THE IMPACT OF THE TAXATION SYSTEM ON INVESTMENT IN THE HYDROCARBON SECTOR IN ALGERIA

By

Senator Khaled

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfilment of the requirements

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ABSTRACT

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By

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In 2005, the Algerian authorities have adopted a new taxation system pertaining on hydrocarbons in order to attract more investments, to avoid any sort of oligopoly and to allow more openness of the sector to competition by the clarification of the role of the different institutions. Eight years after the adoption of this new taxation system, the purpose of the current study is to examine the validity of the government approach based on taxation system as determinant factor of the investment in the sector. Using the linear regression, the available data confirms that the impact of the taxation on investment is very limited and insignificant. Therefore, the Minister of Energy declared on 2011 that Algeria should adopt a new law in order to encourage and to support foreign investors on hydrocarbons.

Key words: *Taxation, investment, oil, gas, hydrocarbon, imports, exports, Algeria*

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I. INTRODUCTION

Since the last century, the international economy has experienced radical changes. The energy sector, especially oil and gas, becomes important regarding its utilization as energy product and raw material for multitude industries (chemical industries and generation of electricity).

In Algeria, hydrocarbon resources were first discovered in the desert in 1956. In July 1969, seven years after the independence, Algeria joined the OPEC that had supported the nationalization of the hydrocarbons in 1971. Since 1976, this pace expanded to the taxation system in order to consecrate the sovereignty over the national resources. However, the decline of prices in 1986 and the international challenges forced the government to modify the legal framework. Therefore, the law 86-14 has, for the first time, opened the oil sector to foreign investment, and devotes many tax incentives in order to attract more oil companies. Furthermore, this law was amended in 1991 and the same rules were extended, with some adjustments, to the gas sector.

The reflections have not stopped at this stage; rather, they continued to improve the institutional framework in coherence with the international context. This period was marked by many discoveries of oil and gas, putting Algeria for the first time in the rank of the countries with the most discoveries (the International Energy Agency, 1997). However, the government adapted a new legal framework to allow more openness of the sector to competition and to clarify the role of the different institutions: the State as holder of public power delegated to the new independent agencies and that of the public company SONATRACH as an economic and commercial agent.

1. Purpose of the research

The Algerian authorities give big importance to the hydrocarbon sector that dominates the national economy and determines the characteristics of the development policies. It is still the backbone of the budget revenues, since the ordinary taxes play a very low percentage (less than 60%). In 2005, the government has adopted a new legal framework governing the sector, which is needed to open the sector to more competition and to clarify the role of the different institutions. According to the Minister of Energy, the Algerian taxation system was very old and not favourable to foreign investments and the new international challenges may threaten the investment attractiveness. Moreover, the new explorations and the new producers (Egypt, Libya and Nigeria, etc.) could put in danger the equilibrium of the national economy based essentially on petroleum revenues (The People' National Assemble, 2005).

Eight years after the adoption of the new legal framework, the purpose of the current study is to examine the impact of the taxation system on investment in the hydrocarbon sector in Algeria. It will analyse the guiding principles of the new taxation framework via comparison with the previous fifty years since the discovering of oil and gas resources in 1956. This study should be important because the analysis will carried out eight (08) years after the adoption of the reforms in the hydrocarbon sector. Its objectives are:

- To explore the evolution of the taxation system on hydrocarbon activities in Algeria since its discovery in 1956 until the promulgation of the law 05-07 and its amendments by the ordinance 06-10;

- To examine the relationship between the investment and the taxation, and to test the impact of changes of taxation on foreign investment in order to state on the justifications given by the government and the critics made by many scholars;
- To evaluate the impact of the rapid changes of the taxation framework on investment, regarding the requests of investors to increase the tax incentives and to insure the stability of the taxation system, which is changing very rapidly (the law 05-07 was modified only 15 months after its promulgation);
- To provide policy recommendations for further modification of the taxation framework on hydrocarbons based on the evaluation of the choices of the government and the justifications given by the Ministry of Energy.

2. Research Questions

To achieve the goal of our study, we try to treat the following question:

What is the impact of the Algerian taxation system on the foreign direct investment in the hydrocarbon sector?

To encourage this research question, it is necessary to have some supporting research questions, as follows:

- What is the impact of the taxation system on the decision of investment?
- Is the taxation system the only factor affecting the decision of investment?
- Could the taxation system support new changes in the hydrocarbon industry and the developments of the international market?

3. Development of hypothesis

1. There is a significant relationship between the taxation system and the number of investors in the hydrocarbon sector: according to the justification of the new law, the Ministry of Energy considered that the Algerian taxation system is very old and not favourable to attract more foreign investors. Many scholars consider that the taxation system could affect the decision of investment but it is not the main factor.
2. In addition to the taxation system, there are other factors (the reserves, the crude price, the level of production and consumption), which could affect the decision of investment on the hydrocarbon sector: there is a general consensus between scholars that the decision of investment is affected by many factors depending on the economic sector. The institutional framework should be interesting but other factors affect also the decision of investment (natural resources, geographical location, etc.)
3. The rapid changes in the taxation system on hydrocarbons could affect negatively the decision of investment: legal stability is a main factor to attract foreign investments, because investors are not willing to take risk in instable countries. Algeria recognizes this problem of instability regarding the rapid changes of its taxation system in very short period of time, which could negatively affect the decision of investment.

