously unsafe areas, while on the other it presents workers with new safety and health hazards (ILO 1994, p.4). For this reason, it is not clear immediately that technology will save lives. For example, Boudreau-trudel et al. (2014) study the impact of new equipment on OSH in underground mining, and find that new equipment and technology do not immediately reduce the injury rate. Although their study is concerned with eight equipment introduction projects, their results imply that technology and equipment alone cannot bring about safety. One reason why technology does not improve safety immediately is the unfamiliarity of workers with new technology and with new hazards introduced by it. Without appropriate training and experience, technology and advanced safety equipment will not bring about safety.

Nevertheless, in the long run overall effect of new techniques and technologies is positive. Long run trends concerning safety suggest that improved technology and substitution of labor with capital are responsible from decreases in the number of accidents, injuries, and fatalities in developing countries (Ruser & Butler 2009). In the case of mining, new technologies allow for improved ventilation and better monitoring of hazardous gas. Improved techniques for eliminating and/or diluting methane emissions have also increased safety (Worldcoal.org 2015). Development of closed-circuit escape respirators “provide breathable air to miners in emergencies, such as an escape from a smoke-filled mine in the event of a mine fire” (NIOSH 2012). Improvements in computer technology contribute to increasing safety in minefields. Integrated detection systems (using GPS technology) and fleet

management systems provide more information to miners at different levels. Remote control dozers, autonomous mining machines, autonomous drilling and haulage decrease risk to operators and miners because they make it possible to digitally control machinery away from hazard areas (Vance 2012). Thus, given enough time and training, improvements in mining technology are likely to improve safety. Nonetheless, it is important to repeat here that buying new technologically advanced machines does not bring about safety immediately (Boudreau-trudel et al. 2014).¹³⁷ Education and training, together with appropriate legislation are required (ILO 2006; ILO 1991; ILO 1994; ILO 2002).

Mine size appears to be an important determinant of safety in mining. Since size of the mining companies correlate with the size of the mine, we discuss this matter in the next section.

7.4.2 Properties of the operating companies

As argued before SMEs are considered to be more risky than large enterprises. This consideration is supported by evidence from different industries. (EU-OSHA 2013; Nichols et al. 1995; Nichols 1997; Walters 2001; HSE 2009) For example, in construction “those working for small firms are at greater risk of fatal injury.” (HSE 2009, p.10) EU-OSHA (2014) report which also includes three mining cases studies also finds that SMEs are subject to greater risks. The report emphasizes the following factors:

- “Many OSH improvements are low-cost solutions, but sometimes SMEs have problems financing an OSH policy, owing to limitations on their access to capital and do not benefit from the effects of economies of scale.
- SMEs have problems implementing an OSH policy, owing to a variety of organizational features.
- Governments face difficulties in fostering effective OSH management in SMEs, mainly because there are so many SMEs and these businesses have limited resources” (EU-OSHA 2014, p.5)

Figure 42 summarizes two problems concerning SMEs: (i) Problems in implementing OSH policy and (ii) problems that enforcing authorities face. The figure is self-explanatory. Nevertheless, it is important to emphasize some important factors here. As argued in the previous section, informational problems are likely to bring about suboptimal safety levels according to economic theory. SMEs suffer from at least two informational problems. First, workers lack formal safety training and both employers and workers are likely to underestimate risks, because of lack of experience and training. It is also very likely that employers do not have enough information concerning safety regulations and costs of noncompliance. Secondly, because of non-standard employment practices workers are less likely to have bargaining power. Lack of bargaining power reduces firms’ efforts concerning safety.

¹³⁷ One study finds that most important factors in successful implementation of new technologies are the skill requirement and acceptance of the equipment by the operators (Boudreau-Trudel et al. 2015). There is a need for more research in this area, especially for developing countries.

82 % of occupational injuries and 90 % of fatal accidents happen in SMEs although less than 70 % of the workforce is employed in them. (The European Commission 2004)

Higher accident risks and incident rates in SMEs

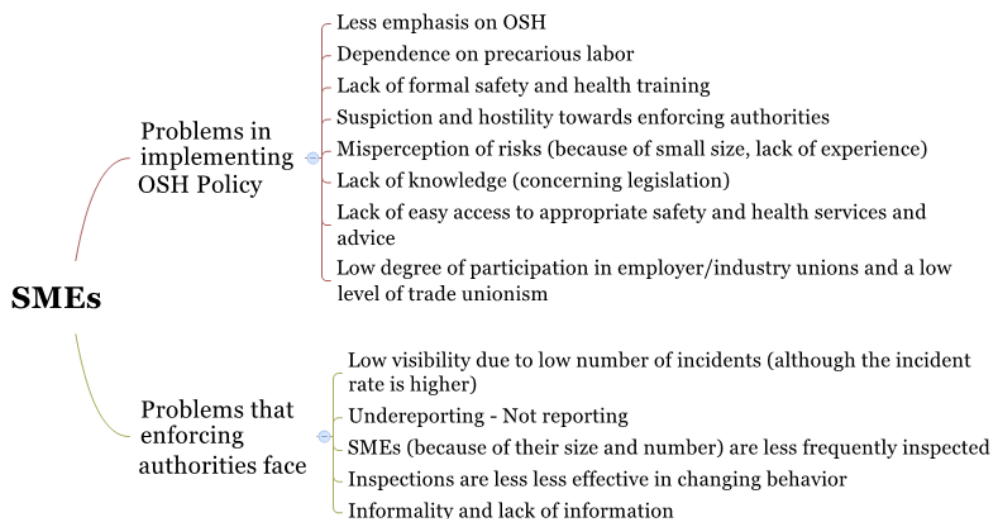


Figure 42 Small and Medium-sized Enterprises

Mining sector is similar to others in that small enterprises are commonly considered as being more risky. The focus in the mining sector is more on mine size and safety. Note here that small mine size correlate with the enterprise size, however this is subject to exceptions because large enterprises may operate many small mines. Nevertheless, a brief overview of the relation between mine size and safety is appropriate here.¹³⁸ Bennett and Passmore (1984) review the literature concerning mine size and safety and report that smaller mines had higher rates of fatal accidents. According to Bennett and Passmore (1984, p.40), in 19060s “U.S. Bureau of Mines officials have concluded that the size of the work force is a critical issue in mine accidents (Drury 1965) and have asserted that small mines are less safe than large mines.” In 1980s reports by U.S. National Research Council (NRC) also found a strong correlation between fatal injuries and mine size (NRC 1983; NRC 1982). These reports attributed higher fatality rates of smaller mines to “the shorter and intermittent mode of operation of these smaller mines and, in the Committee's judgment, a lack of top-quality mining equipment, a lack of adequate financial resources, and inadequacies in the training of workers and managers in these mines” (NRC 1983, p.2)

7.4.3 Types of contract arrangements and their effect on OSH

Mining firms engage in very complex contractual relationships. For example, assume that public authority owns the mining field. Firm A holds the license for mining operations and the agreement requires it to extract a certain amount of coal and transfer it to the public authority. Nevertheless, Firm A leases the mine to Firm B. They sign a royalty contract. As the main operator, Firm B outsources some of its operations to Firm C and Firm D. Firm C has technical expertise in underground mining and basically runs main mining operation. Firm C on the other hand runs supporting operations such

¹³⁸ Large enterprises operating (many) small mines are not very likely to suffer the problems of SMEs. However, if they are outsourcing mining operations, or engaging in subcontracting practices, mine size is more likely to be the determining factor. We discuss subcontracting in relation to OSH in the next section.

as transportation. Each firm has their own workers which are supplied by Firm E—a company specialized in finding short-term contract workers. Moreover each firm could have their own workers (with standard long-term contracts) and contract workers (hired for a short-period for specific tasks and/or with non-standard contracts). This hypothetical example is not far from truth. In fact the reality is much more complex because of the informal and sometimes illegal ways in which mining is organized.

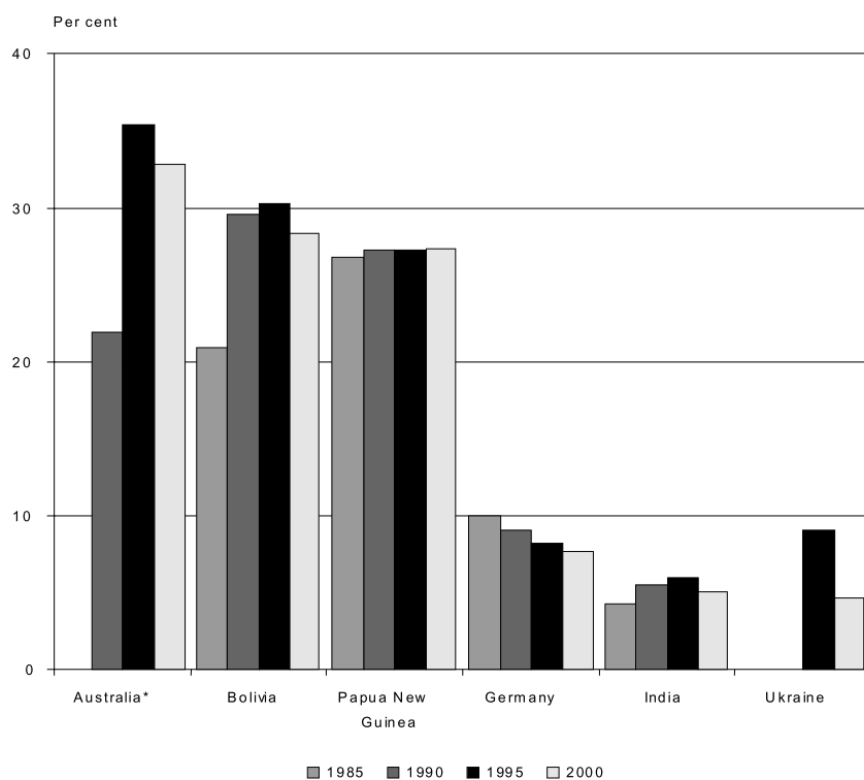
It is difficult to classify how work is organized because there are several employment schemes, such as outsourcing, self-employment, independent contracting, etc., that are similar in certain aspects and different in others. Informal and illegal employment practices also make it difficult to draw clear dividing lines between different types of work organization. Faced with economic pressures firms try to reduce costs by way of finding different ways to get work done in a more flexible and less costly manner. Outsourcing certain tasks is one way to organize production. Outsourcing helps firms to cut management costs. Hiring subcontractors may reduce costs if there is fierce competition among subcontractors. Similarly use of contract workers may also help mining companies reduce costs.

According to ILO (2002) an contract workers form an important part of the employment in the mining industry in many countries (see

Figure 43). “The use of contract workers has implications for both training – particularly safety and health training – and working time in the light of the distancing of the relationship between the principal employer and the contract worker in the mine, but not for the principal employer’s duty of care and responsibilities towards all the workforce” (ILO 2002, p.14). Although the use of contract workers or engaging in other subcontracting practices does not change principal employer’s duty concerning safety, in practice both has important OSH related adverse consequences.

For example, managing relations with many subcontractors may be costly. Subcontracting may also prevent firms from developing necessary skills and firms may become dependent on external sources and suppliers. Subcontracting (including outsourcing and use of contract workers) may have adverse effect on OSH practices for many reasons. Although, not conclusive evidence suggests that accident and fatality rates are higher among self-employed workers and among work places where subcontracting is exercised (Mayhew et al. 1997; Nenonen 2011; Blank et al. 1995; Salminen 1995; Mayhew & Quinlan 2006; Mayhew & Quinlan 1997; Muzaffar et al. 2013). In Turkey, subcontracting and sub-employment practices in the mining sector are commonly criticized. In fact, State Supervisory Council of the Turkish Presidency report cites subcontracting and sub-employment practices as important determinants of mining accidents in Turkey (DDK 2011). Several other reports also blame subcontracting as one of the main causes of mining accidents in Turkey (Güneş 2013; Arslanhan & Cünedioğlu 2010; TBB 2014; Buğra 2014; TMMOB 2014)

Figure 43 Contracted workers in the mining industry, 1985-2000, percent of the workforce



* Non-coal mines.

Source: Responses to ILO questionnaire.

Source: ILO 2002, p.12

Mayhew et al. (1997) reviews the literature on OSH related effects of subcontracting. They find that although job specific hazard and risk exposures are the most important determinants OSH, subcontracting had a strong secondary effect. They list four important factors concerning the relationship between OSH and subcontracting:

- Economic and reward factors
- Disorganization
- Inadequate regulatory controls
- Ability of workers to organize to protect themselves

7.4.3.1 Economic and reward factors

Economic priorities of self-employed, small enterprises and subcontractors may force them to ignore OSH risks. Moreover, because they may not be as flexible as larger firms in adjusting their costs, they may not invest in preventive activities. Economic theory suggests that high risk jobs would pay higher risk premiums to workers. However, this may not be true for subcontractors for many reasons. Because of short-term contracts, workers may not be informed about job related risks, and they may underestimate risk. Moreover, if the contract forces put pressure on the subcontractor with production targets and deadlines, subcontractors and people work for them may overlook risks. For example, “where ‘incentive payment’ bonuses are given for a quicker than tendered completion time, higher levels of occupational injury and stress may result, or where major contracting firms (as in road transport) offered bonuses or impose penalties on the basis of the time taken to complete tasks” (Mayhew et al. 1997, p.167). Additionally, the fear of job loss make contract workers more vulnerable to hazards (Baugher & Roberts 1999). Subcontracting practices are more likely to involve informal practices, which may reduce adherence to OSH regulations.

7.4.3.2 Disorganization

Mayhew et al. (1997, p.167) argue that “subcontractors are often engaged in horizontally (multiple subcontractors) and vertically (pyramid subcontracting) complex relationships”. Complex subcontracting practices are likely to bring about disorganization in the workplace (Mayhew & Quinlan 2006; Mayhew & Quinlan 1997; Mayhew et al. 1997; also see: Dwyer 1991). “These complexities flow on to OHS, creating ambiguity, undermining OHS control systems or making them more difficult to implement, and even leading in some instances to deliberate evasion of legal responsibility for OHS” (Mayhew et al. 1997, p.167).

Some of the inauspicious organizational consequences of subcontracting/outsourcing may be due to (Mayhew et al. 1997; Mayhew & Quinlan 2006):

- Fragmentation of tasks
- Ambiguity in task definition
- Ambiguous responsibilities
- Difficulty in cooperation because of unclear relationships between groups of workers (i.e., between workers and contract workers)
- Working with individuals who do not have adequate information concerning the workplace and hazards

These factors may bring about disorganization in the workplace, but more importantly, they could make OSH management very difficult. The above cited factors may explain why workplace accidents and ill-health correlate with subcontracting, outsourcing, self-employment, and with other non-standard work arrangements.

7.4.3.3 Inadequate regulatory controls

As Mayhew et al. argue (1997, p.168) subcontracting could make regulatory controls very difficult. As we explain later on although Turkish legislation tries to identify whom is responsible from OSH violations, in practice it is very difficult to identify and monitor OSH related responsibilities if mining company is working under a complex subcontracting scheme. Moreover mining companies have incentive to sidestep OSH regulations hence they may engage in informal and illegal activities. Subcontracting often leads to complex multi-employer worksites or numerous isolated worksites which stretch both regulatory resources and create complex webs of legal responsibility. Moreover, subcontractors and self-employed workers are often not effectively covered by employment

regulations or union-negotiated collective agreements. Their employment practices are therefore subject to little scrutiny, and standards imposed under OHS laws may have no real meaning in the absence of inspection and enforcement. The shift to a more decentralized industrial relations system via enterprise bargaining may further limit the effectiveness of what OHS controls do exist” (Mayhew et al. 1997, p.168)

7.4.3.4 Ability of workers to organize to protect themselves

Lastly, subcontracting and short term employment contract schemes exercised by subcontractors reduce the ability of workers access information concerning safety and their collective bargaining power. As economic theory suggests, inadequate information concerning safety and restricted bargaining power are likely to produce suboptimal safety levels. Furthermore, “normal labor process protective mechanisms do not always apply to these subcontractors as they only rarely belong to employer associations or unions, and even where they are covered by industrial relations regulations, these are usually less than effective” (Mayhew et al. 1997, p.168).

7.4.4 Other potentially important issues

A number of other factors influence the number and frequency of mine accidents: Age, experience, training, shifts per day, shift time, longer working hours, unionism, availability of other jobs, production pressures.¹³⁹

7.4.4.1 Age, experience and training

Some evidence suggests that younger miners may be more vulnerable to workplace accidents. This is compatible with the predictions of economic theory. Younger workers have less experience compared to older workers. And evidence suggest that less experienced workers experience higher rates of accidents (e.g., Siskind 1982). Moreover, they are more likely to be less risk averse and underestimate risks of injury. Nevertheless, there is some evidence that suggests that as age and injury rate relationship might have a U-shaped form; where youngest and oldest workers are most vulnerable to risks—i.e., middle age workers being the less vulnerable. One interpretation for this is that while younger workers have less experience, oldest workers might be vulnerable because of their age factor—i.e., losing their ability to operate under risky conditions, where alertness and agility are important. Also note that research indicates that as workers get older they spend more time away from work after an injury (Margolis 2010). Thus, despite the fact as the experience has a positive effect on safety, older age may have offsetting effects. Training on the other hand may offset the negative the negative effects of younger age and inexperience. Bennett & Passmore (1984, pp.41–2) reviews several studies that focus on the relation between training and injury rates. Evidence is somewhat mixed but the literature generally suggests that better training is essential for job safety (Cohen & Colligan 1998). Training is not only essential for work performance but it also increases the ability of workers to respond to routine hazards and emergencies. The real concern in the literature is about the type of training that would achieve the best results.

7.4.4.2 Shifts per day

Where applicable number of work shifts in a day may have some consequences concerning safety. According to Bennett and Passmore (1984, p.41) there are two arguments on this matter. On the one hand, a work schedule that includes two shifts for production and one shift for maintenance is argued to be better, because maintenance shifts help the mine operator control risks in a better way. On the other hand, some argue that a separate maintenance shift does not make the mine safer because maintenance shifts do not include production workers. The argument is that without production

¹³⁹ Lists is adopted from Bennett and Passmore (1984)

workers enough attention would not be paid to workplace risks. The evidence suggests three shift work schedule enhances safety in mines that use conventional equipment; however it has no effect in mines that use continuous mining equipment.¹⁴⁰

7.4.4.3 Shift time

Bennett and Passmore (1984, pp.41–2) review of the literature concerning the relationship between shift time and accident rates is inconclusive. Nevertheless, night shifts lower work performance and increase fatigue levels (Shaw Idea 2010). Hence, shift arrangements that do not take how shift time influences work performance and fatigue are likely to cause adverse health effects and possibly more accidents.

7.4.4.4 Longer working hours

Although shift time does not seem to effect accident rates, Muzaffar et al. (2013) suggests that longer working hours may have adverse consequences on safety. As we have cited earlier, they find that fatality rates among contractors are higher than those of operators. They also find that among contractors accidents are more likely to occur “on the first shift more than 8 hours after starting work” (Muzaffar et al. 2013, p.1342). Long working hours also have adverse health effects (Shaw Idea 2010).

