

Calculating Commission Fee for the Distribution of Gasoline and Gas Oil by Private Sector in Iran: A Proposal for Restructuring Iranian Petroleum Products Market

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ABSTRACT

Currently, the distribution of various types of petroleum products is performed exclusively by the government. The high price of land in metropolitan cities and the lack of incentive for the private sector to invest in the construction of filling stations due to their low-income have caused filling stations not to be sufficiently available. One of the solutions to overcoming this obstacle is to use the ability of the private sector for the distribution of petroleum products. To reduce the government's ownership, the market structure for petroleum products distribution in the country needs to be changed. This change should be firstly done gradually and step by step, and, secondly, the government has to monitor this issue at various stages. In this study, three stages are proposed for the market restructuring of the distribution of petroleum products in the country, and the conditions and requirements for each stage are separately identified.

For the private fuel distributing companies, the most important problem is the economic issue of profitability. On the other hand, since the product price is still subsidized in the country, it is indispensable that the amount of commission fee should be determined in such a way that the activity of private companies is economically justified. In this study, the amount of product commission fee is calculated concerning capital and operational expenditures using the engineering economics method in different situations by employing COMFAR version 3 software. With regard to the various land prices in different places, the results of calculations show that the amount of gasoline commission fee varies from 6 to 12% of the current price of this product; the commission fee varies between 20 and 40% for gas oil.

1. Introduction

Presently, various types of product distribution methods in the country are carried out exclusively by the public sector. One of the current system's essential features is the monopoly in supplying petroleum products. As a result, substantial costs are imposed on the government for freight payment to supply channels, for paying the freight cost to shipping companies, for the prevalence of trafficking phe-

nomenon in petroleum products etc. (National Iranian Oil Products Distribution Company, 2015¹).

On the other hand, in many areas, the private sector is more efficient than the public sector, and reducing government's ownership and increasing competition with the entry of the private sector can increase consumer welfare and improve the allocation of resources. At the same time, some sectors and economic activities are offered due to the type of

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goods or services provided. Moreover, the sensitivity of the issue and sometimes tying with social and even security issues require government policy and continuous government monitoring. The distribution of products in different countries is one of the sectors that has always been involved as an observer and policy-maker. Regarding the economic system governing the states and policies and the government's objectives, the product distribution market follows different frameworks and rules in different countries (Energy Quarterly of NIOFDC, 2015).

The growing trend of population, the increase in the number of motor vehicles, and the lack of public transport with the demand for intra-urban travel have raised the request for petroleum products. However, the higher price of land in metropolises and the lack of incentive for the private sector to invest in constructing filling stations, due to the low income and the lack of competitive atmosphere, have caused the filling stations not to be sufficiently available. Furthermore, the private sector does not have sufficient motivation to invest in the construction of the filling stations. One of the ways to overcome this deficiency is to use the ability of the private sector to distribute petroleum products, which is also prevalent in many countries of the world.

In the downstream sector of the oil industry, particularly the petroleum product distribution market, the private sector (privatization) is employed entirely through restructuring. The oil industry restructuring involves various activities such as the separation of activities, minimization, privatization, organizational rearrangement, and mergings (Research Center of the Islamic Consultative Assembly, 2008).

Restructuring in the energy industry usually consists of four steps:

- System restructuring, which involves separating the production sectors, transmission sectors, and distribution sectors.
- Market restructuring, which refers to moving from a monopoly structure towards more competitive markets.
- Regulation, which requires an independent regulator's existence with effective supervisory activities.
- Change in ownership, which involves privatizing the existing public companies or facilitating the entry of private rivals (Jamash & Pollitt, 2005).

To implement the general policies of Iran's Article 44 of the Constitution Law and reduce the government's ownership, it is necessary to change the structure of the distribution market of petroleum products in the country. Firstly, this change should be gradual and performed step-by-step; secondly, the government should monitor this issue at various stages. In this study, three stages are proposed for the market restructuring of the petroleum products distribution in the country, and the requirements and conditions for each

stage are separately identified. The first step is the provision of conditions for the formation of private companies distributing petroleum products in the country. The second stage is removing the products' fixed price and replacing the commissioning system with the current commission fee system along with the adoption of ceiling price policy. Finally, the third stage is the liberalization of full prices and price determination based on market mechanisms.

The remainder of this paper is structured as follows: Section 2 presents literature review and research methods. Section 3 describes the current fuel distribution structure in Iran. Section 4 includes the studies of fuel distribution in different countries. Sections 5 and 6 present the proposed structure of oil products distribution in Iran and use experts' opinion on the future of the distribution market structure of petroleum products using analytical hierarchy process (AHP). Sections 7-9 describe the issues of determining the commission fee for private fuel distributors by using capital and operational expenditures in the filling station and transportation sectors. Sections 10 and 11 represent the economic evaluation model for determining the commission fee of the private fuel distribution companies. The last section concludes the work and provides some suggestions.

2. Literature review and research methods

Regarding the subject of this paper, calculating the commission fee of the distribution of petroleum products, along with restructuring the country's petroleum products market, has been simultaneously proposed. Therefore calculating the commission fee is mostly addressed in the theoretical restructuring, especially in the downstream sector.

Financial crises point out that the widespread weakness of finance and corporate governance along with misguided macroeconomic policies will bring severe and unexpected outcomes to the social and economic context of the countries.

One of the major changes that can help improve efficiency and manage crises is restructuring. Restructuring can be considered both at the macroeconomic and market level and at the companies' and corporations' level. Major restructuring involves privatization, liberalization, regulation, deregulation, and any changes that improve economic conditions and increase the presence of the private sector in economic activities (Pomerleano & Shaw, 2005).

Depending on the circumstances, restructuring at the company level can include various changes. Restructuring of the company and industry takes place in various forms; it includes investment in new facilities and factories, mergings and acquisitions, closure and miniaturization, operation

termination, separation of activities, or the formation of new business by forming coalitions with other companies etc.

The restructuring process is a gradual and continuous process, and successful companies consistently adapt to the evolution of competitive conditions in the market (Organization for Economic Cooperation and Development, 2002).

In the downstream sector of the oil industry (at the market level), further restructuring includes a set of actions in which the supply or production chain, transmission, storage, and products distribution will be assigned to the private sector to create a competitive environment (US Department of Energy).

Due to the structure of this paper and the related presented discussions, different quantitative and qualitative methods are used in the analysis. Generally, in this work, three types of analysis methods are used as follows.

Method 1: conceptual analysis (conceptual model)

In this section, firstly, by using theoretical concepts and taking restructuring definitions from different dimensions into account, by examining the experience of other countries in restructuring downstream oil sector, and by considering the country's economic conditions, a conceptual model for restructuring the country's distribution market of the petroleum products is presented.

Method 2: analysis based on the model of engineering economics

One of the significant government's roles in the future distribution market of petroleum products in the country is to monitor privately owned companies' activities (in the fuel distribution market). Therefore, one of the critical tasks of the government in the early formation stages of the private companies distributing fuel (which is still determined by the product price) is the economic policy. It includes commission fee determination of these companies (it is explained how to calculate it in detail in the next sections). To calculate

the commission fees of private companies distributing fuel, a model of engineering economics and CAMFAR software version 3 is used.

Method 3: analysis based on the model and the analytical hierarchy process

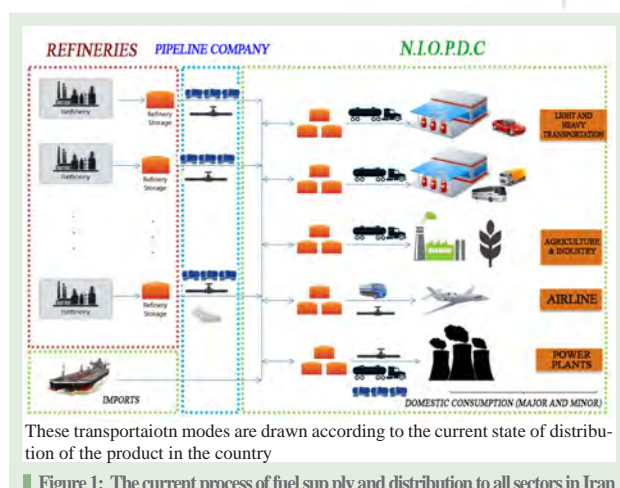
It was mentioned that one of the objectives of this research is to propose a process of restructuring the distribution market of the petroleum products in the country, and this market is currently monopolized by the government. Therefore, in addition to studying the experience of other countries and the leading companies, the expert's opinions are employed in this field. To this end, the hierarchical analysis process (AHP) is used to involve their opinions in this work.

3. The current fuel distribution structure in Iran (with an emphasis on the transportation sector)

Generally, as illustrated in Figure 1, the current fuel supply and distribution process in the country consists of three general segments, including production, transmission, and distribution. The production sector consists of nine refineries which, in pursuance of the general policies of Article 44 of the Constitution Law of Iran, has allocated seven refineries to the private sector. Currently, all the refineries (both private and public) are required to place all their main production products for distribution on the domestic market to the NIO.P.D.C, which is considered a wholly state-owned company. The transfer section consists of four methods: transportation through the pipelines, railroad tankers, maritime industry, and road tankers. However, through the four modes of transportation, only road tankers option is carried out by the private sector, and the other modes are at the government's disposal. Moreover, the distribution section, which is also the most critical part, is mainly at the government's disposal.

Currently, the products required by the country are supplied by road transportation departments, railway, pipeline, and maritime industry. In year 2015, the total payment by the NIO.P.D.C for carriage to the abovementioned sectors was 534,667 US dollars, which accounted for more than 40% of the total current company expenses (Planning Management of the NIO.P.D.C, 2015).

In the current situation, supplying fuel to the transport sector is divided into two distinct parts. The first part is the fuel transportation by transportation companies that deliver fuel from the warehouses of the NIO.P.D.C, and, in return for receiving the freight cost from the company, they will supply fuel to the customers determined by the company. The second part is the filling stations and sales representatives,



who distribute fuel in the retail form between consumers and applicants and receive a commission fee for each liter of the distributed fuel (NIOPTDC, 2015).

4. The study of fuel distribution in different countries

To propose the process of changing the distribution structure of petroleum products in the country, the experiences in this field in different countries are addressed.

-Changing petroleum products market structure in Spain from public to private

The Spanish Oil Industry was monopolized from 1927 to 1997. The government determined the retail and the refinery prices and handed petroleum products from refineries to a monopoly company which was responsible for the distribution.

Following a restructuring that began in the early 1980s, the Spanish government gradually began to liberalize its oil industry to adapt it to European competition laws and regulations. Gradually, some domestic and foreign operators were able to access various sectors of the oil chain (distribution, transportation, storage, and retail), which led to fundamental changes in the industry structure and the relationship between active companies. Significant investments were made in the area of production, distribution, and retail facilities, and the efficiency and performance of this industry increased; the refined products were developed according to market demands and desires.

In 1985, with the adoption of government laws in the downstream sector and the fuel distribution, the filling station commercialization was introduced as the main factor for creating competition. These laws created and established a network of non-governmental filling stations in parallel with the current status.

During 1988 to 1992, the subsequent rules reduced the minimum distance between filling stations to increase the number of filling stations in the parallel private network and increased competition. During this time, fixed government prices were eliminated, and the price ceiling policy was used.

In 1996, by eliminating the minimum permitted distance between filling stations, the price liberalization of gas happened; subsequently, in 1998, the price of gasoline and the free access guarantee to the transportation network of petroleum products for all stakeholders occurred.

In order to create a competitive market, price liberalization was carried out under state supervision. The total time of market transformation from monopolistic to competitive mode lasted for 11 to 13 years (Contín, Correljé and Huerta, 1994).

-Deregulation and market liberalization of petroleum products distribution in Nigeria

In Nigeria's oil industry, some of clear examples of disruptive reasons leading to deregulation were as follows: 1) the regrettable situation of refineries, 2) inefficiency in distributing petroleum products, 3) the adverse effects of the monopolistic practices in downstream sector structure, and 4) the smuggling of manufactured products.