7.4.4.5 Unionism

Economic theory suggests that union workers are more likely to receive compensating wage differentials than non-union workers, because they have more information concerning risks and more bargaining power. For these reasons firms that employ union workers are more likely to invest in safety according to economic theory. Hence, we might expect accident and injury rates among union workers to be lower in comparison to non-union workers. However, as we have seen predictions of the theory might not be realized if there are frictions in the labor market. For example, in the firm has monopsony power, bargaining ability of union workers may be significantly reduced. Bennett and Passmore’s (1984, pp.42–3) review of the literature suggests that there is no clear evidence concerning unionism and safety. For example, U.S. National Research Council’s (NRC 1982, p.12) report suggest that although at the first sight non-union mines appear to be more dangerous, this difference between union and non-union mines can be explained with differences in mine sizes; because non-union mines are commonly smaller mines:

“Nonunion mines overall have twice the fatality rate of union mines; however, this difference can be fully explained by differences in mine size between union and nonunion mines. Union mines have a somewhat higher disabling injury rate than do nonunion mines, but closer inspection of the data suggests that this is largely a reporting phenomenon. Clear differences in fatality and injury rates emerge between the states with underground coal mines. Among the seven largest producers Alabama, Illinois, Kentucky, Ohio, Pennsylvania, Virginia, and West Virginia the disabling injury rate in Kentucky has been considerably lower than in the other states. The fatality rate in Virginia has been larger than that of other states; this difference is due in part, but not entirely, to a greater proportion of small mines in Virginia than in other states.” (NRC 1982, p.12)

¹⁴⁰ The conventional mining techniques are “made up of the cyclic operations of cutting, drilling, blasting, and loading, developed in association with room-and-pillar mining. The oldest of the basic underground methods, room-and-pillar mining grew naturally out of the need to recover more coal as mining operations became deeper and more expensive. During the late 1940s, conventional techniques began to be replaced by single machines, known as continuous miners, that broke off the coal from the seam and transferred it back to the haulage system.” (Evans 2015)

7.4.4.6 Availability of other jobs

As we mentioned earlier, Kahn (1991) conducts an empirical study of Kentucky coal mines. In a game theoretical setting he studies the effect of monopsony and the entrance of additional firms to the market. His finds that the number of firms may have important consequences on OSH levels. In one setting, entrance of a second firm decreases the safety level. However entrance of third and fourth firms increase safety. Nevertheless, the result of the model is ambiguous. For this reason, Kahn conducts an empirical study concerning Kentucky coal mines. He argues:

“The clearest result from the empirical work in this paper is that, given the level of firm and industry employment, the extra choices offered by competition lead to a higher level of safety. For this labor market, at least, when more alternative choices in the same occupation are offered, average occupational safety levels increase” (Kahn 1991: 22)

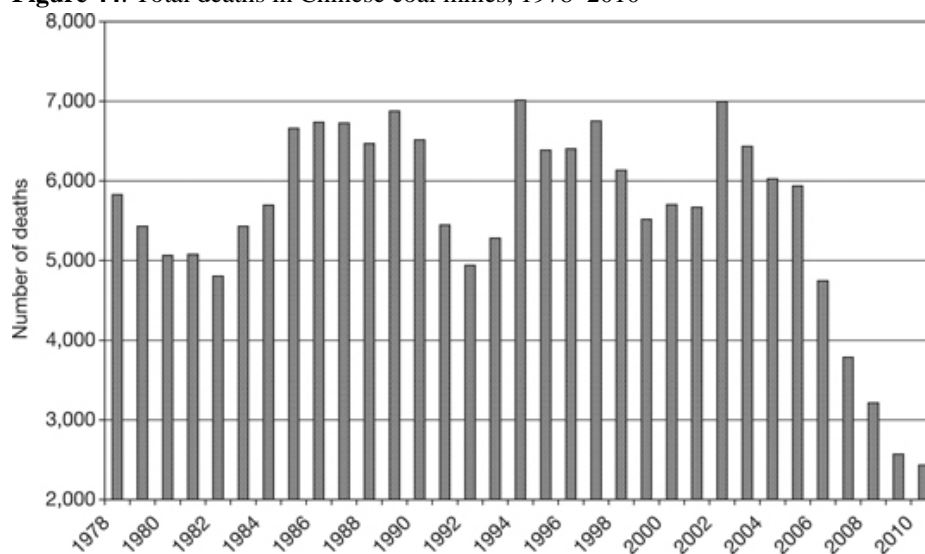
7.4.4.7 Production pressures

Another factor they may affect accident and injury rates is production pressures. Ruser and Buttler (2009) suggest that there is a relationship between business cycles and work place accidents. As the economy is the growth cycle, accident rates increase. This may be explained as follows: Increasing production may force firms to make their workers/workers work overtime, and employ new and inexperienced workers. Moreover, with the pressure of increasing demand, firms might put obsolete equipment into work, and/or invest in new machines. Overtime work and employment of new workers are likely to increase accident and injury rates. Also, because workers/workers are likely to be unfamiliar with older/obsolete or new equipment, this is likely to increase accident and injury rates. On the other hand, when the economy slows down production pressure disappears and hence accident rates may settle down on their ordinary levels. Yet note that in a downturn workers job opportunities will also be scarce. For this reason, underreporting of accidents may also contribute to the decreasing recorded accident and injury rates. In sum, it seems to be very likely that when firms try to produce more in a given amount of time, this will have adverse effects on safety. This is important for the coal mining industry because, coal is an important ingredient of energy production. Developing countries such as China and Turkey that are hungry for growth, base their energy policy on coal production. This may have adverse safety effects as the discussion suggests.

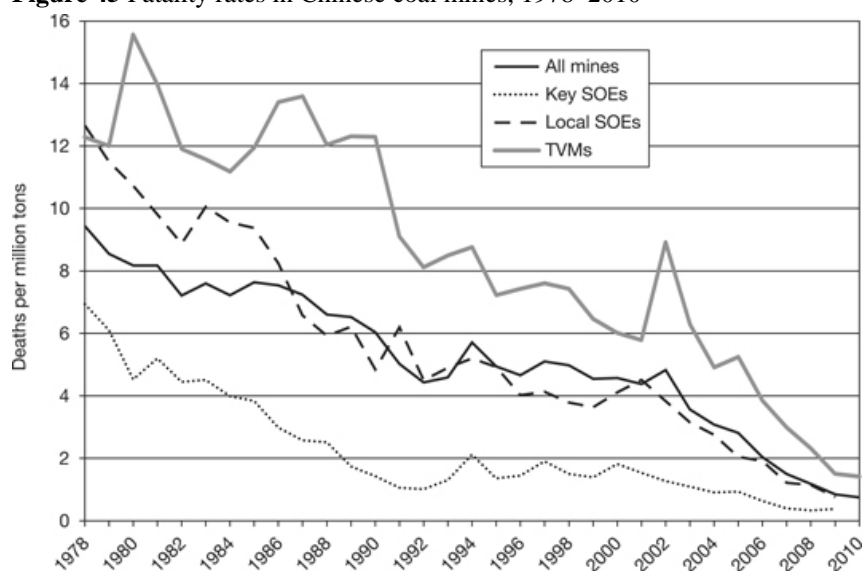
7.5 An international outlook

7.5.1 Lessons from China

China is a major producer and consumer of coal. Moreover coal production is at the hearth of China’s economic growth strategy (Shen et al. 2012). Nevertheless, China is also well-known for its major and deadly mine accidents. However, recently safety tracks record of Chinese coal mines has been reported to be improving. Both number of deaths (**Figure 44**) and fatality rates (**Figure 45**) in the Chinese coalmining industry have declined significantly. **Figure 44** shows that number of deaths has been steadily decreasing since 2003. It illustrates that there is a major decline in fatality rates in coal mines. For these reasons China is sometimes presented as an interesting role model for other countries, such as Turkey, that have high accident and fatality rates (Wright 2015). It is instructive to look at the Chinese experience in our quest for understanding the determinants of OSH practices in the Turkish coal mining sector. How did China improve its safety track record? Are there any lessons in the Chinese experience for countries such as Turkey?

Figure 44. Total deaths in Chinese coal mines, 1978–2010

Source: Wright 2012

Figure 45 Fatality rates in Chinese coal mines, 1978–2010

Source: Wright 2012¹⁴¹

The improvements in the safety track record in Chinese mines are reported to be outcome of the following measures taken by the Chinese government:

- A move away from dangerous underground coal mines by increasing the number of open-cast mines;
- More emphasis on compliance with safety regulations, incentivizing mines to invest in preventive activities;

¹⁴¹ “This figure uses adjusted figures for output (and therefore deaths/million tons) for the years 1994–2005. Deaths in small pits operated by key SOE mines are debited to the key SOE mines.” (Wright 2012)
Abbreviations: **TVM**: Township and village coal mine. **SOE**: State-owned enterprise

- Additional measures for compensation; closing of dangerous small-mines or consolidation of such mines (Wright 2015; Wright 2012; Shen et al. 2012; Geng & Saleh 2015).

Tim Wright, an expert on Chinese coalmining, evaluated the results of these measures as follows.

“When, however, the safety issue moved up the list of priorities in the mid-2000s, partly in response to a series of high-profile and catastrophic mining disasters, partly owing to a more autonomous shift in leadership priorities, the state began to implement a more successful series of policies that at least appears to have had a spectacularly positive effect on the rate of coal mining deaths. This success can partly be ascribed to the greater availability of resources resulting from the steep rise in coal prices. At the same time, however, the state appears to have learned from some of its earlier failures and adopted a more nuanced set of measures to achieve its aims. Most importantly, to some extent at least, it has attempted to assuage local opposition by going down the path of mergers and acquisitions rather than closures. [...] Nevertheless, the policy does seem to have registered much more success than previously. One might want to discount press reports of the consolidation of mines, and certainly in some places this was done for form’s sake only. But unless the safety statistics are totally fabricated – and I do not believe that they are – the reduction by 50 per cent in the number of deaths and around 75 per cent in the death rate per million tons since 2004 must show a radical change in the situation at ground level.” (Wright 2012)

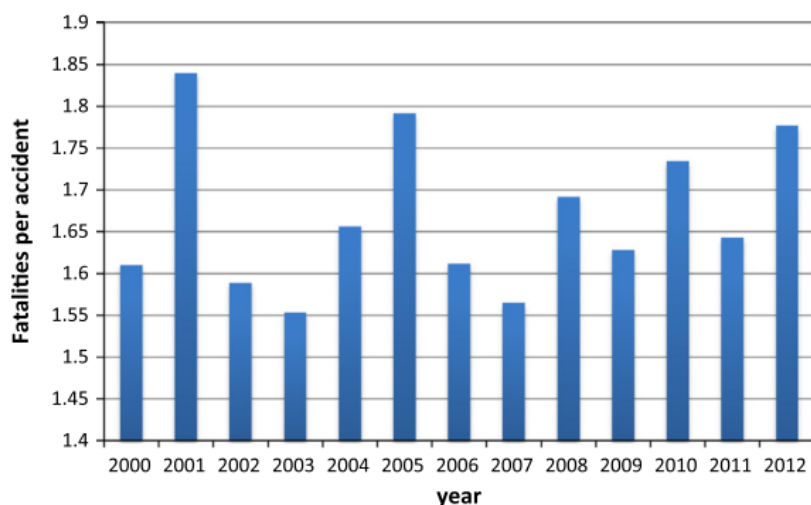
As explained by Geng and Saleh (2015, p.40), between 1998 and 2001 China closed approximately 50,000 Township and Village Enterprises (TVE) and privately owned coalmines (P). It also introduced a number of policies in order to increase safety. China Labour Bulletin (2008) list a large number of policy changes after 2003. However, the major change occurs in 2005; after the Sunjiawan, Shanxi mine accident which killed 204. In August 2005, a directive called *Circular on the Immediate Closure and Restructuring of Coal Mines that Fail to Meet Safety Standards and Operate Illegally* was issued. According to this directive mines that failed to obtain a production safety license were to be closed down (China Labour Bulletin 2008, p.9). Another directive, “*Certain Opinions on Strengthening Coal Mine Work Safety and Standardizing the Integration of Coal Resources* called for the closure by the end of 2007 of mines with an annual production capacity of less than 30,000 tonnes. In June 2006, it was estimated that of the 17,000 small coal mines in China, a third fell into this category.” Moreover, “the State Council’s *Certain Opinions on Promoting the Healthy Development of the Coal Mining Industry*, issued on 7 July 2005, promoted big mining companies and groups, encouraged small mines to restructure and merge into bigger firms, and advocated closing down small mines that were poorly organized, lacked adequate safety, wasted resources and polluted the environment” (China Labour Bulletin 2008, p.10). Last but not the least, benchmark for fatal accident compensation was increased to 200,000 Yuan (China Labour Bulletin 2008, p.21). Among others these regulations stand out as playing a role in China’s success in reducing its death toll.

This narrative concerning China’s success is raises hopes for other countries. It suggests that OSH regulations and strict measures may bring about a reduction in accident risks and fatalities. However, what happened in reality is not that promising, but teaching.

The question at stake is whether safety increased in Chinese mines, or not. First suspicion concerning the Chinese success story arises when we look at fatalities per accident. **Figure 46** illustrates that fatalities per accident did not decrease in China between 2000 and 2012. That is, whenever accidents happen they are still as deadly as before. Of course, this is not a good measure of the change in safety

of Chinese mines. If it is not supported by other evidence, we cannot infer much from this data. Thus, in order to understand what this picture suggests we need to look at other sources of evidence.

Figure 46 Chines coalmine fatality per accident



Source: (Geng & Saleh 2015, p.44)

China Labour Bulletin (2008) gives a good overview of what happened as a response to the above mentioned regulations. It is reported that local authorities and mine operators responded to these regulations in several ways. They did not implement the regulations. For example, the township government was instructed to “‘immediately stop production and improve safety’ in local mines”, but it did not follow this order. Instead, mines hid their activity by “suspending their operations during the day while continuing” to produce at night. Interestingly, later on officials discovered that “not only mines had been shut down, but new mines had been opened” (China Labour Bulletin 2008, p.10). Moreover, local authorities and mine operators invented ways to avoid regulations. One method was to close abandoned mines instead of operating mines. Another “innovation” was to keep mines open by way of approving increased production capacities for local mines; even though these mines did not invest in technological improvements (China Labour Bulletin 2008, p.11). Last but not the least there was widespread corruption that allowed informal and illegal production and underreporting of accidents, injuries and fatalities (China Labour Bulletin 2008, pp.12–16).

“China Labour Bulletin has identified in this report the key reasons why the government’s initiatives have failed to have a significant or lasting effect on mine safety. Firstly, the system of contracting mines out to private operators on a short-term basis has led to contractors seeking a maximum return on their investment in the shortest possible time; production capacity is exceeded way beyond safe levels, investment in safety equipment is insufficient or non-existent and unskilled and untrained workers are hired as miners. Secondly, mine owners and local officials have created an almost impenetrable network of collusion that prevents central government safety measures from being enforced. Finally, mine workers have no representative body to negotiate with mine owners and management over wages, working conditions and mine safety. The balance of power, particularly in privately owned mines, is so one-sided that workers are left essentially powerless to protect their own interests.” (China Labour Bulletin 2008, p.40)

Our question was whether the safety in operating mines has increased or not. The story of how regulation worked in practice sheds doubt on the impressive improvements in safety in China. One

reason is that there seems to be an important amount of under- and misreporting. Moreover, it is possible that reported decrease in number and rate of fatalities is due to the closure of small coalmines, rather than an increase in the safety of operating mines. Geng and Saleh (2015) entertain this idea and find that it is hard to argue that the safety levels of remaining mines has increased:

“We found for example that significant under-reporting and/or data manipulation of fatality numbers in coal mining accidents occurred before 2007. We also found that mining accidents are sometimes (mis)classified as ‘natural disasters’, and as a result, their fatality numbers are not tallied in the official statistics. In short, there are several systemic and structural mechanisms that bias and distort official safety statistics in Chinese coalmines. Second, we found that it is doubtful that safety improvements have occurred in operating Chinese coalmines since 2000. We argued that it is likely that the reduction in total fatality and accident numbers can be explained by the closure of TVE/P mines or the exclusion of their fatality statistics. This does not reflect effective safety regulations. In addition, the massive closedown policy of TVE/P¹⁴² mines is likely to have pushed many of them to operate outside the regulatory oversight. Of the tens of thousands of TVE/P coalmines that have been officially closed, those that sprung back are no longer inspected and their safety statistics not reported. Third, we found that the official fatality statistics may underestimate the actual fatality numbers by a factor ranging from 3 to 5. Finally we concluded our data analysis with a risk matrix of Chinese coalmines and proposed a prioritized list of coal mining hazards for targeted safety interventions and improvements.” (Geng & Saleh 2015: 48)

The case of China is teaching for at least three reasons.

- Firstly, the evidence suggests that most of the reduction in number of accidents and fatalities is caused by the closure of small mines. We have presented evidence above that small mines are likely to be more risky. Thus, OSH regulations should particularly focus on the way in which small mines operate. If closing small mines is not an option, ensuring that safety conditions are improved in these mines is imperative.
- Secondly, the brief account of the experience of China suggests that informality should be an important concern for regulators. Ensuring that there are no informal, illegal mines in operation and that informal work arrangements do not exist in the mining sector is essential for OSH policy.
- Thirdly, corruption is an important concern. Connections between local or government officials may undermine the success of OSH regulations. And last but not the least, mis- or underreporting of accidents may create a false sense of success. Successful OSH regulation needs to ensure that mis- or underreporting practices do not exist, and that accidents do not go unnoticed.

7.5.2 Lessons from the USA

There have been dramatic improvements in OSH in many countries. For example, mining safety in USA improved significantly since 1900s (Saleh & Cummings 2011; Kohler 2015) presents the dramatic improvement in safety in the USA mining industry. Kohler (2015) argues that improvement in safety was a result of OSH regulations and technological improvements. In fact, key legislations represented in seem to overlap with improvements in safety. Thus, a quick look at the graph seems to suggest that regulations have something to do safety improvements. However, not all economists would agree with this view. One could challenge the view presented by Kohler (2015) by arguing that

¹⁴² **TVE/P:** Township and Village Enterprise mines and privately owned coalmines (Geng & Saleh 2015: 39)

there was already a downward trend in fatality numbers and rates, and this downward trend was produced by market forces (including improvements in technology). This argument challenges the view that OSH regulations and their better enforcement increased safety, by pointing out that even in the absence of these regulations we would observe a similar trend. Thus, the argument goes, the role of OSH regulations in reducing safety may be more limited than it first seems. As mentioned earlier, economic theory suggests that if markets are competitive an optimal level of safety would be achieved because of the existence of compensating wage differentials, and that OSH regulations are likely to produce suboptimal outcomes. OSH regulations can improve safety and welfare by removing imperfections and especially by providing appropriate information concerning safety risks. In fact, some economists use similar arguments (see Leeth 2011 for a review of the literature). For example, Leeth (2011) argues that:

“The empirical evidence on OSHA’s effectiveness in improving worker safety and health is mixed. The most optimistic guess based on existing estimates is that OSHA has modestly lowered the frequency of occupational injuries and illnesses. Yet despite OSHA’s fairly small impact, the rates of occupational fatalities and nonfatal injuries continue to trend downward. The overall decline partially reflects changes in the industrial structure of the American workforce and general improvements in safety technology over time, but the decline also reflects the changing financial incentives facing firms, causing them to be more concerned with worker safety.” (Leeth 2011, p.38)

The argument, of course, is not that the regulations had no effect at all, but that their effect was limited that costs might have outweighed benefits. Because the empirical evidence is somewhat mixed, the argument is not conclusive. But if it were true that OSH regulations had minimal impact on safety in USA, what would this tell us about OSH regulations and practices in other countries? If this argument is true, the market conditions in USA must be close to the one stated by economic models, or in time the conditions must have improved in such a way to let the market forces do their job. Thus, even if the argument concerning the effectiveness of OSH regulations in USA were true, it would not tell us much about countries that have imperfect product and labor markets, not to mention other imperfections such as informality and corruption.