In January 2002, the government began the liberalization of the downstream oil industry sector by setting a ceiling price on gasoline, oil gas, and kerosene. In 2012, the government generally abolished fuel subsidies.

The deregulation process of the distribution market in Nigeria lasted from 2002 to 2012 (about ten years), and it was carried out in two steps:

- 1) Determination of the ceiling price;
- 2) Complete elimination of subsidies.

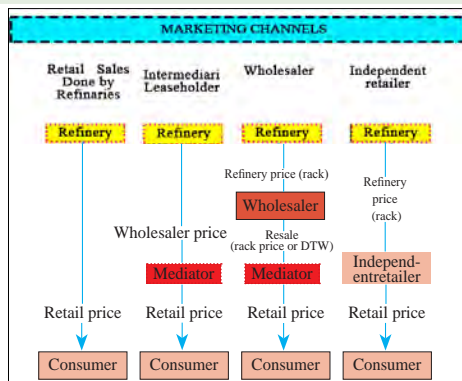
Although deregulation is desirable to reduce government involvement in refining, importing, and distributing petroleum products in the Nigerian market, studies have suggested that deregulation should be performed in several stages (Braide, 2003).

-The Australian downstream oil sector and the government's policies

Australia's refining industry is one of the country's major economy contributors. As a result of its activities, it provides many direct and indirect benefits to the state and builds the competitive base of major export industries.

The government's policies in the petroleum products market include:

- Regulations related to fuel's quality;
- Ensuring safety and security in the field of liquid fuels supply;
- Alternative fuel policies;
- Tax on fuel and oil industry;
- Policies on climate and environmental changes;



Source: U.S. Department of Energy, Energy Information Administration (EIA). 2003

Figure 2: Fuel distribution channels in America

- Regulating in the field of competition and preventing monopoly creation by the private sector.

-Features of the wholesale sector and retail market for petroleum products

- The wholesale and retail sale of fuel prices in Australia is transparent, competitive, free, and related to international prices.
- Approximately 95% of the wholesale crude oil price is the cost of refining petroleum products plus the government taxes.
- Independent fuel importers and wholesalers have more reserves and facilities in comparison to the oil companies.
- Prices may differ significantly between two different regions or cities due to the various competitive and economic characteristics (Australian Petroleum Institute, 2011).

- Deregulation and reformation in India's downstream oil sector

To begin the deregulation process in the oil industry, the Indian government chose a specialists group of government and the private sector. After examining this group, several suggestions were made. Among these recommendations were the devastation of the Administrative Pricing Mechanism (APM) and tariff reform. The government accepted these proposals and took severe actions that significantly changed the legal framework. The government's announcement of APM's phase-out followed these characteristics:

- Fixed time frame (4 years) to dissolve the APM system;
- The relationship between the domestic crude oil price and international prices;
- Liberalizing refineries for pricing and deregulation products;
- Rationalization of customs taxes on crude oil and petroleum products for providing security for refineries;
- Reduction of kerosene and LPG subsidies (liquid gas);
- Establishing legal and regulatory bodies (Narange et al., 1999).

- Dimensions of the structural reform of the Indian

downstream oil sector

A) Pricing structure adjustment along with targeted subsidies

Along with the price liberalization, in order to reform the product market structure in India, targeted subsidies for a small segment of the final consumer were considered.

Providing targeted subsidies for hundreds of millions of people living in dispersed geographic areas is difficult. Moreover, given the indigenous corruption that India faces at all government levels, it is very likely that the targeted subsidy system can be effective in limiting the subsidized products distribution to the targeted population group. Such a system requires a sophisticated monitoring and inspection structure.

For this purpose, the government introduced a new generation of smart cards with an experimental plan in Hyderabad Bangalore and Pooneh, aimed at providing better and targeted distribution of subsidized oil and gas to poor Indian people.

B) Reformation of the taxes structure

Since 2009, several proposals for structural reforms have been presented for the petroleum products pricing. The most important one of these proposals is the proposal to reform the tax system of the petroleum products. This means that the government will reduce the tax imposed on manufactured goods for a short time period.

C) Determining the ceiling price

In May 2009, the Ministry of Petroleum and Natural Gas (MPNG) proposed a structural reform of the gasoline and gas market on a ceiling price basis, according to which the product price was allowed to fluctuate. Based on this proposal, oil companies could determine the petroleum products cost every three months based on the average seasonal crude oil price at the international level. This implication is implicitly based on the idea that some products over-pricing could harm consumers and the economy (Clark, 2010).

In general, the structure reformation of the product market in India was carried out in three stages as follows:

The first stage is the administered pricing dissolution mechanism and the tariff reform. The second stage is the reformation of the gasoline and gas oil market structure based on the establishment of the ceiling price, in which the products' price was allowed to fluctuate (along with the provision of subsidies to sensitive fuels for weak classes such as kerosene and liquid gas). Finally, the third stage is transitioning to free markets and raising prices as a result of market liberalization (Sharma, 2012).

-Reforming the downstream oil market in Japan

For years, the Japanese government has deregulated and controlled the oil market through some "Industry-based laws." These laws allowed the government to restrict entry

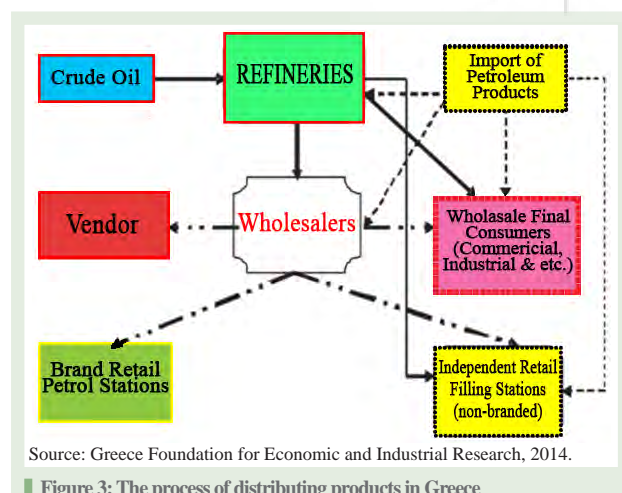


Figure 3: The process of distributing products in Greece

into the market as needed in addition to imposing restrictions on the energy industries operation. The main motive for this government intervention policy was “energy security” which is an essential and national issue and indispensable for the steady development and flourishing economic growth; it is also so important that it is wrong to make it available by market mechanism tools.

In the mid-1980s, deregulation and liberalization began in the Japanese oil market. In 1987, a five-year program began and gradually resulted in the elimination of regulations year by year. In 1996, with the removal of regulatory rules, imports of petroleum products were freed. Limitations on the export of petroleum products and the construction and operation of self-service filling stations were also eradicated. A “free market” system was created in which government intervention was limited to emergencies (such as disruptions in oil supplies).

Since the mid-1990s, when the government decided to liberalize the imports of petroleum products, the price of petroleum products in the domestic market followed a downward trend. This, coupled with a steady decline in the oil sector profit margin in refining industry due to the overcapacity in the Asian oil markets and the deregulations during the late 1990s, led to a reduction in the profits of major oil companies operating in Japan. This accelerated the pace of merger of Japanese oil companies. The result of this merger was

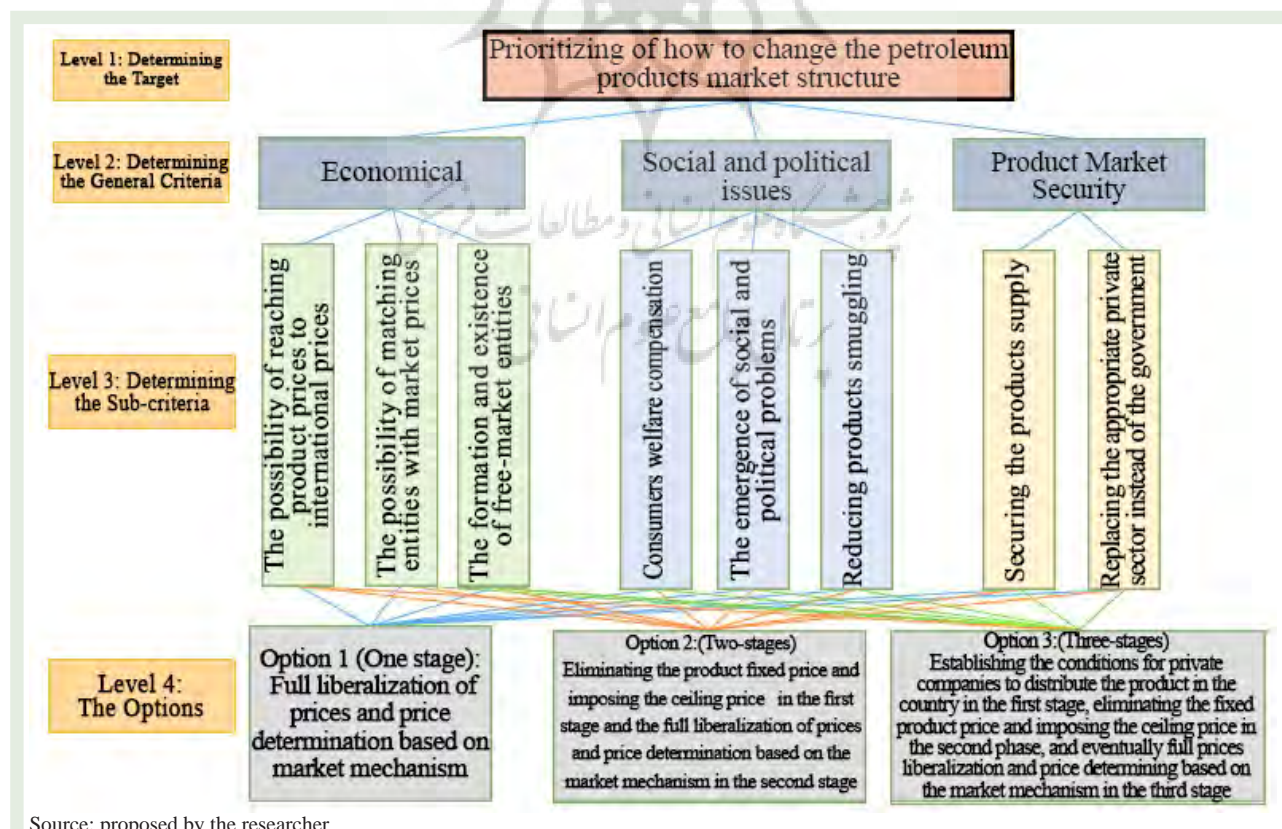
particularly evident in the refining segment, where significant rationalization was made on the number and capacity of refineries in Japan. To simplify operations and maximize economic profit, the number of refineries declined, and the refining capacity of refineries diminished (Eastcott, 2004).

-US fuel market features

- The price is highly competitive and determined competitively in the market.
- State governments have comprehensive supervision on the market and make policy in various fields.
- Even the product transfer pipelines in some states are private, and the government, as the sovereignty, determines the companies’ access rate.
- The market is highly competitive.
- Large stores in the United States sell 80% of the total fuel.

-The petroleum products structure market in Greece

- The Greece downstream oil sector is divided into three distinct parts, namely refinement, wholesale, and filling stations.
- Most refineries produced products which are sold to wholesalers. Wholesaler companies are independent of refineries, and they are free to import or export petroleum products. Most of the wholesalers offer their products to high-consumption and large-scale consumers and filling stations.
- Most of the country’s filling stations (78%) are owned and managed by dealers (DODO), and about 17% of them are



Source: proposed by the researcher

Figure 4: Analytical hierarchy process (AHP), making the desired priority hierarchy

owned by the company and filling stations managers (Dealers) (CODO¹). It is noteworthy that only 5% of the country's holdings are owned and managed by companies (COCO²). (Svetoslav and George, 2014³).