Summary and Conclusions

This section provides an overview of economic determinants of OSH practices. The economic theory suggests that accident and health risks across occupations will be reflected in wages and that workers will be compensated for the risks that they undertake. The extent to which compensating wage differentials reflect risk differentials across industries appears to be an important determinant of the safety level that will be attained by market forces. Workers, firms and public authorities face opportunity costs and OSH regulations should take these costs and offsetting effects into account. Safety level also depends on how much individuals and public authorities value the commodities that are produced by the risky industry. While economic models imply that OSH regulations are likely to reduce welfare these are highly abstract models which are not robust to all changes in their assumptions. Economic analysis proceeds in an institutional vacuum and ignore the influence of existing institutions and regulations on OSH practices, while these in actual practice also are important determinants of OSH practices. The cost and benefits that one needs to analyze in practice are much more complex than those suggested by abstract economic models. Economic models commonly focus on employers and workers, but in the real world OSH practices are influence by the decisions and actions of many other actors. Economic incentives are thus influenced by a complex

set of factors including the characteristics of the working environment and the type of work; governance and regulation; OSH management practices; labor relations, unions and employers organizations; economic factors as well as other factors such as research on OSH, public awareness, etc.

As regards mining, analyses of determinants for accidents include references to properties of the mine including in particular their size; SMEs are considered to be more risky than large enterprises; better technology increases safety in the long term; workplace accidents and ill-health correlate with subcontracting, outsourcing, self-employment, and with other non-standard work arrangement. More specifically, economic priorities of self-employed, small enterprises and subcontractors may force them to ignore OSH risks. Subcontracting practices are more likely to involve informal practices, which may also reduce adherence to OSH regulations. Complexity of the subcontracting practices may bring about disorganization in the workplace, and render OSH management very difficult. Subcontracting could make regulatory controls very difficult. Subcontracting creates complex webs of legal responsibility. Moreover, due to informality subcontractors and self-employed workers are often not effectively covered by employment regulations or union-negotiated collective agreements. Subcontracting and short term employment contract schemes exercised by subcontractors reduce the ability of workers access information concerning safety and their collective bargaining power.

Other factors may include the age of the workers, the shift organization in mining, longer working hours, the levels of training and the availability of other jobs. Unionized workers are more likely to receive compensating wage differentials than non-unionized workers, there is no clear evidence concerning unionism and safety. Production pressures are recorded to have adverse effects on safety. Internationally data from China suggests that their reduction in the number of accidents and fatalities is mostly related to the closure of small mines and that OSH regulations should particularly focus on the way in which small mines operate; that ensuring that there are no informal, illegal mines in operation and that informal work arrangements do not exist in the mining sector is essential for OSH policy, and that successful OSH regulation needs to ensure that mis- or underreporting practices do not exist, and that accidents do not go unnoticed. Moreover, connections between mining companies and government officials may undermine the success of OSH regulations.

8. INFORMATION ON PRACTICE IN STATISTICS

Introduction

In this section, we aim to statistically link the occupational accidents and fatalities with sectoral production patterns after providing a detailed description of the national legal framework of the OSH practices. As the Soma incident clearly indicated, operations and OSH practices in the mines are not exactly in par with the regulatory framework that exists on paper. A major concern in the media and interviews has been the 'short-sightedness' problem in the sector, i.e. firms focusing on short term massive extraction of resources and stretching the capacity beyond acceptable risk levels. Short term focus also implies that gross fixed investments as well as occupational health and safety investments fall behind the required levels for long term efficiency and risk management. In this section, we rely heavily on the Annual Industry and Services Statistics provided by the TURKSTAT to present a comparative perspective on the employment, physical investments, and profits in the coal mining sector. Our benchmark sectors for comparison are construction, electricity gas and water sewerage, and manufacturing. We then attempt to link accident rates with sectoral profits and investments per worker.

8.1 Statistical data concerning coal mining accidents and fatalities in Turkey

Turkey is no stranger to fatal coal mining accidents. Since the turn of the millennium, Turkey had a coal mining accident resulting in double digit fatalities almost every year. In addition, the features of the accidents in the coal mining are discussible in some points. Accordingly, the fatalities in Turkish coal mines resists on not decreasing. Consequently, OSH regulations and their deficiencies are frequently discussed in mainstream media by experts.

Firstly, Turkey has one of the highest accident rates per million tonnes of coal produced compared to major coal producers. A longitudinal analysis of coal miner fatalities per million tons of coal mined reveals rather interesting findings for the case of Turkey (see **Error! Reference source not found.**). When compared with other large coal producing countries such as the United States, China and India, Turkey's record in fatal accidents appears to be both worrisome and volatile. Between 2009 and 2010, the number of fatalities per million tons of coal production in Turkey jumped from 0.03, a level similar to that of the United States, to 1.06, a number worse than infamous China for that specific year. Likewise, in the following two years Turkey's coal miner fatalities per million tons produced fell drastically to 0.26 in 2012, though initial calculations suggest that the figure was once again at the 0.6 level in 2013.

Secondly and maybe more interestingly, Turkey has the highest accident occurrence rate per unit of energy potentially produced in mines (see **Table 2**). Accordingly, fatalities per GigaWatt (GWh) electricity production from coal production is the most volatile and the highest in Turkey between 2007 and 2012 when compared to United States, China and India. The second highest fatality rate per unit of energy produced from coal between 2007 and 2012 is pertaining to China, which is still far below than Turkey. Also, China seems to succeed to decrease the fatality rates from 0.244 to 0.066 from 2007 to 2012. India has almost the same fatality rates per unit of energy produce from coal with China until 2010, which is also decreasing at smoother rate than China. Remarkably, US has the least fatality rates per unit of energy produced from coal between 2007 and 2012, which is ranging from minimum 0.09 to maximum 0.022.

Thirdly, almost all of the major coal mines accidents with 10 or more fatalities since 1995 had taken place in private owned mining operations (see Table 3). Yet, the only exemption is a state-owned enterprise in scope of privatization. The firedamp explosion is the most common reason of major coal mining accidents. In addition, the historical mass fatality occurred in Soma, which is private-run coal mining.

So, there are two main questions to answer: 1) Why is Turkey's performance in OSH of coal mines significantly worse than other comparable countries and 2) Why does Turkey's performance in occupational safety greatly fluctuate whereas all other countries have a rather stable linear or downward trend? In this section answers to these questions will be sought among indicators that are suggested to be causally related with OSH performance in established academic literature.

8.2. Firm Level Analysis

8.2.1 Sources and limitations

The analysis presented in this section relies on TURKSTAT's Annual Industrial and Services Statistics and the Household Labour Force Statistics for the years 2004-2012 and 2008-2012 Statistical Yearbooks of the Social Security Institution (SSI). These different sources provide some useful information and insights on the industrial structure, albeit with serious limitations which will be further explained below.

TURKSTAT's Annual Industrial and Services Statistics is a firm-level data that is collected based on a representative sample of Turkish enterprises under NACE Revision 2 classification of industries.¹⁴³ TURKSTAT uses both full enumeration and sampling methods in compiling the Annual Industry and Services statistics. For the enterprises having more than 20 workers and for the enterprises active in some special classes, full enumeration methods are used while for the enterprises having less than 20 workers, sampling method is employed.¹⁴⁴ The statistics consists of several firm level indicators such as the annual average employment, investments, sales, profits, and costs between 2003 and 2012. The statistics prior to 2003 unfortunately does not classify the mining sector separately from the manufacturing sector and hence are not readily exploitable for data analysis. Statistics pertaining to 2013 and onwards are not yet available. The other two limitations of the data are that i) analysis aggregated only at the sectoral level is allowed to be publicly disseminated, and ii) certain characteristics of firms, such as the age, location, and type of legal entity are classified for public view.

The annual statistics by the Social Security Institution includes information on total number of employment injuries and occupational diseases as well as numbers on total death cases at NACE Revision 2 industrial classification. The two limitations with these statistics are that i) the data includes employment injuries and occupational diseases for the period only between 2008-2013, and ii) includes information on accidents that hit only the registered/formal employment. Hence we acknowledge that we have a very limited time series for sectoral analysis to link the injury rates with industrial characteristics and at the same time, we do not have a clear idea on the extent of the

¹⁴³ The industries include: B) Mining and quarrying, C) Manufacturing, D) Electricity, gas, steam and air conditioning supply, E) Water supply; sewerage, waste management and remediation activities, F) Construction, G) Wholesale and retail trade; repair of motor vehicles and motorcycles, H) Transportation and storage, I) Accommodation and food service activities, J) Information and communication, L) Real estate activities, M) Professional, scientific and technical activities, N) Administrative and support service activities, P) Education, Q) Human health and social work activities, R) Arts, entertainment and recreation, S) Other service activities. The sectors not included are; A) Agriculture, forestry and fishing, K) Financial and insurance activities, O) Public administration and defense; compulsory social security, T) Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use and U) Activities of extraterritorial organizations' and bodies

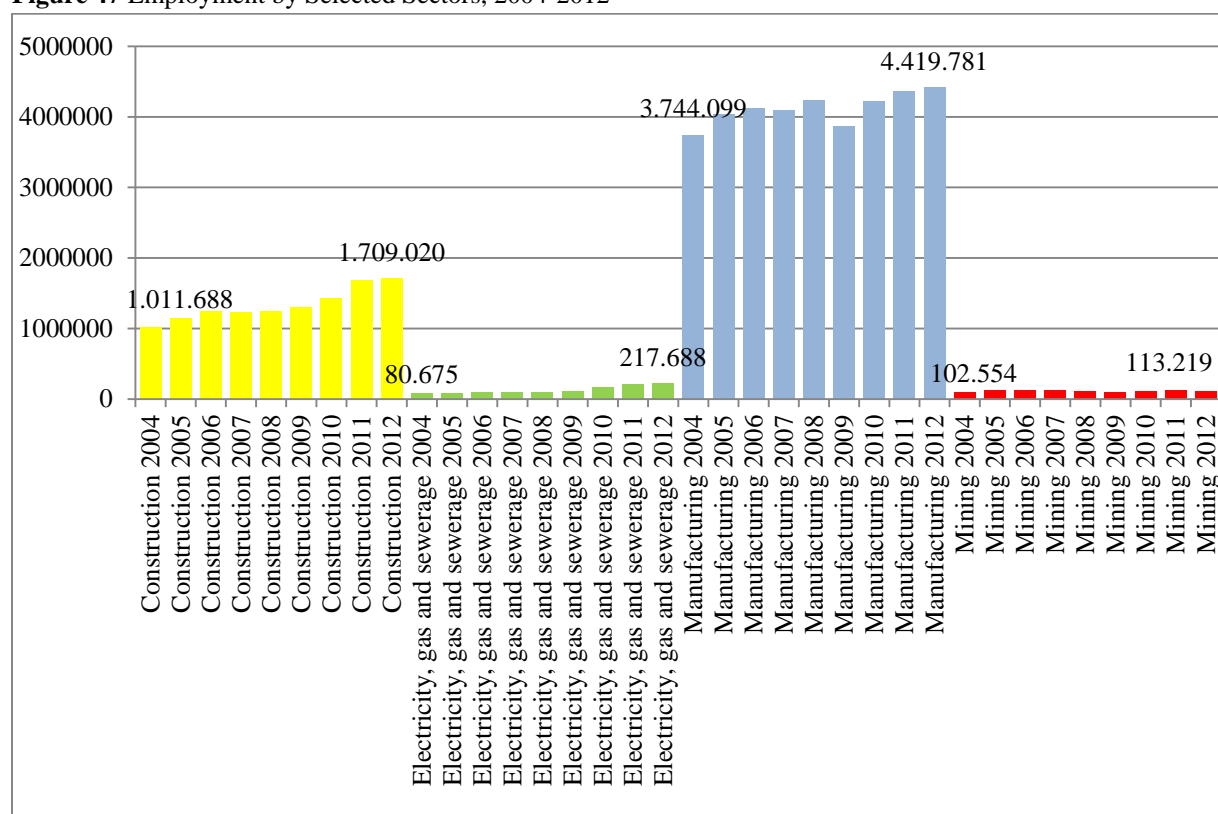
¹⁴⁴ http://www.turkstat.gov.tr/PreTablo.do?alt_id=1035

unreported injury cases faced by the informal workers. Therefore, what follows below is unfortunately limited to presenting certain statistical correlations, rather than establishing a causal relationship to explain what really drives the high fatality incidents in the mining sector. In our analysis, we provide comparisons of the mining sector characteristics with those of the construction, manufacturing and electricity, gas, steam, water supply and sewerage sectors.

8.2.2 The workforce

As compared to the other three comparison group, employment in mining and quarrying sector which includes the coal mining and lignite has exhibited the lowest growth rate, increasing to 113.2 thousand people in 2012 from 102.6 thousand in 2004 while the employment growth in construction sector was about 70 percent and 169 percent in the electricity, gas and water sewerage sectors.¹⁴⁵

Figure 47 Employment by Selected Sectors, 2004-2012



Source: Household Labour Force Surveys, TURKSTAT

8.2.3 Number of enterprises

According to TURKSTAT's Annual Industrial and Services Statistics figures, the number of enterprises in the mining and quarrying sector increased from 1.7 thousand in 2004 to 3.4 thousand in 2012. During the same period the number of enterprises in the manufacturing sector increased from 234.6 thousand to 336.9 thousand; in the electricity, gas and water sewerage, from 3.3 thousand to 4.4 thousand and in the construction sector, from 37.5 thousand firms to 143 thousand firms. These figures suggest that in all the sectors except for the electricity, gas and water sewerage, average sectoral employment per firm actually declined between 2004-2012. Average employment size per firm declined from 60 to 33.7 in mining and quarrying sector, from 16 to 13.1 in manufacturing sector and

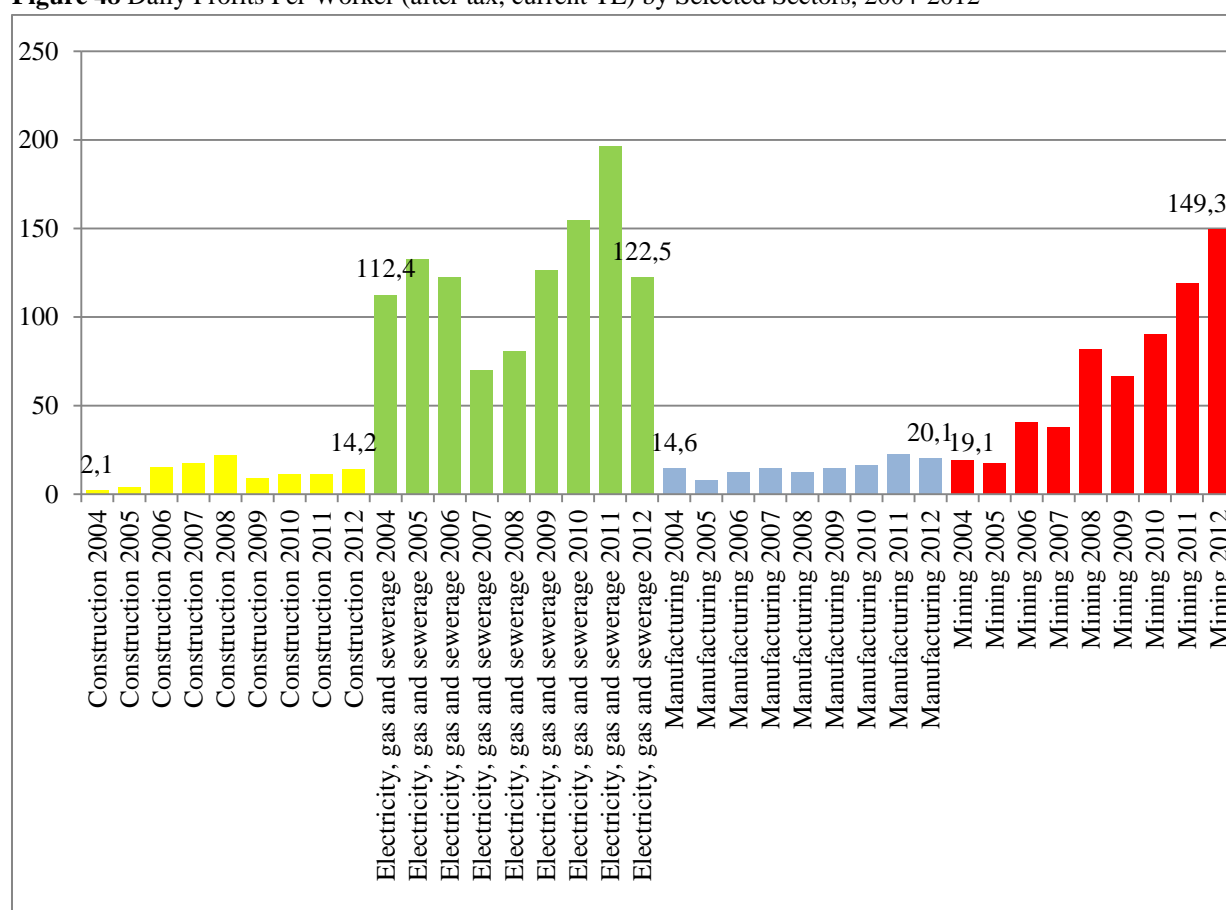
¹⁴⁵ The Annual Industry and Services Statistics suggest that the employment in coal mining and lignite exhibited a remarkable growth rate of 93 percent, increasing from 33.7 thousand in 2004 to 65.2 thousand in 2012. As explained in section 2 however, these figures do not match with household labour force statistics, due to different sampling and loss of prediction power under detailed industrial breakdown in labour force statistics.

from 27 to 11.9 in the construction sector between 2004-2012. Average employment per firm increased from 24.7 to 49.7 in the electricity, gas and water sewerage in the same period.

8.2.4 Daily profits

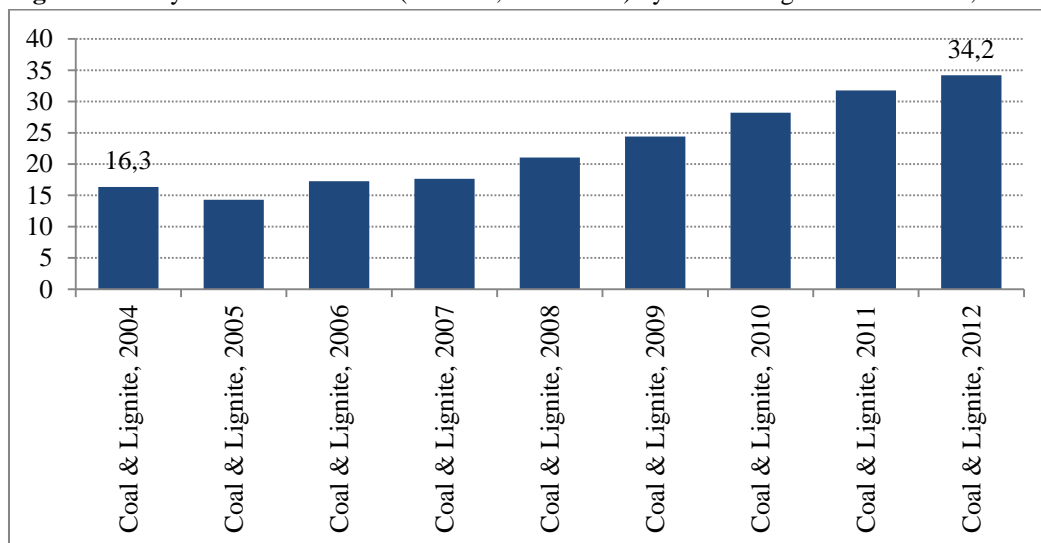
While we see that employment growth has been limited in the mining and quarrying sector, daily profits per worker actually demonstrated the highest growth as compared to the other three sectors between 2004-2012.¹⁴⁶ Daily after tax profits in the mining increased from 19.1 TL in 2004 to almost 150 TL in 2012 while we see much more limited profit increases in the electricity, gas and water sewerage and in the manufacturing sector. The only notable comparable to the one in mining is in the construction sector where the daily profits per worker increased from 2.1 TL in 2004 to 14.2 TL in 2012. Yet, the daily profits in the mining sector seems to be ten folds of the profits per worker in the construction sector. On the other hand, the daily profits (after tax) in the coal and lignite sub-sector increased more than two folds as well between 2004 and 2012. In particular between 2004 and 2007, daily profits per worker showed slight fluctuations, but have continuously increased from 17.6 TL to 34.1 TL especially after 2007.