The result of studying the experience of other countries in changing the distribution market structure of petroleum products shows that the change in the market structure of most countries is a gradual and slow process. It is firstly performed at least in two stages (three stages in Spain and India and two stages in Nigeria). Secondly, it happened in a relatively long time (11 years in Spain, about 12 years in India, and more than a quarter of a century in Japan)

5. Using experts' opinion on the future of the country's distribution market structure of petroleum products using analytical hierarchy process (AHP⁴)

Considering the conclusion of the previous section, using the experts' opinion, employing the competent and influential people of NIOPDC in restructuring the distribution market of petroleum products in the country, three options are proposed as follows:

The first scenario (one stage): Full liberalization of prices and price determination based on the market mechanism.

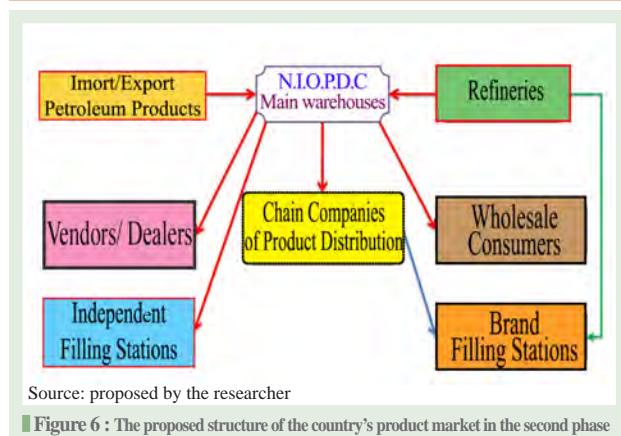
The second scenario (two-stages): Eliminating the product fixed price and imposing the ceiling price in the first stage and the full liberalization of prices and price determination based on the market mechanism in the second phase.

The third scenario (three stages): Establishing the conditions for forming private distribution companies in the coun-

Table 1- The ultimate outcome analysis of the elite's views on different options; the future market structure of the country's petroleum products distribution

Senaro Name	Weight
Senaro One	0.107246
Senaro Two	0.280835
Senaro Three	0.611919

Source: AHP Solver software output



try in the first stage, eliminating the fixed product price and imposing the ceiling price in the second phase, and the full liberalization of prices and price determining based on the market mechanism in the third stage.

In order to take advantage of the companies' experts' opinions, the AHP method is used. To this end, at first, the characteristics of the human resource management of the NIOPDC were received by a total of 119 middle managers, senior executives, heads of the company's headquarters, having the positions of the head of the department, assistant director, director, and general director.

Subsequently, a short-term training course (two days) was held for restructuring issues, experience from other countries, requirements and procedures for restructuring, its effects on the organization etc. Then, fifteen experts were selected with regard to the field of study, the number of years of experience, short interviews on the level of familiarity with the subject, work experience, etc. to complete the questionnaires. The purpose of this interview and completing the questionnaire was to select the best option among the suggested options.

In order to achieve the defined goal and select the optimal option, three main economic, social & political, and the product market security criteria were defined, and their importance in reaching each option was obtained from the manager's viewpoints. Thus, a hierarchical analysis process was used. The hierarchical analysis process of this subject has four levels: purpose, criteria, sub-criteria, and options as illustrated in Figure 4.

After identifying and determining the criteria and sub-criteria, using the analytical hierarchy process (AHP) in the four stages of hierarchical construction, paired comparisons, relative weight calculation, and final options weight and indicators according to the criteria and sub-criteria were determined, evaluated, and ranked. Eventually, the third option with the highest score was chosen as the best option.

The final output of the software (AHP Solver) regarding the various scenarios proposed for the future structure of the NIOPDC is described in Table 1.

6. The proposed structure of oil products distribution in the country

Today, the product market structure of most countries, which is mainly competitive, has been transformed into this way in a gradual process. Taking into account this issue and the results of the opinion poll from the experts of the NIOPDC, in order to change the market for petroleum products in the country, a three-stage plan is proposed as follows; the requirements, conditions, and duties of the government in each of these three stages is determined.

1 Dealer Owned Dealer Operate
2 Company Owned Dealer Operate

3 Company Owned Company Operate
4 Analytic Hierarchy Process

Although the structure of the product distribution market has changed in different countries, in this study, the results of those countries are explored in designing the model and restructuring the product market in Iran. However, given the specific conditions of the Iranian economy and its sensitivity to the product price changes, the gradual model of product market change has been designed in detail with regard to the economic, social, and even political conditions of Iran. Moreover, it can be said that this is a unique subject to be studied further with determining the rates and in-depth details.

6.1. The first stage (short-term): Creating conditions for the formation of the private company product distributor

At this stage, the necessary conditions should be provided for the formation of private fuel distributing companies. The characteristics of private fuel distributor companies and market conditions at this stage will be defined by the following.

6.1.1. Establishing the private product distributing companies

At this stage, with the government's license, privately-owned product distributing companies with a specific brand name can form partnerships and combinations of station owners and current shipping companies. Furthermore, new companies can operate in this field by investing in a filling station construction and developing transportation facilities. The privately-owned products distributors carry products with their own vehicles and receive freight for products distribution at their premises from the government (per each liter of sale). The privately-owned products distributors will have the following characteristics at the beginning:

1. Having at least 60 fuel distribution nozzles in various filling stations and at least 6 oil tankers, concerning maximum 50% of each city filling stations ceiling, 40% of the region

total stations (province), and 20% of all the stations in the country. In the towns with only one station, this is an exception, and it is not necessary to meet this condition.

The purpose of this limitation is that the company can not become a monopoly in a province or country. The percentages stated herein are based on the writer's experience as the expert in the fuel distribution field, and they are considered in consultation with other experts in this field.

2. Having a special commercial name (brand);
3. The scope of the company's activities will be transferring and distributing the product from the warehouse to stations.

6.1.2. The proposed structure for the distribution market of petroleum products in the first stage

Due to the presence of the private sector in the distribution market in the country, at this stage, the proposed structure for the product market is according to Figure 5.

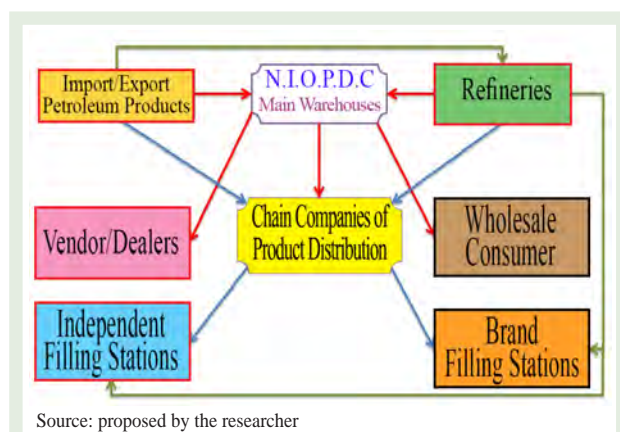
6.2. The second stage (midterm): The stage of transition from the commission system to the commission fee system and ceiling price determination

At this stage, all the transfer costs, distribution and the private company's marginal profit are directly received from consumers, which is so-called the commission fee. (Dehghani, 2013).

Since the fuel price is still subsidized at this stage, the amount of commission fee, which is usually considered as a percentage of the fuel price, is determined by the government, which is the main topic of this paper.

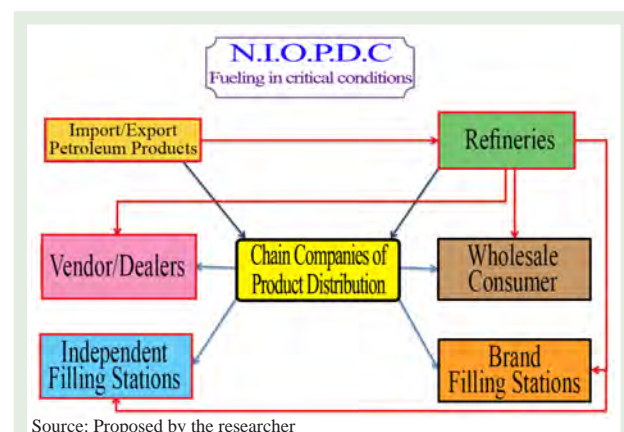
6-2-1 The characteristics (requirements) of the product market at the second stage

1. Private fuel distributing companies have reached maturity and are responsible for distributing the product.
2. The product price is still not fully liberalized, and the ceiling price policy is applied.
3. The commission fee system has replaced the commission



Source: proposed by the researcher

Figure 5: The proposed structure of the country's product market at the first stage



Source: Proposed by the researcher

Figure 7: The proposed structure of the country's product market at the third stage

system.

4. The NIDC will have large distribution warehouses and will distribute fuel along with the private sector.
5. The import and export of products by the private sector (alongside the government) are possible.

6.2.2. The proposed structure for the distribution of petroleum products in the second phase

Considering that the private product distributing companies are almost exclusive in the product market at this stage, it is necessary to expand the activity scope of these companies in the market and gradually reduce the role of the government in this field. Therefore, the graphic structure of the product market in the country is represented in Figure 6.

6.3. The third stage (long term): Full liberalization of the product price and price determination by the market mechanism

After the first and second steps of implementing and establishing the private product distributors in the country's fuel distribution market, growing the development of these companies, and creating competition fields, we can gradually move towards the formation of a competitive market based on supply and demand mechanism.

6.3.1. The characteristics (requirements) of the product market in the third stage

1. There are sufficient refineries, with adequate capacity and in needed locations.
2. The product price is determined on the basis of the market mechanism (supply and demand), i.e.e full prices liberalization.
3. Private fuel distributing companies are fully formed.
4. In crises and unexpected events, the national distribution company will have the strategic reserves to take into action

and take operational activities.

5. The import and export of the product are carried out only by the private sector. The licenses are issued by the National Iranian Oil Products Distribution Company in this regard.
6. Foreign companies are operating alongside domestic companies in the full supply chain and distribution of the country.

6.3.2. The proposed structure for the distribution market of petroleum products at the third stage

Since privately-owned product distributors have fully matured and can perform all the fueling operations at this stage, the product market structure in Iran is suggested as represented in Figure 7.

7. Determining the commission fee for private fuel distributors

The National Iranian Oil Product Distribution Company as an observer at all the stages of restructuring the product distribution market will monitor this process from various aspects. The way of monitoring at each of these three stages may vary.

For example, the identification of the necessary indicators for the assessment of qualified private companies which can operate their brand in the market for petroleum products distribution is carried out by the NIOPDC, and the assessment of these companies is performed by the mentioned company. In addition, all the necessary supervision over the activities of the privately-owned distributing companies, including safety issues, the fuel distribution with a standard quality, environmental issues, and the granting of permits for the safe harbor construction is the responsibility of the NIOPDC.

One of the most important tasks of the National Iranian Oil Product Distribution Company is to formulate eco-

Table 2 : Model indirect relationships

Title	Filling station type based on the number of platforms			
	One platform	Two platforms	Three platforms	Four platforms
Minimum required land area (m ²)	150	350	800	1,200
The cost of getting all the splits and creating a building	25,220	58,850	134,510	201,820
Equipment costs	10,800	25,220	57,660	86,480
Total cost of construction	36,020	84,070	192,170	288,300
Number of nozzles	4	8	12	16
Construction costs per nozzle	9,005	10,508	16,014	18,018

Source: commercial management of NIOPDC: 2016

economic market policies at various stages of restructuring, including the determination of the amount of commission fee, the amount of taxes on fuel etc. Given that the market economic issue, the income, and the cost of productive enterprises are among the important (perhaps the most important) factors in this regard. Moreover, the success in increasing competition and the presence of the private sector through the formation of individual companies depend on the availability of economic conditions for the private sector. Therefore, this section will deal with the calculation of commission fee amounts for these companies. For this purpose, we need to first analyze the cost of these companies in different sectors.

The activities of private fuel distributing companies are composed of two major parts. Part one deals with equipment and facilities related to the product transportation, and the second part is the locations of these companies where the fuel is distributed. Also, the administrative part of these companies will be responsible for supporting the activities of both sectors. Technical and economic appraisal techniques are used to determine the price of the commission fees.