Figure 48 Daily Profits Per Worker (after tax, current TL) by Selected Sectors, 2004-2012



Source: Annual Industry and Services Statistics, TURKSTAT

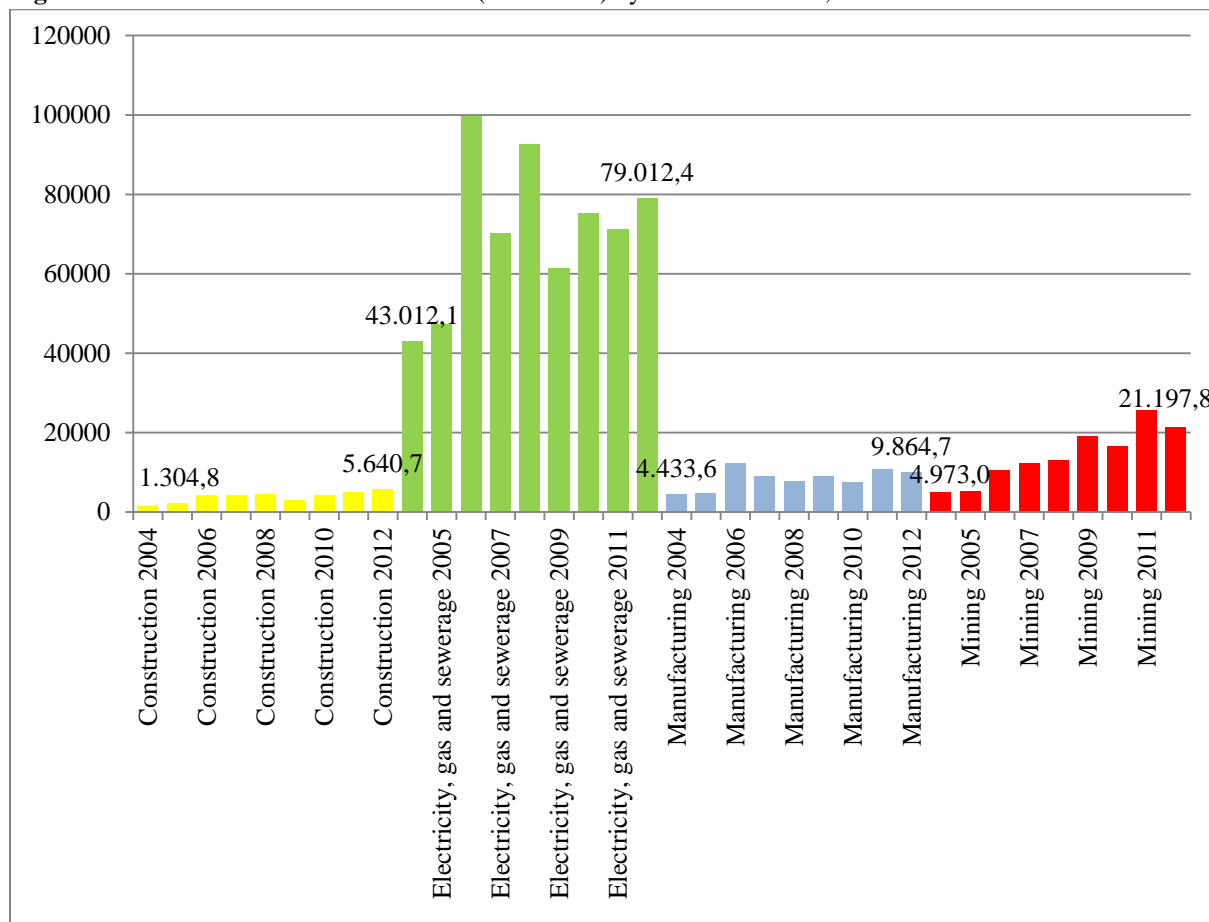
¹⁴⁶ Daily profits per worker is estimated as the annual aggregate sectoral after tax profits divided by sectoral employment times 365.

Figure 49 Daily Profits Per Worker (after tax, current TL) by Coal & Lignite Sub-Sectors, 04-12

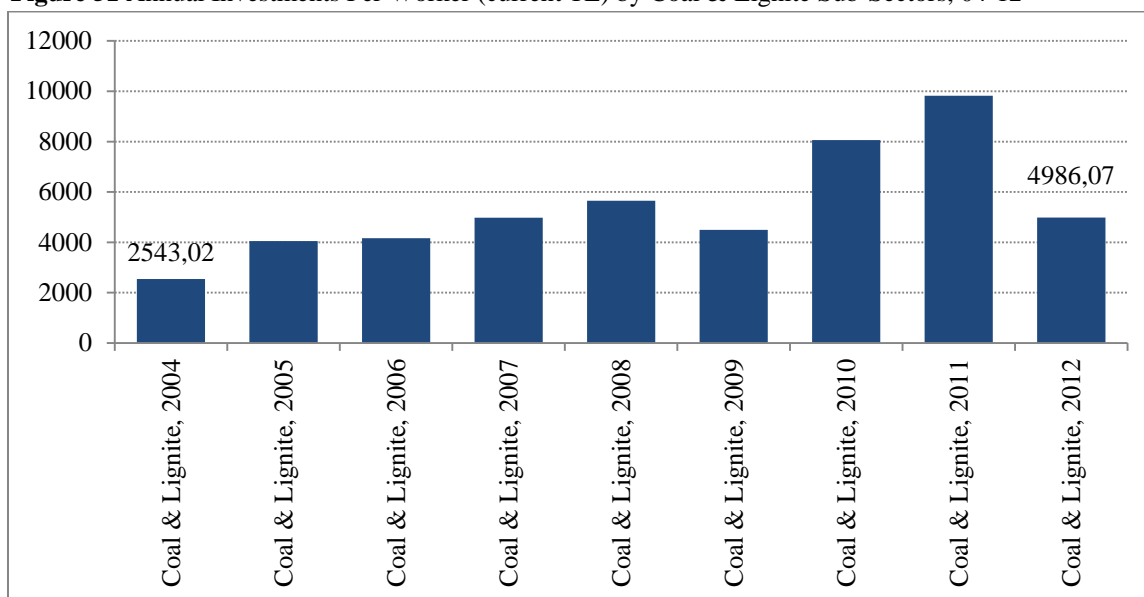
Source: Annual Industry and Services Statistics, TURKSTAT

8.2.5 Level of investments

While the profit margins seem to show a steep increase in the mining and quarrying sector, total tangible investments per worker measured as the sum of land investments, investments to existing buildings, construction and alteration of buildings and machinery and equipment investments per worker seems to have increased by four folds between 2004-2012 from about 5 thousand TL in 2004 to about 21.2 thousand TL in 2012. The statistics show that the investment levels in the general mining sector does not seem to significantly lagging behind other sectors and in fact seems to have increased significantly over the last decade while it is observed that the coal and lignite sub-sector investment per worker levels failed to catch up with investment levels in all other sectors. Tangible investment per worker in coal & lignite sub-sector increased by almost four fold between 2004 and 2011, followed by a dramatic decline in 2012. Investments in the construction sector also seem to have picked up by a comparable rate during the same period, increasing from 1.3 thousand TL per worker in 2004 to 5.6 thousand TL per worker in 2012.

Figure 50 Annual Investments Per Worker (current TL) by Selected Sectors, 2004-2012

Source: Annual Industry and Services Statistics, TURKSTAT

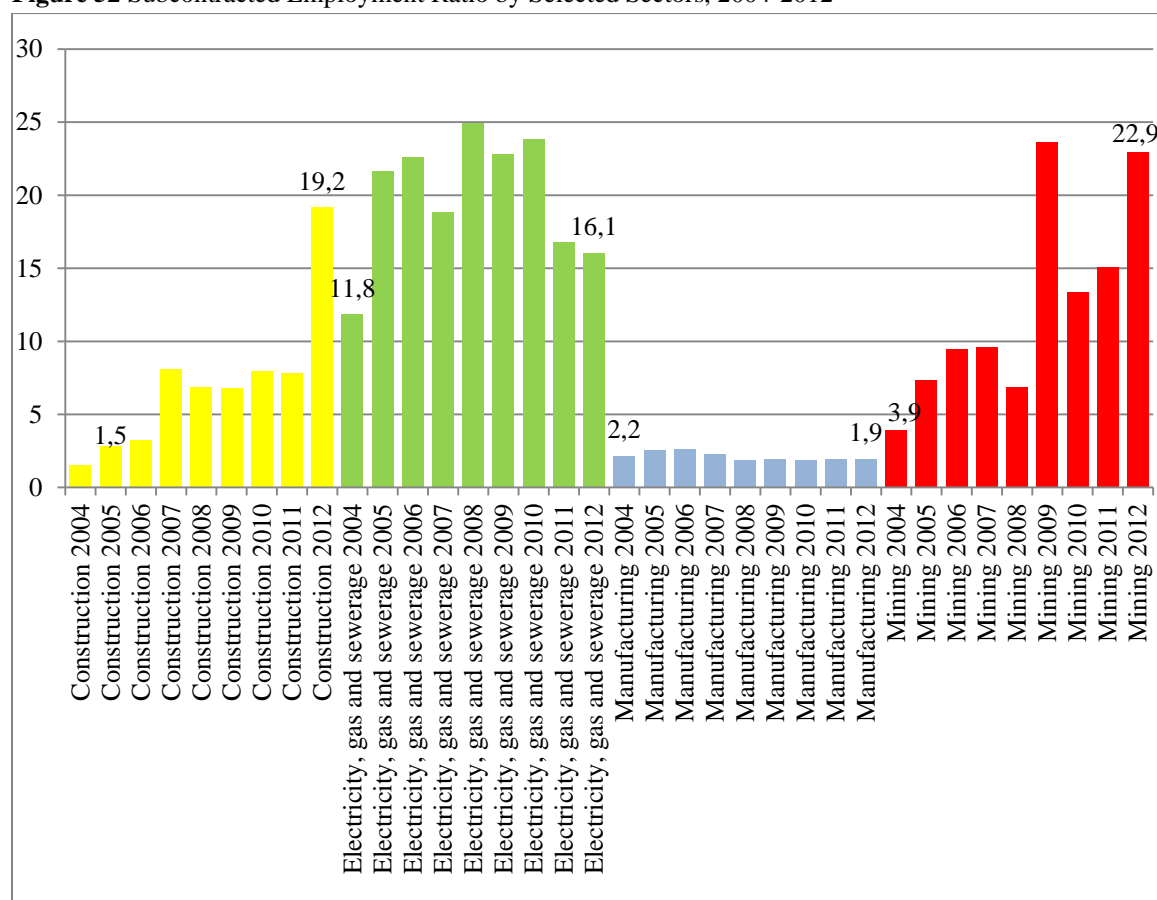
Figure 51 Annual Investments Per Worker (current TL) by Coal & Lignite Sub-Sectors, 04-12

Source: Annual Industry and Services Statistics, TURKSTAT

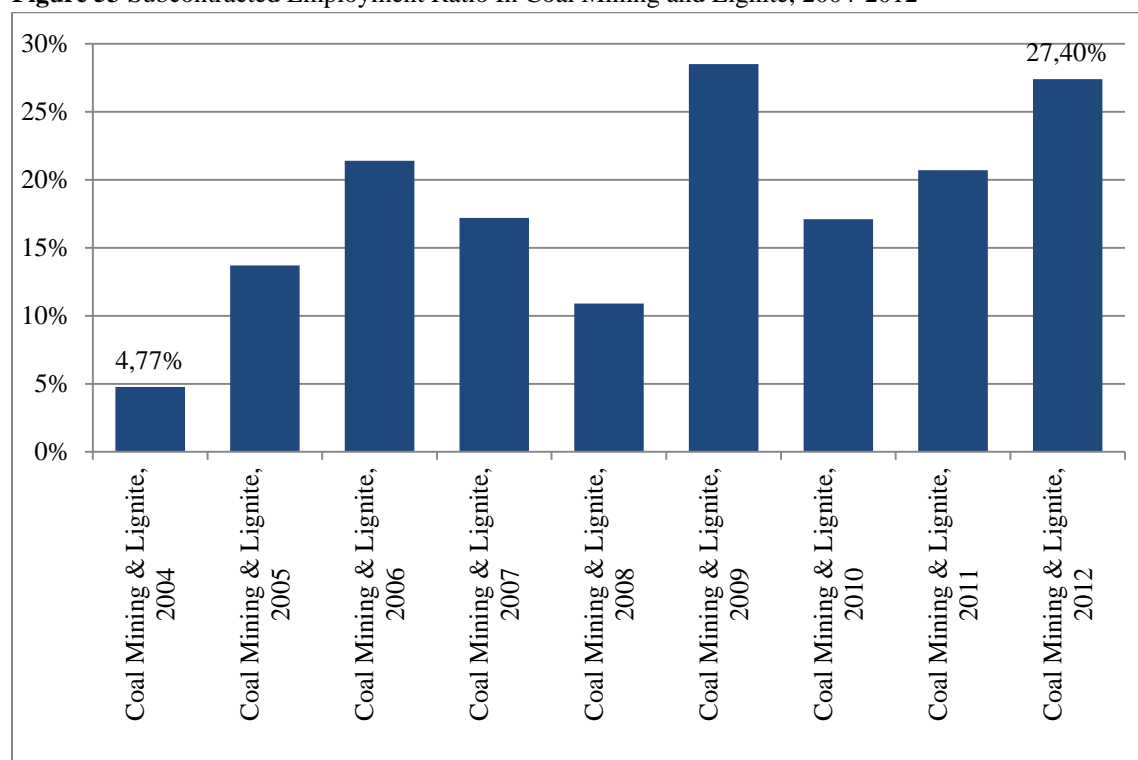
8.2.6 Subtracted employment by sectors

TURKSTAT's Annual Industry and Services Statistics provide information on the i) outsourced workers from external agents, ii) subcontracted workers, iii) support and administrative staff and iv) own employment registered in the pay rolls of firms. Unfortunately, we do not have information whether or what percentage of the subcontracted workers are registered in the social security system as the question in the survey is posed to the firms to provide an "average annual estimation" and it could be possible that some firms only report the formally employed subcontracts. Our calculations using this data source show that in the mining and quarrying sector as a total about 25.9 thousand workers were employed as subcontracted workers in 2012, increasing from 4 thousand workers in 2004. The same figure for the construction sector was about 327.3 thousand workers in 2012, increasing from 15.6 thousand workers in 2004. These figures correspond to 22.9 percent of the total employment in mining and quarrying sector and 19.2 percent of the total employment in the construction sector as of 2012. Sub-contracted employment in coal mining and lignite sub-sector increased from about 1.6 thousand workers in 2004 to about 17.8 thousand workers in 2012, corresponding to 27.4 percent of total sub-sector employment in 2012. While the sectoral employment figures that are reported in the Annual Industry and Services Statistics can be cross-checked with those in the Household Labour Force Surveys, the subcontracted workers share cannot be verified from another source, as the latter does not include information on the type of contracts that the employed individuals engage in. Therefore, we acknowledge that the estimations on the prevalence of subcontracting employment practices might be prone to mis-measurement.

Figure 52 Subcontracted Employment Ratio by Selected Sectors, 2004-2012



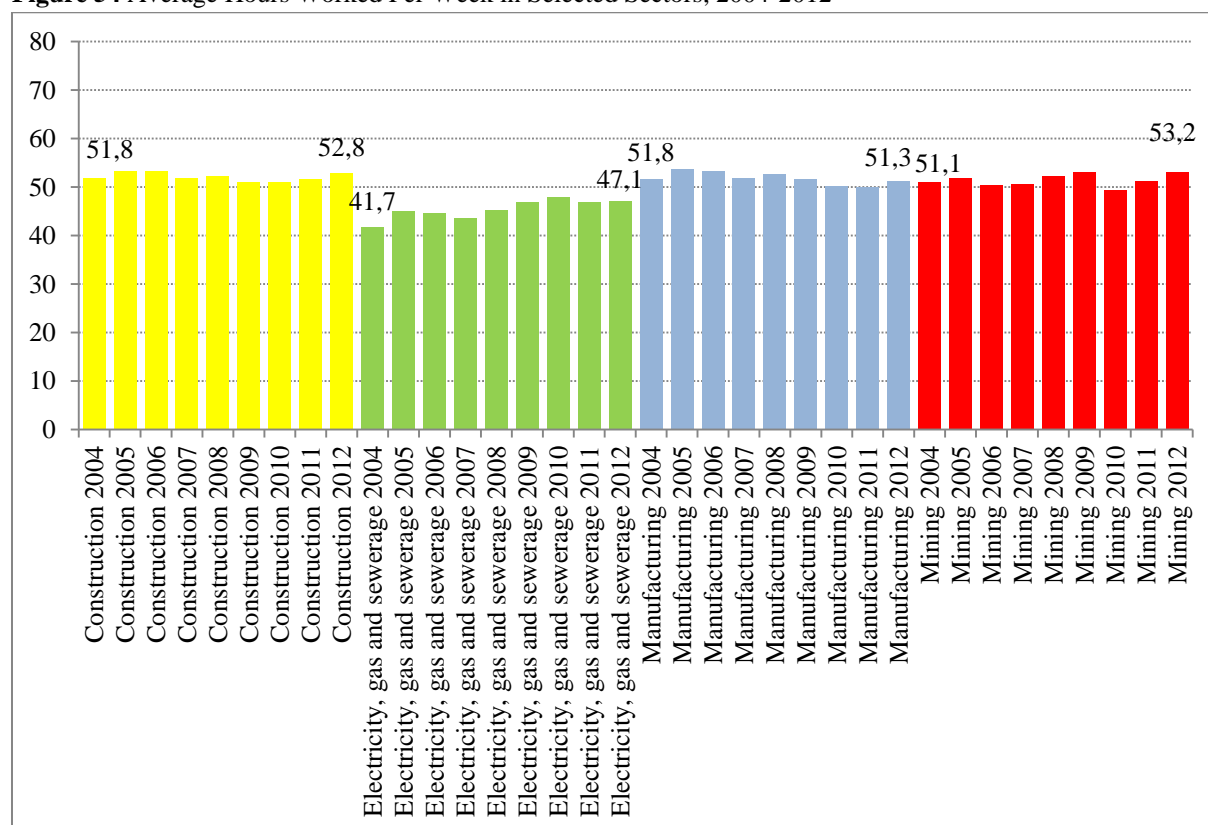
Source: Annual Industry and Services Statistics, TURKSTAT

Figure 53 Subcontracted Employment Ratio In Coal Mining and Lignite, 2004-2012

Source: Annual Industry and Services Statistics, TURKSTAT

8.2.7 Average hours of work – informal hours

In section 2, we presented hours worked on a regional basis in comparison to agricultural, industrial and services sector as it was not possible to provide hours worked under a more detailed industry classification due to the nature of sampling. In this section we compare average hours worked across Turkey in comparison to the construction, electricity, gas and sewerage, and manufacturing sectors. While the selected sectors exhibit variation in investment levels and subcontracting practices, average hours supplied by workers per week are very similar across the sectors and have been fairly constant over time. Household labour surveys show that the mining sector had the longest average working hours per week in 2012 with 53.2 hours across Turkey while electricity, gas and water sewerage sector had the shortest working hours with 47.1 hours per week. On the other hand, our estimations show that the average hours worked in the coal mining and lignite sector was 50.2.