8. The capital and operational expenditures of private fuel distributors in filling stations

Generally, the costs related to filling stations can be divided into two parts: the capital and operational expenditures.

The capital expenditure for the construction of fuel supply stations are equipment costs, construction costs, land purchase costs, and the costs of obtaining split water and electricity as summarized in Table 2.

In this study, the land needed to build fuel supply stations at different capacities is presented in Table 2. Considering that the land price varies in cities and country parts,

economic calculations for various land prices are unnecessary. Therefore, in this study, calculations for three country parts, including centers of the provinces, other cities (non-provincial cities like suburbs), and the inter-route filling stations, where land prices for each square meter are respectively considered 666, 222, and 44 dollars, are conducted.

If the private fuel distributor wants to have a combination of filling stations, the average cost of constructing each nozzle for this company would be about 13,389 US dollars (the arithmetic mean), and the minimum cost of a private company to build a site that could be licensed by the Ministry of Petroleum (at least 60 nozzles) will be 803,333 US dollars.

If the private fuel distributing company is supposed to have a combination of filling stations in different locations, the average land needed to build a nozzle will be 62.5 square meters. The total amount of area required for a private company to build a sufficient number of filling stations that can be licensed by the Ministry of Petroleum (at least 60 nozzles) will be at least 3750 square meters.

The capital expenditure required for a private fuel distributor in various situations is listed in the below table. If the company is supposed to establish the same filling stations in the provincial centers, other cities, and inter-route filling stations, the land cost for this number of nozzles will be 1,166,667 US dollars.

The operational expenditure of filling stations at different capacities based on actual data collected from different filling stations in different country regions is tabulated in Table 4.

If the private fuel distributing company wants a combination of filling stations, the average monthly current cost per nozzle will be about 747 US dollars (the arithmetic mean). The total monthly cost of a private company in the filling station that can be licensed by the Ministry of Petroleum (at least 60 nozzles) will be 44,849 US dollars.

Table 3 : Capital expenditure in the construction of a filling station by a private fuel distributor in various modes (US dollars)

Row	Description	Land price per m2	Total cost of land	Total costs of equipment and construction	Total initial investment
1	The company belongs to public organizations	0	0	807,330	807,330
2	The filling stations are just inter-route	44	165,000	807,330	972,330
3	Filling stations can only be built in cities other than the provincial capitals	222	832,500	807,330	1,639,830
4	Filling stations are to be built only in provincial centers	666	2497,500	807,330	3,304,830
5	Filling stations are built equally in provincial centers, other cities, and inter-route places	311	1,166,250	807,330	1,973,580

Source: Calculated using the data in Table 2 and previous information

9. Capital and operational expenditures of private fuel distributors in the transportation sector

The cost of privately-owned fuel distributing companies in the transportation sector, similar to the filling station sector, is divided into two parts: the capital expenditure and operational expenditure. The capital expenditure of the transport sector is related to the means of transportation of the product or tankers needed to be able to transfer fuel from the warehouses of the NIOPDC to the sites of the filling stations of the company distributing fuel with at least 60 nozzles; at least 6 trucks with a capacity of 30,000 liters are needed. The price of every tanker with all the equipment is assumed to be 133,333 US dollars. According to these assumptions, the initial investment required to provide the transportation equipment of the private companies distributing fuel will be 800,000 US dollars.

Moreover, according to an inquiry conducted by the supply and distribution management of the private fuel distributing companies, the total monthly costs of the transportation sector of the fuel distributing companies, which have six tankers will be at least 11,273 US dollars.

Another operational expenditure of private fuel distributing companies is office expenses and human resource wages/salaries in various specialized fields. Based on the evaluation and inquiry made by the commercial management of the NIOPDC, 10 staff members, having a base grade of 10, and 5 employees, having a base grade of 12, are required to carry

out the affairs of the recruitment office and technical affairs; taking into account the salary basics and other benefits based on the Ministry of Labor and Social Welfare in 2016, the monthly wage cost will be 8,132 US dollars. In addition, if the cost of renting an office or the opportunity cost of an office for a fuel distributing company is considered 2444 US dollars, the total cost of the central office of the companies is 10,576 US dollars per month.

10. Economic evaluation model for determining the commission fee of the private fuel distributing companies

To evaluate the financial and economic issues, the proposed feasibility model of the United Nations Industrial Development Organization is used.

In the model proposed by the United Nations, essential and effective indicators in the decision making are derived from the contrast between project's input and output flows. These indicators are the net present value (NPV), internal rate of return, and payback period (Tavanpour, Kazemi, 1386).

For this purpose, the following function is also used to determine the amount of commission fee for private fuel distributing companies.

$$NPV = \sum_{i=1}^n \frac{(R_i - C_i - D_i)}{(1+r)^i} - S$$

Table 4 : Monthly operating costs of fuel supply stations with different capacities (US Dollars)

Title	Filling station type based on the number of platforms			
	One platform	Two platforms	Three platforms	Four platforms
Labor cost	1,816	3,672	5,578	7,375
Water	6	11	15	23
Electricity	84	106	128	148
Telephone	22	29	37	43
Taxes and duties	618	832	987	117
The cost of maintenance (major and minor)	548	957	1,376	1,480
Total current expenses	3,124	5,670	8,078	10,272
Management profit (7% of the total costs)	218	391	567	717
Total current monthly expenditure	3,313	6,024	8,568	10,992
Number of nozzles (dispenser)	4	8	12	16
Monthly running cost per nozzle	835	757	711	687
Daily product sales (liters)	12,000	24,000	36,000	48,000

Source: Calculated at National Company for the Distribution of Petroleum Products using standards and empirical issues of filling stations of the whole country: 2016

where, C_i and D_i are the current and annual depreciation costs respectively. Also, S represents initial investment, and r stands for the discount rate. To make the above-mentioned equation equal to zero, the only unknown parameter (R_i) is calculated as revenue using COMFAR 3 software for different models.