Figure 54 Average Hours Worked Per Week in Selected Sectors, 2004-2012

Source: Household Labour Force Surveys, TURKSTAT

These figures include hours supplied by both the formal and informal workers. Looking at the hours supplied only by the informal workers, i.e. those that are not registered in the social security system and thus have no social protection, we see the following the picture; while in all four sectors, the number of weekly hours supplied by the informal workers seem to have declined between 2004-2012. Yet, the hours in the mining sector is as high as 56 hours, followed by the 50.6 hours in the construction sector suggesting that the formal hours have surpassed the informal hours in the construction sector, whereas informal hours are still higher than the formal hours in the mining and quarrying sector. Formal hours in coal mining and lignite subsector were recorded as 50 hours, versus 55.9 informal hours in 2012 accordingly.

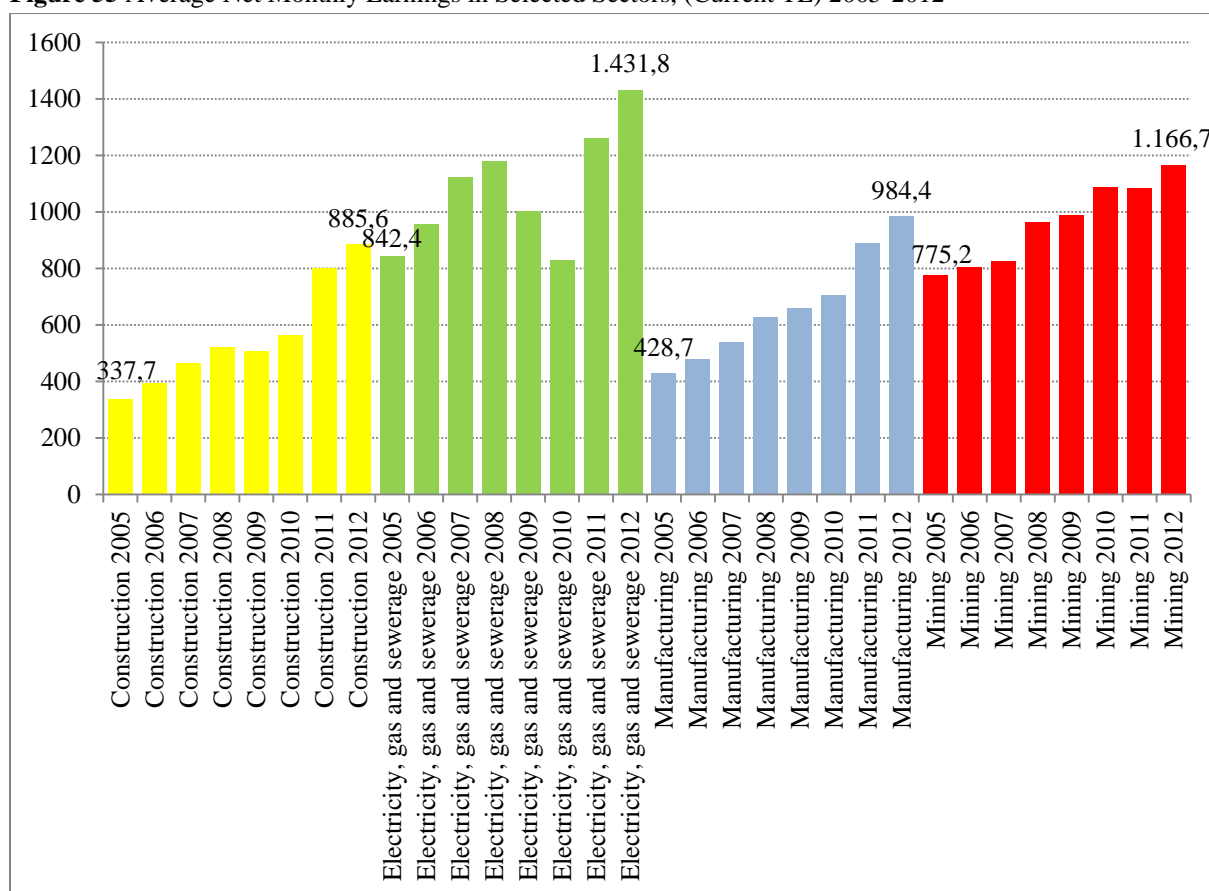
Table 13 Informal Hours Per Week, 2004-2012

	2004	2012
<i>Mining and Quarrying</i>	57.0	56.0
<i>Manufacturing</i>	51.8	46.5
<i>Electricity, gas and water sewerage</i>	49.6	46.5
<i>Construction</i>	51.7	50.6

Source: Own estimations using the Household Labour Surveys, Turkstat

8.2.8 Average monthly earnings

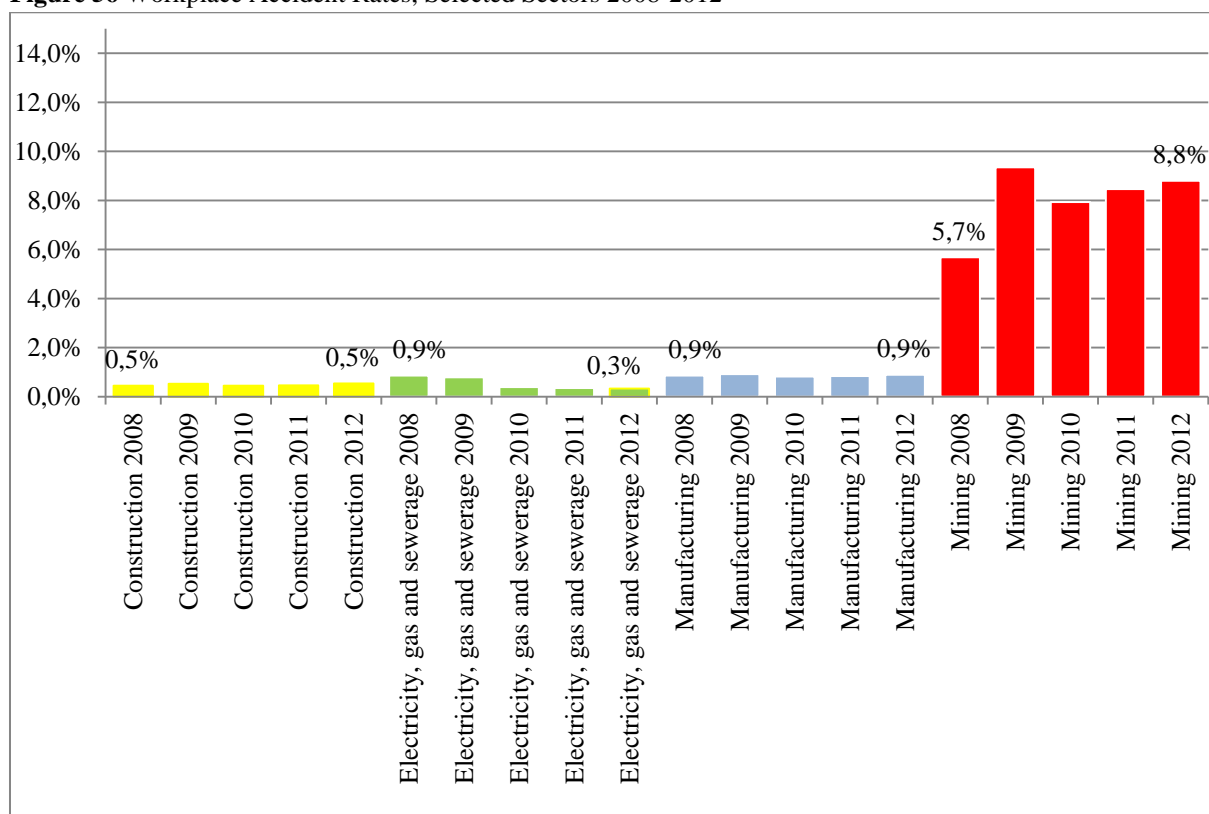
Figure 55 Average Net Monthly Earnings in Selected Sectors, (Current TL) 2005-2012



Source: Household Labour Force Surveys, TURKSTAT

While working hours are longest in the mining sector, in terms of the current monthly total net earnings (after tax), the sector comes next after the electricity, gas and water sewerage sector with average monthly earnings of about 1,166 TL. Across the four sectors, the workers in the construction sector had the average lowest monthly earnings of about 885.6 TL followed by the manufacturing sector with average earnings around 984.4 TL. Average net monthly earnings were about 1,193 TL in the coal mining and lignite sub-sector.

8.2.9 Workplace accident rates

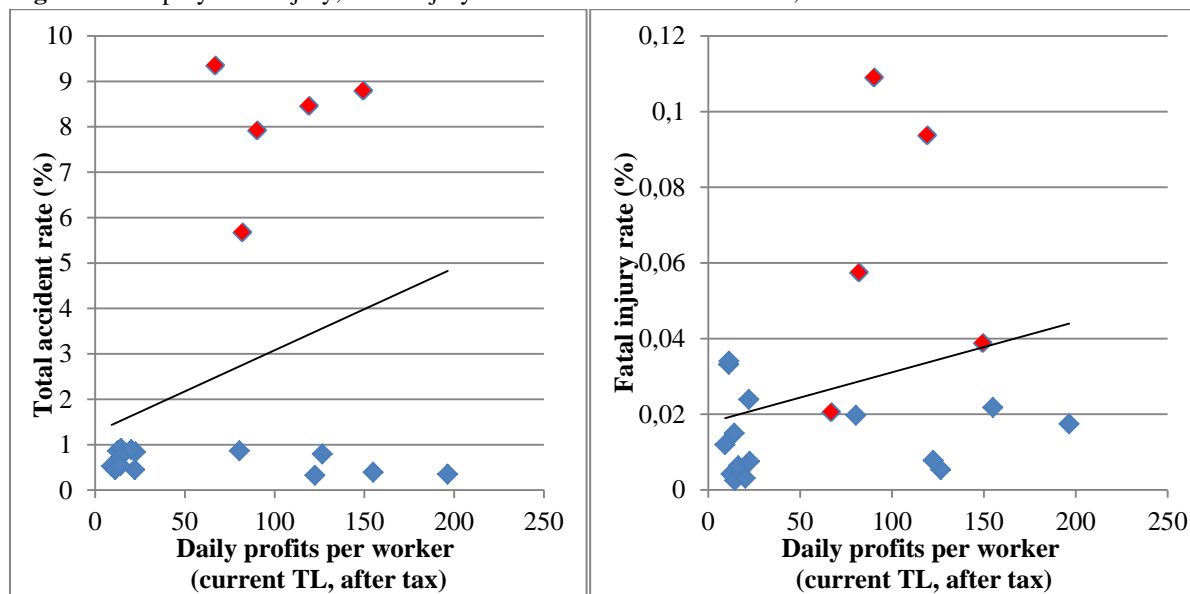
Figure 56 Workplace Accident Rates, Selected Sectors 2008-2012

Source: Statistical Yearbooks, Social Security Institution and Household Labour Force Surveys, TURKSTAT

And finally, we compare the workplace accident rates across sectors. Although, SSI provides the number of actively insured workers by sectors, we use the sectoral employment rather than the total number of registered workers in measuring the accidents rates, as using the latter can be misleading in a comparative analysis with other sectors, as the informality rates might differ. Therefore, we estimate the sectoral accident rates are as the total number of employment injuries divided by the total sectoral employment. As Figure 6.1.2.7 shows, mining and quarrying sector has the highest workplace accidents rate compared to the sectors of construction, manufacturing and electricity, gas and sewerage. In addition, while number of workplace accidents per workers decreased in the sector of electricity, gas and sewerage and remained more or less constant in construction and manufacturing sectors, the rates steadily increased in the mining and quarrying sector between 2008-2012.

8.2.10 Correlating data

Due to the data limitations explained above, we have a limited time-series data where trying to establish a causal link using different databases is likely to suffer from several statistical problems. However, we still attempt to uncover the correlates of employment injury rates and the direction of their co-movement with several sectoral indicators. Although the production structures are entirely different, we still include the construction, electricity, gas and water sewerage and the manufacturing sectors in our analysis below as unlike other remaining sectors, these sectors also operate under certain systemic employment injury and occupational disease risks.

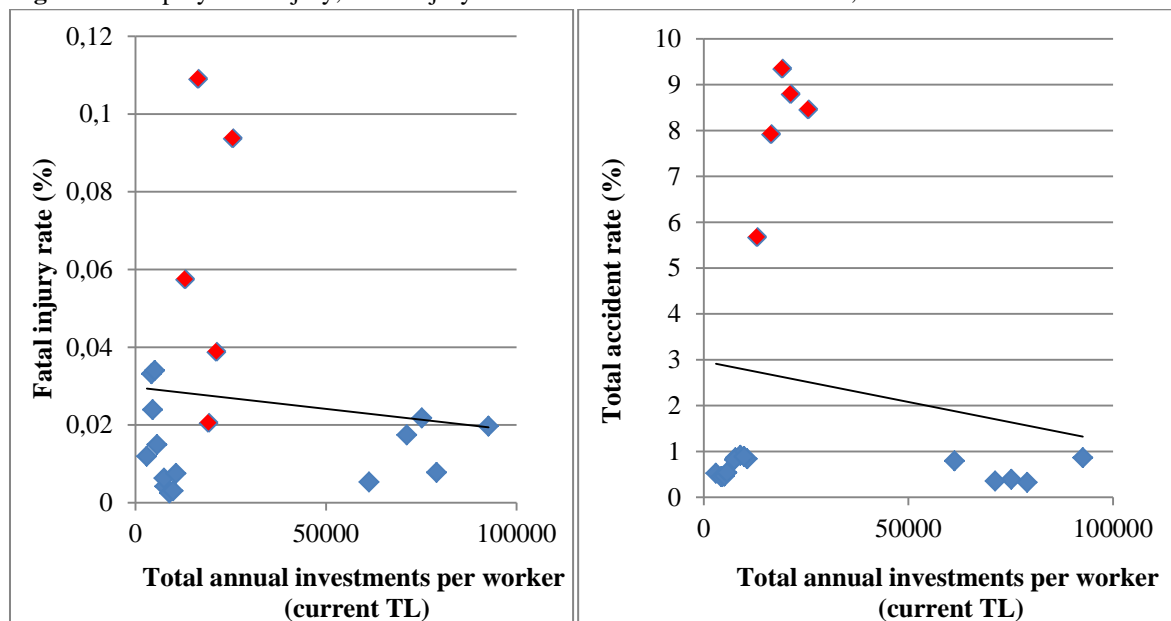
Figure 57 Employment Injury, Fatal Injury Rates and Profits Per Worker, 2008-2012

Source: Annual Industry and Services Statistics, TURKSTAT and Statistical Yearbooks of SSI

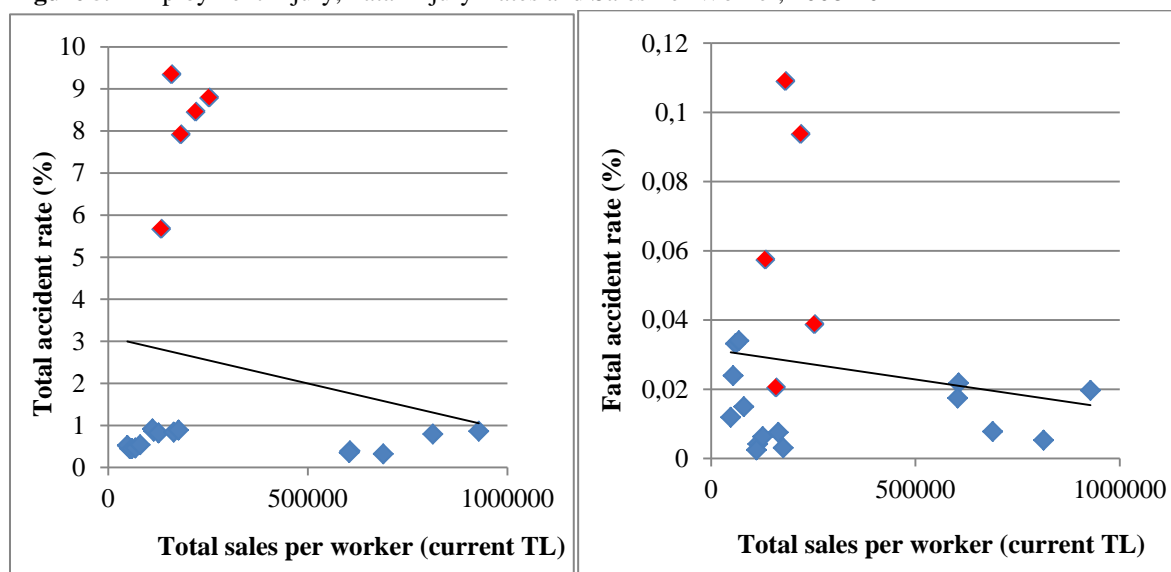
The left panel Figure 6.1.2.8 shows the simple relationship between the total accident rates with the daily profits per worker and the right panel shows the relationship between fatal injury rates with daily profits.¹⁴⁷ The two simple scatter plots indicate that higher profits per worker are associated with both higher total accident rates and fatal injury rates. While these two figures do not imply any causal relationship whatsoever, they might be hinting at the problem of exploitation or excessive bargaining power over the workers. The red dots in both panels indicate the mining and quarrying sectors and remain clearly above the fitted line for almost all years, suggesting that as compared to other sectors, mining sector is prone to much higher accident and fatality rates for a given level of profit per worker.

While we see a positive, albeit weak association between the accident rates and profitability across the four sectors, Figure 6.1.2.9 shows a negative association between the accident rates and annual investment per worker. In other words, higher investment per worker levels are associated with lower rates of both employment injuries and fatal accident rates across the four sectors. However, the negative association seems to be driven by the fact that in the electricity, gas and water sewerage sector, the accident rates are relatively lower while the investments are carried over in a much larger scale, and hence the relationship is not robust.

¹⁴⁷ Total accident rate is measured as the total number of employment injuries and occupational diseases divided by sectoral employment and the fatal injury rate is measured as the death cases divided by sectoral employment.

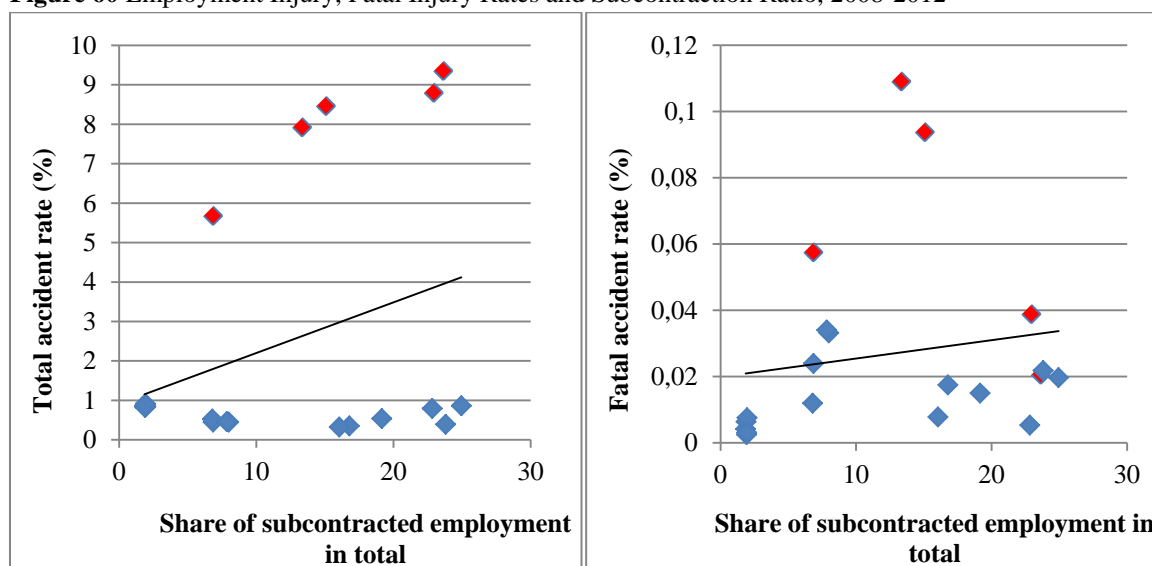
Figure 58 Employment Injury, Fatal Injury Rates and Investments Per Worker, 2008-2012

Source: Annual Industry and Services Statistics, TURKSTAT and Statistical Yearbooks of SSI

Figure 59 Employment Injury, Fatal Injury Rates and Sales Per Worker, 2008-2012

Source: Annual Industry and Services Statistics, TURKSTAT and Statistical Yearbooks of SSI

Figure 6.1.2.10 above shows the association between the sales per worker and the accident rates. We use sales per worker (current TL) as a proxy for the average productivity across sectors. Both panels show a negative association between productivity and accident rates, however the two simple scatter plots again suffer from the same problem as in the case of investments; that the negative association seem to be driven by the electricity, gas and water sewerage sectors where the sales per worker are relatively larger and accident rates are relatively lower.

Figure 60 Employment Injury, Fatal Injury Rates and Subcontraction Ratio, 2008-2012

Source: Annual Industry and Services Statistics, TURKSTAT and Statistical Yearbooks of SSI

Next, we investigate the correlation between the accident rates and the prevalence of subcontracting practices across sectors. Both panels show a positive association between the share of subcontracted workers in total sectoral employment and accident rates. Unlike in the case of investments and sales per worker, the positive association does not seem to be driven solely by the electricity, gas and water sewerage sector. In fact, excluding the latter sector yields a stronger positive association between the variables.

Summary and Conclusions

This section presented an overview of statistical data on occupational accidents, sectoral sub-contraction ratio, sales, profits and investments per firm between 2004 and 2012 in comparison to construction, electricity, gas and water sewerage, and manufacturing sector.

TURKSTAT's Annual Industry and Services Statistics show that while the number of enterprises in the mining and quarrying sector increased from 1.7 thousand in 2004 to 3.4 thousand in 2012, employment in the mining sector has exhibited the lowest growth rate as compared to the benchmark sectors, increasing to 113.2 thousand people in 2012 from 102.6 thousand in 2004. This implies that average employment size per firm declined from 60 to 33.7 in the overall mining and quarrying sector. On the other hand, daily profits per worker (after tax) in the overall mining sector increased from 19.1 TL in 2004 to almost 150 TL in 2012 while the upward trend in profits in the coal and lignite sub-sector remained much more confined, a two folds increase from 17.6 TL in 2004 to 34.1 TL in 2012. Yet, daily profits per worker are still higher than the profits in manufacturing and construction where the profits stood at 20.1 TL and 14.2 TL as of 2012.

Annual total tangible investment levels (per worker) in the mining and quarrying sector is only second to the electricity, gas and water sewerage sector, where the investment per worker was 21.2 thousand TL in the former and 79 thousand TL in the latter as of 2012. On the other hand, annual investments per worker in the coal and lignite sub-sector lagged behind the investment levels in all other benchmark sectors despite the fact that investments had increased by almost four folds between 2004 and 2011, but then followed by a dramatic decline to 4.9 thousand TL in 2012. Investment per worker in the construction sector is the second lowest after coal mining and lignite with 5.6 thousand TL per worker in 2012, followed by investments worth of 9.8 thousand TL per worker in the manufacturing sector.

Not surprisingly, the overall mining and quarrying sector as well as the coal mining and lignite sub-sectors have the highest sub-contracted employment ratio, and the rates of increases have been staggering ones. Subcontracting ratio have increased from 3.9 percent in 2004 to 22.9 percent in 2012 while the ratio increased from 4.8 percent in 2004 to 27.4 percent in 2012 in the coal mining and lignite sub-sector. The second highest ratio after the mining sector is observed in construction with 19.2 percent in 2012, increasing from 1.5 percent as of 2004. Manufacturing sector has the lowest subcontracted employment ratio, with only 1.9 percent of the total.

The statistics by the Social Security Institution shows that mining and quarrying sector has the highest workplace accidents rate compared to the sectors of construction, manufacturing and electricity, gas and sewerage. The ratio of total number of employment injuries divided by the total sectoral employment was recorded as 8.8 percent in the mining sector as of 2012 while the rates are all below 1 percent in all other benchmark sectors. In addition, while number of workplace accidents per workers decreased in the sector of electricity, gas and sewerage and remained more or less constant in construction and manufacturing sectors, the rates steadily increased in the mining and quarrying sector between 2008-2012.

We suffer severely from lack of data that does not enable us to link firm accidents and firm characteristics at the micro level to establish a causal relationship and to uncover the reasons behind high fatality rates. Occupational accidents data is only available at the sectoral level, and not at the firm level. We therefore, give our best shot to present simple correlations using the available data, instead of providing causal relationships between firm profits, sales and investments.

Our simple and somewhat primitive analysis show that higher profits per worker are associated with both higher total accident rates and fatal injury rates. While we do not suggest any causal relationship whatsoever, the results might be hinting at the problem of exploitation or excessive bargaining power over the workers. Moreover, as compared to other sectors, mining sector is prone to much higher accident and fatality rates for a given level of profit per worker. Our simple analysis also shows a positive but a weak association between the accident rates and profitability across the four sectors while there is a negative correlation between the productivity-measured by sales per worker and the accident rates. These two results suggest that as occupational accident and fatality rates are likely to be higher in higher profit earning sectors and accident rates are likely to be lower in more productive industries, although these results are likely driven by the electricity, gas and water sewerage sectors where the sales per worker are relatively larger and accident rates are relatively lower. And finally, there is a positive statistical association between the share of subcontracted employment in total sectoral employment and accident rates, suggesting that the sectors where the subcontracting ratio is higher, accident rates tend to be higher too.

9. INFORMATION ON PRACTICE - CASES

Introduction

In this part some information on practice has been reflected. First it includes a summary of the outcome of the Parliamentary Investigation Committee of the case of Soma. Secondly it provides an account of the three field visits carried out to Turkish mines. Thirdly, a brief international outlook is made based on a study including a systematic examination of mine disasters and fatal accidents that have occurred in Australia, Britain, Canada, New Zealand and the USA since 1992.

9.1. The Parliamentary Investigation Committee of the case of Soma

9.1.1. Background

Following the Soma tragedy of May 13, 2014 that cost the lives of 301 miners and engineers and injured 486 others, a parliamentary investigation committee was set up to “investigate in detail the Soma Eynez Underground Coal Mine accident, and determine the occupational safety and healthy precautions in order to prevent similar accidents from happening in the future.”¹⁴⁸ According to the Constitution, Parliamentary investigation committees are only mandated to an “examination conducted to obtain information on a specific subject,” Their findings and recommendations are thus not legally binding. The Constitution also requires parliamentary investigations to be conducted and their reports to be submitted to the Assembly within four months of the committee’s first meeting.¹⁴⁹ Between June and September 2014, the Soma Investigation Committee convened 17 times in the Parliament to hear representatives from the public agencies (TTK, TKİ, MİGEM, MoLSS, MTA etc.), private sector, trade bodies, unions, academics and other experts active in the coal mining industry. Furthermore, the committee visited Soma four times, to both examine the mine and to interview miners and those that were under arrest, and was the first group since May 13 to visit the scene of the accident. The resulting Parliamentary Investigation Committee Report is a two-volume study of over 1200 pages comprising 11 chapters. The first volume provides technical background information on coal as a mineral and coal mining industry with a specific focus on underground mining, outlines the significance of coal as a source of energy in the world and Turkey, explains the nature of contractual arrangements observed in Turkey’s coal mines, and evaluates the Soma Eynez tragedy in light of the facts listed previously. The second volume highlights the sectoral and structural shortcomings that came into light following the accident, lists the committee’s recommendations to prevent other coal mining tragedies from occurring in the future, and concludes the report with the committee’s main findings.

9.1.2 Main findings

According to the committee’s findings, the Soma Accident occurred due to interplay of multiple OSH non-compliances, avoidance to invest in technology, and technical ignorance. As such, the report states that “if the ventilation systems for each gallery had been directly connected to the surface; if pillars between panels and galleries had been of the proper width; if barricading had been done properly to fully isolate and seal each part of the mine; if the internal walls of heavy load bearing

¹⁴⁸ Grand Assembly of Republic of Turkey. 2014. “Manisa’nın Soma ilçesinde, başta 13 Mayıs 2014 tarihinde olmak üzere meydana gelen kazalarının araştırılarak bu sektörde alınması gereken iş sağlığı ve iş güvenliği tedbirlerinin belirlenmesi amacıyla kurulan meclis araştırma komisyonu raporu.” Cilt 1, 4.

¹⁴⁹ Article 100 of the 1982 Constitution: “If a decision to launch an investigation is made, the investigation shall be conducted by a committee of fifteen members, chosen by lot, for each political party in the Assembly, separately from among three times candidates nominated for each seat reserved to party groups in proportion to their strength. The committee shall submit its report on the result of the investigation to the Assembly within two months. If the investigation is not completed within the time allotted, the committee shall be granted a further and final period of two months.”

galleries had been fortified with concrete caissons; if all electrical machinery had been explosion proof; if flame resistant materials such as wire mesh, gunite and shear connectors had been used in main galleries instead of wooden connectors and wedges; and if conveyor belts had been made of nonflammable material, then the risk of such an accident occurring would have been very slim.”

Structural issues in the coal mining sector that came to light as a consequence of the increased public interest following the Soma accident are categorized under seven subheadings:

- a) There has been a lack of attention by policy makers to the mining industry, in spite of its contribution to the GDP and no long term mining policy has been formulated;
- b) There are issues related to the entire oversight structure in coal mines; i.e., distribution of authority, duty and obligations between public agencies, OSH mechanisms created by employers, and the OSH practices of trade unions;
- c) There are issues arising from production methods and mine operators such as over-production, failure to invest in the operation and non-compliance with OSH measures;
- d) There are issues arising from contractual arrangements in Turkey’s coal mining sector such as *rödövens*, procurement of services and subcontracting practices,
- e) There are shortcomings in relevant laws and regulations, lack of a safety culture, lack of education, hardships in procurement of mining equipment, and a lack of laboratories to run tests and analyses; OSH focused research and development units; and specialized courts with well-informed judges and prosecutors on technicalities of mining;
- f) There is a lack of a holistic, scientific and technical approach to coal mining; and,
- g) There are issues related to search and rescue activities in the aftermath of mining accidents.

9.1.3 Policy recommendations

Against this background the report formulates important policy recommendations aimed at preventing similar tragedies from happening in the future. This part of the report spans over 50 pages and lists 87 recommendations under the following main headings:

- *Turkey’s mining policy should be restructured.*
The most significant change proposed is establishment of a Ministry of Mining that would gather public agencies such as TTK, TKİ, MİGEM and MTA under its organizational structure. Furthermore, the report also recommends enacting a separate body of legislation for the coal mining industry that regulates both production and OSH requirements, and updating the mine licensing and planning processes.
- *A system of continuous OSH inspection at workplaces should be implemented.*
In line with this, new regulations are necessary to create a compulsory insurance system for occupational accidents and diseases. Moreover, occupational safety experts’, workplace health professionals’ and technical supervisors’ work conditions and wages must be re-evaluated. Finally, the right to reject working must be introduced and all workers must be insured with life insurances.
- *The system of periodical inspections carried out by public institutions must be restructured.*
First of all, during period inspections duties, authorities and obligations between public institutions must be clearly delineated. In order to improve the periodic inspection system, MoLSS inspectors and relevant MİGEM personnel’s training must be re-evaluated, an online portal for the inspection system must be set up, information sharing between ministries and social partners must be improved, and inspectorship security must be regulated in the law.
- *Current regulations should be significantly amended.*

This section has numerous technical recommendations related to Turkey's Law on Mining and Law on OSH. Most importantly, this section envisions a move towards making mines safer through computerized and centralized monitoring systems. As such, requirement of using central monitoring units in coal mines for measuring heat, humidity, air speed, levels of gasses etc. is recommended. The report also recommends updating and clarifying numerous clauses in the regulations, most of which are related to OSH equipment in coal mines. On the issue of contractual arrangements, the report states that currently the relevant clause is ambiguous and recommends clarifying administrative, financial and legal obligations of license owners, sub-contractors and *rödövans* contractors. Finally, it is recommended to redesign the contracting system in the coal mining industry in ways to incentivize stronger OSH practices.

- *A separate mechanism of incentives must be established in order to increase production while strengthening OSH practices.*

Here, in order to ensure full compliance with OSH regulations, a new set of incentives to coal producers is elaborated in the form of long-term and low-interest loans and incentives for high technology investments. Furthermore, the whole coal mining OSH ecosystem is recommended to be supported by the state, enabling more firms to be accredited to fix, calibrate and test ATEX certified equipment and establishment of more labs that test workplace hygiene. Lastly, the report recommends supporting large scale and fully mechanized coal mining, making methane drainage in coal mines mandatory, and requiring modern support systems to be used in main galleries.

- *The quality of the workforce in coal mining should be improved.*

This recommendation has two main parts: implementing a system to deliver vocational and on-the-job training to coal miners and improving the social rights of the workers.

- *OSH related structural shortcomings should be addressed.*

This section provides a comprehensive list of improvements aimed at strengthening the whole coal production ecosystem: (a) improving vocational training, OSH training, search and rescue teams' trainings, inspectors' training; (b) setting up a OSH related research and development units; (c) establishment of specialized courts for mines; (d) creation of a mining OSH data portal; and (e) firms active in coal mining to be listed on the stock exchange.

- *Search and rescue activities in the mining sector should be improved.*

9.2 Field visits

As part of this study, field visits were conducted to Park Termik Underground Lignite Mine and two hard coal underground facilities in Zonguldak. The aim was to conduct on-the-spot analyses and documenting the general workflow of coal-mines. Interviews with key actors involved in various stages of the coal mines were at the core of these field visits. The TEPAV team aimed at ensuring that the interviews in the field include all the following actors; i) miners, ii) engineers, iii) unionists, iv) employers, v) occupational safety specialists, vi) locals, and additional relevant parties where deemed necessary.¹⁵⁰

9.2.1 Park Termik Underground Lignite Mine

9.2.1.1 Mine Characteristics

Park Termik is located at Çayırhan, 110 kilometers from the city center of Ankara. The premises comprise a thermal power plant and an underground lignite mine, both operated by Park Holding S.A. In 1996, operation of both facilities was transferred to Park Holding by EÜAŞ with a minimum annual electricity generation requirement based on a 25 year long *rödövans* contract. Since 1997, the thermal

¹⁵⁰ For further details regarding the field studies, see Annex I.

plant has been generating 3 - 3.5 million KWh annually. There is thus no minimum limit on coal production, but instead there is one in electricity generation. Currently, both facilities combined employ over 2800 people.

Çayırhan is one of three semi-mechanized underground coal mines in Turkey. Since 2000, the mine has been producing 4.5 - 5.5 million tons of lignite. The lignite produced is only used to feed the thermal plant and cannot be sold under any conditions. Lignite reserves in the area have a heat content of between 2000 to 3000 kcal. Currently, lignite production in Park Termik is semi-mechanized and carried out simultaneously in four galleries. Each of the four fully mechanized drilling units is valued at €30 million, and extracts 1 - 1.5 million tonnes of lignite in a given year. As one lane of coal is being extracted, new lanes are being prepared via digging tunnels. Currently, there are 11 tunnels that are being dug.

Park Holding has established a vocational training school in Beypazarı and employs all graduates who apply for a job. Managers report that applications have dropped significantly in the recent years and the youth does not want to work in the coal mining sector due to a prevailing perception of intensive labour and high risk.

9.2.1.2 Conclusions and recommendations collected

The conclusions collected in the interviews addressed the following issues:

- **Technology:** As the extraction process in a coal mine gets more mechanized, it leaves less room for fatal human errors. Increased mechanization also reduces the number of workers required for coal extraction and helps to reduce the number of people that may be injured from a possible accident. While mechanization reduces both accident risks, and fatalities and injuries per accident, mechanization requires significant levels of investment. The cost of an extraction machine with a 5 meter radius is in the range of €30 million.
- **Mine size:** For it to be economically feasible to make a coal mine semi/fully mechanized the coal reserve has to be above a certain threshold. The coal reserve has to be roughly around or above 100 million tons. At this level the return of investments in mechanized production becomes feasible. Mechanization is also dependent on the characteristics of the specific coal reserve such as its depth, its slope, and its structure.
- **Contract length:** The length of the *rödövens* contract must allow the company to make the necessary investment and reap the benefits in the longer term. Park Çayırhan is a good example of this. Just the disassembling and reassembling of extraction units when one gallery is depleted and a new gallery will be started is said to take two months. Therefore, contract lengths such as 2, 3, 5 or even 10 years become makes it unfeasible for companies to make the necessary investments to increase efficiency.
- **TKİ's decision to contract out underground coal mines:** As noted previously, even though about only 30 percent of all coal produced in TKİ owned mines is produced by the private sector, 98 percent of coal produced underground is produced by the private sector. According to Park Çayırhan's general manager - a former TKİ employee himself - this is due to the fact that the State does not want to invest in coal mines. Following the Derviş reforms, the State decided to downsize both TKİ and TTK. During this period, according to a Ministerial decision, TKİ and TTK were only allowed to replace only 10 percent of their retirees and their budgets were also placed under strict control. By early 2000s, the production cost of a ton of lignite mined in open cast mines was about 15 TL, whereas the same figure for a ton of lignite mined underground was over 100 TL. However, this significant gap did not accurately reflect the reality, and when Park Teknik took over a semi-mechanized underground lignite mine from the State, it was able to make a profit on a contract that pays 26 TL per ton of lignite.