11. Determining the amount of commission fee for the private fuel distributors

In calculating the commission fee of private fuel distributing companies, the following assumptions are included in the processing of models in addition to the numbers related to the initial investment costs and current costs and information in Tables 2 to 4.

1. The useful life of equipment and facilities are assumed 20 years.
2. The salvage value of equipment and facilities at the end of useful life is considered zero.
3. Straight-line depreciation method is used to calculate depreciation cost.
4. A discount rate of 20% is assumed.
5. The average daily sales of each nozzle in filling stations are considered to be 3000 liters. Due to the high sales of petroleum products, especially gasoline, in some filling stations of the country, some experts believe that this amount should be 4000 liters per day although the charge rates are calculated based on this amount of sales.
6. The useful life cycle of the oil tankers is assumed 20 years.
7. The salvage value of the oil tankers at the end of useful life is equivalent to 20% of their initial value.
8. The average monthly performance of the oil tankers is

assumed 6000 km.

Taking into account the above assumptions and processing various models, the net income of private fuel distributing companies per liter of the product sold in various options are summarized in Table 5.

It must be noted that the resulted values followed by commission fee are calculated through the equation of NPV to zero regarding the commission amount and product price at different land prices. In other words, commission percentage is calculated in different modes of economic breakeven point.

At the current fuel price, it is suggested that, in order to execute a commission fee system, the government should receive about 85% of the price of gasoline from the private fuel distributor, and the government will deliver it to the private fuel distributing company at its warehouse. The gasoline product is shipped to its premises by its means of transport and sold to the final consumers through these locations; for providing such services, it receives a maximum of 15% of the gasoline price from the consumer.

In the context of gas oil price, considering the current price (0.067 US dollar per liter), the amount of commission fee of the private companies distributing the fuel will be according to Table 6.

In order to create more competition between private sector companies and the possibility of offering products at different prices in Iran, it is suggested to use the ceiling price policy coupled with the commission fee system. In such a way, for example, for the government, whose price is currently 0.22 (US dollars per liter), the government will set the commission fee at 15%; in other words, private companies will take the product at the warehouse of the NIOPTDC for 0.19 US dollars per liter, and for gasoline supply, the government can receive up to a maximum of

Table 5 : Commission fee for private gasoline distributors

Description	Land price per square meter (US dollars)	The amount of commission fee (product price percentage) for the sale of each nozzle	
		Daily sales of 4000 liters	Daily sales of 3000 liters
Company is owned by public organizations.	0	5.8%	7.8%
The filling stations are just inter-route filling stations.	44	6%	8%
Filling stations should be built only in cities other than provincial centers.	222	6.8%	9%
Filling stations are to be built only in provincial centers.	666	8.6%	11.5%
Filling stations are equally constructed in provincial centers, other cities, and inter-route places.	311	7.2%	9.6%

Source: findings of the research

15% of the gasoline price from the consumer. Therefore, no company can sell gasoline at a price higher than 0.22 (US dollar per liter). In the case of gas oil and other products, a similar trend can be applied.

Conclusions and policy issues

As mentioned above, in the current situation, fuel supply is divided into two separate sections. In the first part, the fuel transportation is carried out by transportation companies which take fuel at the warehouses of NIOPTDC and receive the carriage cost from NIOPTDC; they deliver fuel to the customers designated by the company. Based on the product's supply origin, the nature of carriage route, the type of transportation, the destination of fuel delivery etc., the payment rates are very different, which have caused NIOPTDC several problems. This situation also causes dissatisfaction for shipping companies and drivers. The second part of the fuel distribution system in transportation sector is filling stations which distribute fuel in the form of retail sales among consumers and applicants and receive commission fee per liter of the distributed fuel. The mismatch between the income and the current costs and investment opportunity cost of gas stations discourages the private sector from investment in constructing filling stations due to the low revenue, especially in metropolitan cities. One of the ways to overcome this obstacle is to use managerial and financial capabilities of the private sector through reducing government's ownership and creating a competitive environment for the private sector to enter. Creating such a competitive environment in the distribution market of petroleum products in the country requires restructuring this market. In this

study, three stages are proposed for the restructuring of the distribution market of the petroleum products in the country, and the conditions and requirements for each stage are separately identified.

Together with changing the structure of the distribution market of petroleum products, it is necessary to change its relevant financial and economic issues. In this study, the rate of commission fee of product distributing companies is calculated.

With regard to the different land prices in different places, the results of the calculations show that the amount of gasoline commission fee varies between 6 and 12% of the current price of this product. This amount for gas oil varies from 20 to 40%.

Based on the results of the current work, the following suggestions are briefly presented to implement the private sector's participation in the product distribution field in Iran.

1. It is suggested that the country's fuel distribution market should be divided into different regions, and, the appropriate commission fee should be determined within each region for private fuel distributing companies.

2. In order to successfully implement the proposed restructuring plan, the government should also apply the defined commission fee rate in practice. In other words, the government should refrain from determination and application of unilateral figures which pay less attention to the private sector's interests.

3. Given that the formation of a competitive market for the distribution of petroleum products without price liberalization is not feasible, and the other countries experiences also confirm this issue, it is suggested that the subject of increasing the price of energy carriers should be considered seriously and outside the political categories in the annual

Table 6 : Commission fee for private companies distributing gas oil

Description	Land price per square meter (US dollars)	The amount of commission fee (product price percentage) for the sale of each nozzle	
		Daily sales of 4000 liters	Daily sales of 3000 liters
Company is owned by public organizations.	0	19.6%	26%
The filling stations are just inter-route filling stations.	44	20%	27%
Filling stations should be built only in cities other than provincial centers.	222	22.7%	30%
Filling stations are to be built only in provincial centers.	666	28.8%	38.4%
Filling stations are equally constructed in provincial centers, other cities, and inter-route places.	311	24%	32%

Source: findings of the research



budget laws of the country.

4. Given that the product market type in each country is almost dependent on its economic system, along with the product market liberalization and the product price determination in the market, the issue of liberalizing the country's economy should be considered seriously by the authorities. In fact, the success of the distribution market competitiveness will be challenging in the country unless the country's economy is liberalized.

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