- **Dayıbaşılık.** In a way, Dayıbaşılık is the perfect mechanism for employers that want to cut costs significantly while remaining a “by the book” operation on paper. The mechanism functions as follows. A *Dayı* goes to talk with the operator of a coal mine, saying that he commands a workforce of usually above 50 people that he is willing to utilize for that particular coal mine. If the employer accepts, a pit is given to only the worker *Dayı* brings. No other workers go into this part of the mine and the employer does not know what is going on inside. However, as required by the law, the employer legally employs all these people and pays their social security premium. At the end of each month, employer pays *Dayı* the sum of the following equation: [(coal extracted by the team * price per ton of coal previously agreed upon) – social security premium of the team]. The *Dayı* then distributes this sum to his team according both to team hierarchy and individual worker performance. As the workers are not in direct contact with the main employer, in reality they exercise no rights, and at times Dayıbaşılık turns into a system of serfdom with forced labor and physical violence. Park Çayırhan experts stressed that this is one of the flaws that plague Turkish coal mining system especially because it is so hard to detect and/or prevent. Even if a social security inspector visits the said part of the mine, it is impossible for them to recognize that the Dayıbaşılık system is in place in the said mine. The only way to eradicate this system is through collective action of employers, which can in turn be achieved by entry of bigger and more prestigious firms to the sector. We also asked why workers preferred to work in this Dayıbaşı sytem even in places where more established firms operated the mines. According to information received, it is possible that workers get a slightly higher monthly wages when they work in this system, or for small-scale mines. The reason for this is as follows: Established and institutionalized firms play by the rules. For example, if they are paying a 2000 TL wage to a worker, they pay the social security premiums accordingly. Other employers (sometimes using a Dayıbaşı as a middleman) could pay slightly higher wages, say 2300 TL a month, but pay the lowest premium possible by recording the salary at the rate of the minimum wage. Because a slight increase in their monthly wage is vital to many workers in the coal mining sector, they forgo their future (retirement) income in order to survive today.
- **Bonus system:** Experts told us that some firms pay managers bonuses indexed to production targets and that this increases risks. If bonuses solely focus on the amount of coal production but not on OSH targets, managers will be more likely to underestimate risks.
- **Overproduction:** In the case of Soma the minimum limit of production was 1.5 million tonnes and the actual production close to 3.5 million tonnes of lignite annually. If there is such a discrepancy between the minimum required and the amount actually extracted, the experts at Park Çayırhan maintained that it very likely that something goes wrong. Hence, adding a contractual limit for coal to be extracted in *rödövans contracts* based on the characteristics and plans for each specific coal mine might be a good way to make sure firms do not put pressures on workers to overproduce
- **Recent OSH amendments:** The recent OSH amendments made in the law will significantly increase the costs for employers, and will make a lot of coal mines unprofitable. Just the upgrading of the PPE for one worker may cost well over €2 thousand. A coal mine that employs 500 workers must therefore invest at least an extra €1 million and keep up with these investment levels. Experts say that these amendments, if enforced, will act as a process of “natural selection” in which labour intensive operations with many sites will be forced to shut down.

9.2.2 Zonguldak Underground Hard Coal Mines

9.2.2.1 Mine Characteristics

A large majority of Turkey's known hard coal reserves are in the Zonguldak basin. The Turkish Hard Coal Authority - located in Zonguldak - is the state enterprise in charge of operating or transferring the right to operate the hard coal fields through *rödövans* contracts. In 2014, 530 thousand tonnes of the 1.8 million tonnes of total hard coal produced in Zonguldak was produced by private sector firms operating with *rödövans* contracts.

The TEPAV project team visited two facilities in Zonguldak. The first visit was to TTK's Kozlu Operation, which is Turkey's only undersea coal mining facility. TTK Kozlu currently employs 1570 underground and 400 over ground workers. TTK Kozlu's hard coal reserves are estimated to be at 150 million tonnes, which corresponds to roughly 10 percent of TTK's total reserves. In 2014, 500 thousand tonnes of raw hard coal was mined in Kozlu, 300 tonnes of which were merchantable.

The second was to Demir Group, which is the largest private sector producer of hard coal in Zonguldak. Currently, Demir Group operates four underground hard coal mines through *rödövans* contracts, two in Üzülmöz and two in Karadon provinces of Zonguldak. In 2014, 149 of 530 thousand tonnes of hard coal mined by the private sector was produced by the Demir Group. Currently about 600 workers are employed by the group.

9.2.2.2 Conclusions and recommendations collected

Recent legislation to amend the OSH Law has significantly hampered hard coal production in Zonguldak. As a result, firms, particularly in the private sector, lay off a number of workers in order to regain profitability. The total level of employment in mine filed operated under *rödövans* contracts decreased from over 5000 workers to below 2000 as a direct consequence of the legal changes that occurred after the Soma tragedy. As a result, firms are trying to extract more coal per worker employed, which is increasing the risk of accident.

Additional requirements - increased costs: Recent legislative amendments have significantly increased production costs for both TTK and the private sector also in other respects. According to the Demir Group their cost of producing a ton of hard coal increased from 110 TL to 170 TL. Multiple sources report that firms have been making monthly losses for the past year or so, and almost everyone is waiting for the new election results and a new government to fix the unsustainable status quo. The current government is said to have promised subsidies for the increased costs, but the current offered subsidy is reported to be only around 22 TL per tons when the costs incurred as a result of the amendments are about 60 TL per ton.

- i. One of the most important factors that caused costs to skyrocket is the reduction of the work week to 5 days, and limiting of underground work hours to 7.5 hours per day. The Demir Group officials report that this change alone increased their costs by 20 percent.
- ii. The change that raised the minimum wage for coal miners to two times the minimum wage is also reported to be an imported factor in increasing costs. According to TTK Kozlu officials private firms pay the required amount according to official records but force the workers to refund about 300 or 400 liras in cash once they have received their wages.
- iii. The ATEX amendment forces the use of equipment with European certificates. Equipment from the US, Canada or Australia are not allowed according to the latest ATEX

amendment. For example - a TTK Kozlu official reports - an ATEX certified locomotive costs 1.2 million TL, while a similar explosion proof locomotive could be bought for 300 000 TL elsewhere.

Currently all mining in the Zonguldak basin is carried out in a traditional way with labour intensive work. However, **mechanization** of the coal production in Zonguldak is possible and multiple projects are currently being designed. Information was received that a pilot project of semi-mechanized mining was being tested in Amasra, and another similar project was in the pipeline. According to the experts the most feasible technology for the Zonguldak area is semi-mechanized mining, which is almost 7 times more productive per worker, and 10 times cheaper than fully-mechanized projects. When asked about the implications for employment, we were informed that a move towards more mechanized mining would not necessarily entail job cuts; faster mining would need more workers to prepare the galleries that would be mined after the current ones.

There are currently multiple **lawsuits in process** that were brought to court by coal mine operators against the decisions of labour inspectors. Experts emphasized the need for specialized courts with judges and prosecutors trained to make educated decisions on their cases.

There is a widespread call for establishing a **central regulating authority** similar to the Capital Market Authority (SPK) or Energy Market Regulatory Authority (EPDK), which should comprise the best mining experts in the country.

The amendments to Law No 6331 following the Soma tragedy were **reactive changes** with no real scientific basis. According to TTK Officials these changes were aimed at calming the collective uproar that followed after the Soma tragedy regarding OSH conditions in coal mines in general.

9.3 An international outlook

The present study was triggered by the advent of one of the worst mining disasters in Turkey's history, the fire that occurred in the Soma Manisa min on 13 May 2014 and where 301 miners perished. While the task to examine the causes for this disaster lies with the competent national Turkish authorities, it is also relevant to draw upon the experiences gained and lessons learned in the aftermath of major accidents in other parts of the world.

9.3.1 Mining disasters worldwide

In a recent publication, a systematic examination has been carried out of mine disasters and fatal accidents that have occurred in *Australia, Britain, Canada, New Zealand* and the *USA* since 1992.¹⁵¹ This study – which has been carried out by and expert in the field - is informative, comprehensive and analytical and the conclusions drawn can assist the stakeholders in their efforts to prevent a recurrence of disasters such as the one in Soma.

9.3.2 Pattern causes

One of the findings of the examination carried out is that there are common pattern causes which repeatedly recur in the incidents examined. The author lists the following ten pattern causes which repeatedly have been found to occur:

- Engineering, design and maintenance flaws;
- Failure to heed warning signs;

¹⁵¹ QUINLAN, Michael, *Ten Pathways to Death and Disaster*, The Federation Press, NSW, Australia, 2014, ISBN 978 1 86287 977 5 (hardcover book)

- Laws in risk assessment;
- Flaws in management systems;
- Flaws in system auditing;
- Economic or reward pressures compromising safety;
- Failures in regulatory oversight;
- Worker or supervisor concerns that were ignored;
- Poor worker or management communication and trust; and
- Flaws in emergency and rescue procedures.

It is suggested that against this background, this list can be used as a priority check list for efforts to manage OSH in mines aimed at preventing serious events. The argument is made in virtually all cases these flaws can be identified.

9.3.3 Policy implications – learning from failure

The ensuing question is the policy implications that can be drawn from this study. In the study the question is raised why these pattern causes have proved so resistant to intervention by government and how, for example, governments can strike a proper balance between prescriptive regulation and risk management or system based approaches? In the study the author also identifies instances where lessons have been learned. While a number of practical implications can be noted as a result of the study, in terms of broader policy implications the author emphasizes that “only by understanding and modifying the political economy of safety can these problems be addressed.” In the concluding part the author refers to a common regulatory imbalance where responsibility flaws in management rarely is imposed on the corporate leadership. He adds that the other side of this imbalance is the inability of workers, in most cases, to safeguard themselves by having the capacity to raise concerns and know they will be treated seriously or, in situations of perceived danger to withdraw from the work area without penalty.

Summary and Conclusions

The case studies in this section provide a rich and varied ground for further analysis and discussions which should be taken up into account in the context of discussions on the way forward in this field. In that context it is relevant also to refer to the question of the right to refuse unsafe work regulated inter alia, in Convention No. 155. Quinlan emphasizes that

“ In practice, a right only becomes meaningful when it can be asserted and this is unlikely in circumstances where many if not most workers feel vulnerable due to production pressures or job insecurity.[...] In most [...] jurisdictions and industries the situation is such that refusal to undertake safe work is so exceptional as to be largely irrelevant. This needs to change. Steps in this direction include discouraging insecure work arrangements, stronger union presence, and representation mechanisms like statutory empowered worker safety representatives who have knowledge and authority to take such decisions.” (Quinlan p.221)

10. CONCLUSIONS AND POLICY RECOMMENDATIONS

10.1 Conclusions

The multidisciplinary approach of this study has allowed us to examine the forms, extent, legal drivers and impact on OSH of contractual arrangements in Turkish coal mines from different perspectives. Similarly as concluded in other contexts¹⁵², the OSH conditions in the Turkish mining industry are a result of the interplay of a large number of factors. While further research and analysis undoubtedly would permit more refined conclusions, the picture that emerges from the present study is the following.

10.1.1 The dangerous attraction of the mining industry for the workers

Occupational safety and health is intrinsically and basically a workplace matter. It is directly related to the daily efforts of the workers. This study has revealed while the average number of years of schooling of the workforce is increasing in other sectors, it is decreasing in the coal mining industry. Recently there has also been a significant fall in the average number of years of experience among coal mining workers as compared to other sectors. Low levels of education and experience diminishes the workers' ability to detect and avoid risk factors. Less educated workers have fewer options and are more likely to accept risky tasks. While the OSH law provides for education and training of workers on OSH, further efforts may be required to ensure this legislation is implemented in practice. This should include efforts to train and support workers and their representatives; to increase workers' capacity to safe guard themselves by raising concerns and to create conditions for these concerns to be treated seriously. Particular efforts should be carried out to ensure an effective application in practice of the legally provided right of workers to remove themselves from unsafe workplaces.

However, while alternative employment opportunities in the mining regions are limited, work in mines is attractive because the coal-mining earnings are twice to three times higher than for example agricultural earnings. One of the legal actions taken after the Soma accident was to provide that workers engaged in underground coalmines be entitled to at least twice the minimum wage.¹⁵³ Furthermore, according to a decision in December 2015, the minimum wage was increased from around 1000 to 1300 TL (net of social security premium). While these decisions have an undisputed general benefit, they have significantly increased the attraction of the mining industry for economic benefits. This being said, and although official figures are not yet available, according to anecdotal information, the higher cost for labour has had a direct impact on the unemployment level in the mining sector.¹⁵⁴ In order to address this issue, a new omnibus law (No, 6661) was introduced 14.01.2016 to alleviate the financial impact of new OSH requirements for the employers¹⁵⁵

Although there is no supportive official data, the power of attraction for economic benefits may also have contributed to the development of *Dayıbaşı* or gang master system – particularly in small-scale mines. While this practice may only be prevalent locally notably in the Soma Manisa basin, the particular danger with this system is that the workers pay dearly for their economic benefits in the form of a disregard for OSH rules and regulations. The *Dayıbaşı* have no incentive to observe OSH

¹⁵² See Section 9.1 above.

¹⁵³ Additional Article 9 to the Mining Law, introduced 10.09.2014.

¹⁵⁴ After the law came into force, 5.330 mine workers lost their jobs in Zonguldak and Kütahya within one week.

¹⁵⁵ Article 6 of Bag Law 6661 says: Underground mines for the extraction of lignite and hard coal which are operated by private entities as license holders, can obtain financial support to meet increasing costs of production. This support should be drawn from MoLSS' allocations. Applicable implementation procedures and principles will be determined by the Council of Ministers.

rules, they operate on the fringe of legality for short term benefits and do not even provide the most rudimentary levels of OSH training of their workers. They also operate independently and are not supervised by line managers. More generally however, official data suggests that although the informality rate is decreasing in mining, it is still among the highest in comparison to other sectors.

10.1.2 The role and functions of OSE:s

The new OSH law includes important requirements to increase the awareness of OSH and the skills to apply national laws and regulations at the enterprise level by the introduction in 2004 of a requirement for employers to designate both safety and health experts. According to the most recent information available, since the introduction of this requirement, some 15.750 OSEs (with the A-class certificate required for the most hazardous types of work) have been certified.¹⁵⁶ The attraction of employment of OSE:s in the private sector appears to have had an unintended effect as a number of public officials, including trained labour inspectors, sought this qualification and other employment. While their contribution to occupational safety and health cannot yet be assessed, their role and functions do not seem to be clearly established in practice. According to the law, OSE:s should be independent advisors to the employer while the responsibility for ensuring safety and health of workers remains employers' responsibility. However, in the aftermath of the Soma accident criminal charges for negligence were brought against some of the seven OSE:s employed by Soma Holding. Inc. Such developments may have dampened the interest for work in this field. At present less than 40% of the certified experts are working as OSE:s. The ILO Supervisory Bodies have underscored¹⁵⁷ that preventive services (such as those provided OSEs and OPHs) are advisory services provided to the employer, the workers and their representatives in the undertaking and that responsibility for ensuring a safe and healthy working environment rests with the employer. In another development, and following the Soma accident, the particular need for technical expertise in the coal mining industry was recognized causing the introduction of a requirement for a continued presence of mining engineers at mining workplaces¹⁵⁸.

10.1.3 Being a manager in the coal mining industry

One of the unequivocal results of this study is that the Coal industry is and will continue to be of significant strategic and economic importance for Turkey. Turkey will continue to be highly dependent on an increasing supply of energy. As significant alternative sources of energy will take time to develop¹⁵⁹ the pressure will remain high on the industry to increase - or at least keep up - the domestic production of fuel for the thermic plants. Managers will thus continue to be required to produce, cut costs as well as to apply national laws and regulations of OSH. Underground mining is costly and the introduction of technological solutions for the increase of safety is also costly. Information from the field visits reflect this dilemma and also appear to have had an effect on unemployment. While improved and targeted supervision by technically skilled inspectors is important, it would seem that the strong pressure on the industry would also require the introduction of some considerable incentives to support enterprises in their efforts to improve the OSH record, all while taking strong actions to enforce the central and main responsibility of employers to ensure a safe and healthy environment for their workers.

10.1.4 Contractual arrangements

While the Turkish legislators had foreseen and regulated the use of subcontracting at an early stage, it is not certain that they had taken into account such an extensive use of subcontracting and the impact it

¹⁵⁶ Only 6.395 are in active service however.

¹⁵⁷ 2015 observation by the CEACR concerning the application by Turkey of the Occupational Health Services Convention 1985, (No:161)

¹⁵⁸ Implementing regulations for this requirement have not yet been issued.

¹⁵⁹ Nuclear power plants are only recently a part of Turkey's strategy to satisfy its energy needs

would have on the labour market. As the data presented demonstrate, subcontracting is flourishing in Turkey. Subcontracting practices are likely to decrease safety due to economic and reward factors, disorganization, inadequate regulatory control and the reduced ability of workers to get organized and protect themselves. The fragmentation of the responsibilities related to OSH represents a serious obstacle for a full and effective implementation of national OSH laws and regulations. The regulators may be well advised to examine further the impact this practice is having on the world of work and on OSH.

This study also clarifies that the use of *rödöväns* contracts mainly developed through practice in the mining industry and that one of the main drivers for the use of these contracts was that underground mining is costly and that the SOE:s had a need to bring in private capital. The crucial question which remains to be answered is why the economic feasibility would be different for a private sector entity and why a private sector entity would have more possibilities to make the exploitation of these underground mines economically interesting? Were private entity managers using *rödöväns* contracts more efficient? Did they introduce working methods that enabled a higher yield? Or were the increased profitability created at the expense of cutting corners regarding OSH requirements perceived as an unnecessary cost? Whatever the answers may be to these questions, it seems to be urgent and necessary to introduce an increased oversight into the process and conditions for the award of *rödöväns* contracts including an evaluation of the intention and capacity for a prospective lease holder to comply with OSH laws and regulations. At present, the process for the award of *rödöväns* contracts is managed by MiGEM and MoLSS is not involved. MoLSS is therefore neither required nor in a position to assess the possible OSH implications of transferring *rödöväns* contracts. One of the relevant issues in this context has been raised concerns the length of the contracts. As short term contracts offer offer a more limited time to ensure return on investments in safety.

A positive development is that negative impact of a pressure towards overproduction has been legally recognized. In addition to the general suspensive authority of MiGEM, MoLSS has also been granted an authorization to suspend operations where there is overproduction and production which is not in compliance with the production and manufacturing plans.¹⁶⁰ A definition of the meaning of “overproduction” is yet to be introduced. In this context, consideration could perhaps be given to the introduction of upper production limits in contracts awarded.

This study has also revealed that the courts are struggling to cope with ambiguous and disguised contractual arrangements. The legal vacuum caused by the initial lack of regulation of the *rödöväns* contracts may have been one of the factors contributing to the development these ambiguous and disguised contractual arrangements. Their scale and importance are not known, and it may be relevant to consider examining that question in a more systematic way. The fragmentation of the responsibilities in the supply chains, appears thus to have been compounded in Turkey, inter alia, by the use of such ambiguous and disguised contractual relationships. The negative impact of the use of *rödöväns* contracts may primarily be related to these developments. Given the intention of the Government to continue to use *rödöväns* contracts it may be relevant to consider how to ensure that such contracts are used for their intended purpose and to assist the courts in their efforts to clamp down on the use of ambiguous and disguised contractual relationships.

10.1.5. National management of mining and OSH

Turkey has a long tradition in mining. The most recent comprehensive regulation is reflected in the Mining law of 1985 and related regulations. This legislation has been updated and amended on a

¹⁶⁰ New paragraph 7) to Article 25 of the OSH Law.

regular basis. Institutionally the regulatory and management oversight is carried out by the MENR who has attributed the management of the licensing procedure and technical aspects of mining to its agency MiGEM. National legislation regarding OSH, which is under the regulatory and practical oversight of the MoLSS and the LIB, and is of a younger date. Triggered by Turkey's acceptance as an accession country to the EU, the regulatory OSH system has been the subject of a major overhaul harmonizing it with EU legislation and as noted, this effort has also enabled Turkey to undertake international commitments in the area of OSH by ratifying ILO Conventions such as the centrally important Convention No. 155 and most recently Convention No. 176. The fact that the mining industry is governed by two sets of legislative systems managed by two separate ministries implies that there is need for ongoing cooperation between these ministries. The lack of such cooperation has been brought up as a problematic issue in the context of ensuring a full and effective implementation of not only mining but also OSH requirements. There is a lack of coordination between the two ministries in this respect, particularly in the licensing stage. A coordinated response is thus required to the need for an efficient continued development use of Turkey's natural resources, all while ensuring the safety and health of all persons engaged in the mining sector in line with inter,alia international commitments such as ILO Conventions.

10.2 POLICY RECOMMENDATIONS

Against the background of the research carried out and in the light of discussions that have been held with the tripartite constituents and relevant actors in the field, the following policy recommendations have been developed. While the responsibility for articulating these policy recommendations, and the ultimate responsibility for their content, lies with the authors of this study, they have been vetted in a tripartite context and are based on a broad level of consensus.

10.2.1 Develop a national policy on mining

Given the strategic importance of mining in Turkey's economy, and in line with international commitments undertaken, a national policy should be developed - in close cooperation with the social partners - to enable a coordinated response to the need for an efficient continued development and use of Turkey's natural resources, all while ensuring optimal levels of safety and health of all persons engaged in the mining sector. A sectoral development strategy for the coal industry must be developed in line with Turkey's macro level goals such as the Tenth Development Plan and the Prioritized Transformation Programmes. While these policy documents constitute a good framework, a more nuanced perspective is required, specifically for the coal industry based on an analysis of Turkey's energy needs, and the potential of the coal industry to meet these needs, with a long term vision that also takes into account the OSH implications of such a vision. In that context, consideration should be given, inter alia, to the following substantive issues:

10.2.2. Revise Turkey's energy policy taking into account sustainability principles

Coal is an important source for meeting Turkey's energy needs. The 2014 energy balance statistics show that the share of coal and lignite combined is 30 percent in Turkish primary energy supply, which is 90 per cent fossil fuel dependent. Such a dependency on fossil fuel is inevitably reflected in Turkey's greenhouse gas emissions. Data from TURKSTAT suggest that emissions increased around 110 percent during 1990-2013, and that Turkey doubled its emissions just in 13 years. Yet, the international policy framework promotes development policies that should entail a low carbon growth. The emphasis on the implications of any type of policies on the economic, social and environmental structure is pronounced more frequently in the international policy agenda. These are reflected in the Sustainable Development Goals (SDGs) undertaken by 195 member countries in the 2015 Paris Climate Change Agreement of the General Assembly of United Nations. Moreover, the G20 under Turkish Presidency highlighted the need to promote development policies that comply with the SDGs.

Taking into account the recent global agreements, Turkey needs to reconsider its energy policies and adopt a framework that also allows for a shift from coal towards low-carbon renewable energy alternatives that are in harmony with the newly agreed international standards.

10.2.3 Revise the governance structure in the mining sector

A structural change in the governing institutions is necessary in order to ensure an improved governance structure and a smooth functioning of the coal industry with an improved OSH record. Currently, and while the MENR is responsible for both planning and overseeing energy production and mine licensing, its primary obligation is to ensure that the electricity production is both affordable and timely. This is both politically and economically a very important responsibility when taking into account Turkey's ever growing energy needs and energy deficit. However, the mandate of energy stability appears to relegate the operation of mines to a secondary level of importance and unfortunately incentivizes increased risk taking in the coal mining sector. In order to ensure that an increased reliance on domestic resources does not lead to a trade off against OSH standards, the mandates of decision making on energy production and creating the inputs for the energy production should be separated through a governance reform that aims at facilitating long term strategic planning which will increase efficiency, encourage long term technological investments and improve the OSH record of Turkey. In line with priorities and preferences of the authorities, such a governance reform could be carried out in – at least - three different ways; i) enhancing the power of MİGEM in strategic sectoral planning while maintaining the existing institutional structure; ii) establishing a separate Ministry that would be in charge of regulating the mining sector; and iii) separating MİGEM from the MENR and restructure it as an independent public board that would be responsible for the oversight of the sector. This last option might be preferable given Turkey's successful experience regarding institution building reforms, such as the independent Central Bank and the Independent Banking Regulation and Supervision Agency and might prove be effective in promoting long term strategic planning and improving the OSH record.

10.2.4 Ensure an appropriate assessment and monitoring of compliance with OSH standards at the licensing stage

One of the key findings regarding governance structures and OSH inspections is that, under the existing and applied structure, MoLSS is not involved in the evaluation of the OSH standards in the project licensing stage. In practice, and due to scarce resources, MoLSS monitoring commence after the start of operations of an entity. There seems, however, to be a lack of consensus among the stakeholders regarding which institution that should undertake this responsibility. MoLSS suggests that in line with the shared responsibility to build a "OSH Culture", it is not only the employers, workers, experts or inspectors that are responsible for promoting OSH standards, but all involved parties need to reflect OSH policies in their decision making. On the other hand, MİGEM suggests that by law its mandate is to extend licenses all while ensuring that Turkey's mining reserves are utilized under the most efficient and rational principles, that the property rights as well as the environment are protected, and that the state's share is collected over the value added of production. In their view it follows it should be the responsibility MoLSS to verify whether projects meet the OSH standards laid down. In any event, from a perspective of prevention it is of utmost importance that OSH standards in a given project are evaluated at the licensing stage before any operations start. It does not, however, seem possible to resolve this important issue without engaging higher level authorities. It is recommended that relevant policy makers urgently take the matter in hand and resolve the uncertainty regarding the monitoring of OSH in the licensing stage.

10.2.5 Redesign the sectoral governance structures to increase inclusiveness

In the field surveys carried out, both public and private stakeholders expressed their concerns regarding the haste with which amendments to the Law No 6331 were developed and implemented following the Soma tragedy. Furthermore, not only the tripartite constituents but also non-governmental sectoral bodies such as TMMOB, TOBB, and other civil society organizations should be a part of the process. For example, TOBB's Mining Sector Assembly could be redesigned and expanded to include all relevant stakeholders in the mining industry and generate guiding policy decisions. This way, the process of designing policies and implementing and enforcing them could be separated to increase efficiency. This board could also take into account policies regarding regional land use planning; expected demand for coal resources as well as potential environmental and economic impacts that could ensue. In addition, it could become the link between government and citizens by ensuring close consultation.

10.2.6 Ensure that *rödövens* contracts and subcontracting arrangements are not misused and that the question of fragmentation of responsibilities are addressed

The widespread misuse of *rödövens* contracts has had a negative effect on the working and OSH conditions in mines. While underground coalmines operated by private companies now are prohibited from executing such contracts, this ban is limited in scope as state owned enterprises and their subsidiaries are exempt from this amendment. As a continued use of *rödövens* contracts is foreseen in the Tenth Development Plan of Turkey, a more comprehensive approach should be developed to regulate this practice to ensure it serves its purpose. While subcontracting is regulated in the Labour Law, action should be taken to identify not only improper uses of *rödövens* contracts but also of the prevalence and use of other ambiguous and disguised subcontracting arrangements. In terms of subcontracting arrangements in compliance with national laws, further consideration is required to address problems related to fragmentation of responsibilities including how to ensure an efficient implementation of Art. 23 of the OSH law.

10.2.7 Ensure that workers effectively can exercise their rights and that ambiguous recruitment systems are eradicated

In a well-functioning OSH system based on prevention, ensuring they have a voice and tapping the knowledge of workers should be a regular practice, inter alia, to enable a proper and continuous assessment of risks at workplaces. Furthermore, as provided in Article 13 of the OSH law, workers have the right to protect their lives in situations of imminent and serious danger. In order for this right not to be illusory, concerted efforts need to be taken to ensure that workers can exercise this and other rights at the workplace, with the assistance, as appropriate, by their representatives. Furthermore, according to the recently ratified ILO Safety and Health in Mines Convention, 1995 (No. 176) which will enter into force for Turkey as of 23 March 2016, workers shall not only have the right to request and obtain a labour inspection where there is cause for concern on safety and health grounds, but also have the right to have recourse to advisers and independent experts. Promoting awareness on these and other rights of the workers and their representatives is vital both for the promotion of a safety and health culture based on prevention. On the other hand, as the statistics reveal, the years of worker experience, years of schooling as well as formal employment rates have declined in Turkish mining sector. The causes for this deteriorating labour profile should be examined in further detailed research also taking into account the possible impact of employment structures such as the gang master system (*Dayıbaşılık*), and whether this is a widespread phenomenon beyond the Soma basin. In order to ensure that mine workers know their rights, are appropriately trained and have the necessary skills, it would be important to enhance the collaboration between MoLLS, İŞKUR, and employer representatives and workers unions. The fact that a reform of the vocational schools is on the agenda

of the government could be an opportunity to improve the skill profile of mine workers. The field visits show that in some of the best run private mines in Turkey, there are vocational schools in the facilities which help meeting the training needs of mining workers. Incentivizing such practices could help to improve the profile of mining workers across Turkey.

10.2.8 Improve the national capacity to provide standardized first aid, search and rescue trainings

A criticism that was raised in the stakeholders meeting was the available capacity and lack of standardization of first aid and search and rescue trainings. Views were expressed that the capacity of the training center in Zonguldak fell short of meeting the national needs and that there was therefore a need for public policy intervention to step up and standardize search and rescue education. Further training to spread risk management culture should also be on the agendas of the MoLSS and of MNER.

10.2.9 Develop a centralized database on national mining activities

Another gap raised throughout meetings held was the lack of a common inter-public institutional database with access to all information relevant for the sector. A common database which would bring together and harmonize data collected by different institutions and line agencies would be an important tool for identifying sectoral risks and preventing accidents. While steps already taken to develop a protocol for data sharing between some public institutions is a very positive development, it should be ensured that such data sharing is systematic and inclusive for all related stakeholders. On the other hand, it should be noted that the current reporting system does not include a requirement to notify “dangerous occurrences,” although this will become an obligation for the mining sector under Convention No. 176. Such dangerous occurrences should also be reflected in official statistics and be part of the commonly available information system as an analysis of such occurrences is an important element in prevention. A data sharing system would be an important tool for identifying needs and problems, promoting transparency and improving the governance structure in the mining sector in Turkey.

10.2.10 Explore the possibility to use non-public entities for additional oversight

The Mandatory Personal Accident Insurance for Mine Workers Regulation that came into effect in 26 January 2015 is an interesting mechanism which constitutes an additional tool for oversight in the coal industry. Currently, however, risk premiums of the accident insurance are predetermined and equal for all workers in all mines. This system could be improved by keeping the insurance mandatory, but determining the premiums in accordance with the insurance firms’ risk evaluation of each specific mine. This way, additional incentives to improve OSH conditions would be created for private coal mines in order to reduce the insurance premiums they pay for each worker. Another possibility that could be explored is the possibility of having the OSH experts being paid by the insurance firms as opposed to the existing structure where the wages of the experts are paid by the employers. While this proposal should not be taken to affect basic tenant in Act No. 6331 that it is the Employers’ responsibility to ensure compliance with OSH standards, international best practice regarding the roles and functions of OSH experts should be explored.

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ABBREVIATIONS

BTU	British thermal units
CEACR	Committee of Experts on the Application of Conventions and Recommendations (also abbreviated as the Committee)
ÇASGEM	Labour and Social Security Training and Research Centre
DIRECTORATE	The OSH Directorate of the MoLSS
DISK	Confederation of Progressive Trade Unions
EÜAŞ	Electricity Generation Company
EPDK	Energy Market Regulatory Authority
GWH	Giga watt hours
HAK-İŞ	Confederation of Real Turkish Trade Unions
ILO	International Labour Organization
KESK	Confederation of Public Employees Trade Unions
Labour Law	Labour Law, No. 4857 of 2003
LIB	Labour Inspection Board
MEMUR-SEN	Confederation of Public Employees Trade Unions
Mtoe	Million Tonnes of Oil Equivalent
Mining Law	Mining Law No. 3213 of 1985 as amended up to and including Act No. 5995 of 2015 http://www.juristurk.com/turkish-mining-law-no-3213-english-version/
Mining Regulations	Mining Regulation (as amended up to 10 March 2015 Reg 29291)
MİGEM	General Directorate for Mining Affairs of the Ministry of Energy and Natural Resources
MTGM	General Directorate of Mineral Research and Exploration
MENR/ETKB	Ministry of Energy and Natural Resources
MoLSS	Ministry of Labour and Social Security
MTA	Mineral Research and Exploration General Directorate of the Ministry of Energy and Natural Resources
NUTS	Nomenclature of Territorial Units for Statistics
OPHH	Occupational Physician (Article 3.1 i) of OSH Law)
OSH	Occupational Safety and Health/Occupational Health and Safety
OSE	Occupational Safety Expert (Article 3.1.f) of OSH Law)
OSH Law	Law on Occupational Health and Safety No. 6331 of 30 June 2012
SGK	Turkish Social Security Institution
SPK	Capital Market Authority

SOE	State Owned Enterprise
TVM	Township and village coal mine
Startup regulations	Regulation on licenses for Opening and Running a Workplace
TEPAV	Turkish Economy Policies Research Foundation
TISK	Turkish Confederation of Employer Association
TKİ	Turkish Coal Mining Corporation
TMD	Turkish Miners Association
TMMOB	Mining Engineers Chamber/Chamber of Architects and Engineers
TWh	Tera Watt hours
TTK	Turkey Hard Coal Authority
TÜRK-İŞ	Confederation of the Turkish Trade Unions
TÜRKİYE KAMU-SEN	Confederation of Turkish Trade Unions of Public Employees
TÜRKİYE MADEN-SEN	Mine Workers' Union of Turkey
TURKSTAT	The Turkish Statistical Institute

ANNEX 1. Concept note for TEPAV's Coal Mines Field Visits

TEPAV research team will undertake between 2-4 field visits to an operational coal mine with the aim of conducting on-the-spot analyses and documenting the general workflow of coal-mines. Interviews with key actors that are involved in various stages of the coal mines will be at the core of these field visits. TEPAV team will ensure that the interviews in the field will include all the following actors; i) miners, ii) engineers, iii) unionists, iv) employers, v) occupational safety specialists, vi) locals, and additional relevant parties where deemed necessary.

These visits will be critical for the following reasons:

1. Witnessing the issues with OSH implementation and enforcement first hand;
2. Establishing the bridge between the legal, regulatory frameworks and the practice, highlighting the gaps given the fact that Turkey seems has to comply with many international conventions at least on paper;
3. Documenting the social dimensions which cannot be extracted by solely desk research;
4. Confirming the findings of primary and secondary literatures utilized for the study;
5. Pursue answers to questions/issues that are not answered in the literature on the Turkish coal mining sector through these interviews and observations.

All in all, during the field study, research team will seek to observe and document detailed information concerning following matters: working conditions, wages, working time, health and safety practices including the use of risk assessment methodologies, quality and appropriateness of safety equipment, quality and frequency of training, safety personnel, emergency practices, subcontracting practices, frequency and efficacy of audits, enforcement mechanisms and practices, etc.

List of target enterprises:

A sample of small vs. larger enterprises as well as public vs. private are expected to be covered. In addition to the Soma and Zonguldak Coal Mines, some potential mines based on the above criteria are;

Lisencee	2012 Production (million tons)	Type of Mine
Ege Linyit	TKİ 10.4	Open/Underground
Çan Linyit	TKİ 1.8	Open Pit
Garp Linyit	TKİ 3.8	Open/Underground
Bursa Linyit	TKİ 0.6	Open Pit
Ilgın Linyit	TKİ 0.1	Open Pit
Güney Ege Linyit	TKİ 4.2	Open Pit
Yeniköy Linyit	TKİ 7.9	Open Pit
Afşin Elbistan Linyit	EÜAŞ 18.6	Open Pit
Seyitömer Linyit	EÜAŞ 5.3	Open Pit
Sivas-Kangal	EÜAŞ 3.2	Open Pit
Çayırhan Kömür İşletmesi	EÜAŞ 5.5	Underground

Adıyaman Gölbaşı	Private	0.14	Open Pit
Amasya	Private	0.5	Open/Underground
Aydın	Private	0.7	Open/Underground
Balıkesir	Private	0.6	Open/Underground
Edirne	Private	0.4	Open/Underground
Karaman Ermenek	Private	0.15	Open/Underground
Konya Beyşehir	Private	0.5	Open Pit
Manisa	Private	0.5	Open/Underground

Source: 2013 TKİ Mining Report

Documentation:

The findings of the field research stage will be incorporated to the final report in their relevant sections either as a whole subsection, or in boxes, where deemed necessary. Nevertheless, visits to the coal mines are expected to significantly boost the validity and reliability of the sections on coal mining sector value chain analysis and social analysis.

Sample Interview Questions:

1. Production brown coal in Turkey
 - 1.1. What is the general method of production in the lignite mines of Turkey? According to the geological structure does it reveal differences? Which method is used in the specific field that is visited?
 - 1.2. How many million tons of brown coal reserves in that specific mine? How many of them will be more licensed?
2. Arrangement/contract types in Turkey's mines
 - 2.1. Who gives the licenses?
 - 2.2. Is the duration of licenses tied with investments?
 - 2.3. Do these investments include OSH investments when the initial license to start excavating is given?
 - 2.4. Is there a follow up mechanism for these initial investments?
 - 2.5. When does the Ministry of Labour enter the picture?
 - 2.6. Do they follow how the operation is actually performed in an actual mine?
 - 2.7. Who has the responsibility to take OSH precautions? The original licensee?
 - 2.8. Are coal pits in the specific mine licensed under *rödövans* or sub-contracting?
 - 2.9. In determining the arrangement type, at which extent constraints, costs and feasibility would be taken into account?

2.10. No matter what type of contract, do the companies get to have certain properties for binding the tender conditions? And again, no matter what type of contract, are there any certain conditions of licensing the mines which may exceed maximum risk limits?

2.11. How was the licensing process in the specific mined that was visited? Have hazards of this pit and the qualification of the tendering firm been taken into account in that process?

3. Health and Safety in Brown Coal Mines of Turkey

3.1. What are the main drivers of potential accidents in brown coal pits?

- Sub-contracting
- Overproduction
- Deficiencies in the management implemented in mines
- Lack or inadequacy of personnel safety equipment
- False/ short-sighted agricultural policy
- Weaknesses in monitoring, inspection and control
- Problems encountered in the organization of rescue task

3.2. For the mentioned above or aside, what are most the most important risk factors in the specific mine that is visited?

3.3. Who are technically responsible if a disaster were to occur? How are responsibilities distributed among parties?

- Employee/Licensed Owner
- TKİ
- ETKB-MİGEM
- Ministry of Labor and Social Security
- Unions

3.4. Who are responsible to compensate the humanitarian, social and economic costs if a disaster were to occur? What did they do for preventing it? Had they ever used control mechanism or did they use it inefficiently?