The remainder of this study is organized as follows: the first chapter contains the theoretical framework: the literature review and the political economy of hydrocarbons. Based on the literature review, the following chapter is for objective to analyse the taxation system on hydrocarbons. The chapter 3 is for objective to analyse data and to present findings. The conclusion is pertaining on the implications, limitations of study, and directions for future researches.

II. THEORETICAL FRAMEWORK

1. Literature review

The relationship between taxation and investment is not a new issue, there exist a wealth of literature on this topic and we cannot be exhaustive to cover all but the most relevant to this study. Many articles, thesis and government reports take this issue in general, but this work is important because it is going to focus only on the hydrocarbon sector that is the backbone of the Algerian economy. In fact, there is a general consensus among specialists about the negative relationship between investment and taxation. However, some scholars confirm that this relationship is not automatic, it could work in some sectors but it may not work in others, depending to the activity and the other advantages, alternatives and options hold by investors.

This section is for objective to show the arguments of each approach in order justify theoretically the research question and the hypothesis of the study. The *first approach* represents the theories and studies which continue to argue that the taxation is the main factor that affects the decision of investment. Often the supporters of this approach consider the macroeconomic situation, without focussing on any specific sector. The *second approach* represents the studies that recognise the importance of the taxation as an element of the investment but they try to argue that other factors could be more determinants. On the contrary of the previous approach, this approach focuses on one specific sector such as the hydrocarbon sector.

1.2. First approach: taxation is the main factor affecting the decision of investment

In 1961, Modigliani and Miller suggested that people are willing to invest because they take into consideration only the final profit earned. Otherwise, they calculated the final revenue after deduction of all taxes in order to take decision of investment. Moreover, investors are very sensible to the taxation, and any change in the rates, the scope or the tax base should have a direct impact on them behaviour (F. Modigliani and M.H. Miller, 1961).

According to R. B. Hassane and N. Zatla, taxation should have direct impact on the foreign direct investment in Algeria. To proof this relationship they use an empirical analysis that takes many variables: GDP, Population…and Taxation, and they conclude that government should take taxation issue seriously because it is a determinant factor of the investment decision (Rafik Bouklia-Hassane, Najat Zatla, 1999). Mike Pfister who shares the same point of view, insisted that the tax incitation could not substitute the negative situation of infrastructures, or legal and political instability (Mike Pfister, 2010). Many other specialists focus on the tax incentives because it should have positive impact on the decision of investment, but its sustainability is a serious problem regarding the budgetary cost. Therefore, it is necessary to focus on the modification of rates and scopes of the direct taxes instead of the reduction of the indirect taxes rates (Pierre-Alain Muet and Sanvi Avouyi-Dovi, 1987). For the Algerian case, incentives and guaranties have a positive impact on the Foreign Direct Investment. In comparison with other countries, the Algerian case is very clear, because the impact was direct and positive in many cases (A. Lamache, 2010).

The hydrocarbon taxation was always a critical point because of the contradictions between the aims of governments and investors. The objective of government as collector of taxes is to maximize the rent for their country over time, in order to achieve the development and socioeconomic goals, but the main objective of investors is to insure that the return on investment is consistent with the risk associated with the project, and with their corporations' strategic objectives (Silvana Tordo, 2007).

In Algeria, the hydrocarbons play very important role on the national economy and it dominates the State budget. The dependent rate passed from 13% in 1970 to 60% in 2000, which put the government in a critical situation because it is not able to reduce the taxation rates, but at the same time, it could not maintain the high level of taxation view the potential effects of the competition from other oil producers (S. A. Dib, 2002). D. Annad shares the same idea, but she proposes another factor relative to the retention of hydrocarbons, because she considers that the government should take into consideration the rights of the future generations on national resources. For the same reason, she analyses the evolution of the reserves and the behaviour of foreign investors (Djamila Annad, 2002). In his Doctorate dissertation, A. Ouchene examines the impacts of the economics changes on the public policy relative to hydrocarbon sector. He talks about the taxation policy without treating its impact on investment (A. Ouchene, 2008). The point of G. Lounaci is that changes in the global economy should have direct impacts on the prices of oil, and to reinforce this believe she analyses the data relative to oil prices during the period 1990-2000, and she take the taxation as a variable among others, without focussing on the relationship between taxation and investment in the hydrocarbon sector (Ghania Lounaci, 2002). Mostefaoui treated the question of the hydrocarbon taxation and investment in the framework of the law 86-14 and its amendment, and he focused on the incitation given to foreign investors especially on

the difficult zones as defined by the same law. He takes into consideration that crude oil and gas are exonerated to many common taxes. According to the same article and in comparison with other hydrocarbon producers (UK, Norway, Angola, and Gabon), the Algerian legal framework is very favourable for investment (Ahmed Mostefaoui, 2002).

Concerning the other countries, the hydrocarbon taxation was treated always prudently. According to Catherine Mathieu, the hydrocarbon taxation in French is heavier than many UE countries, but this does not really affect the investment in the sector. He insists that this situation cannot bear any more taxation, and there will be a negative impact on investment in the sector, in addition to the side effects on the employment in other sector on relation (Catherine Mathieu, 1991).

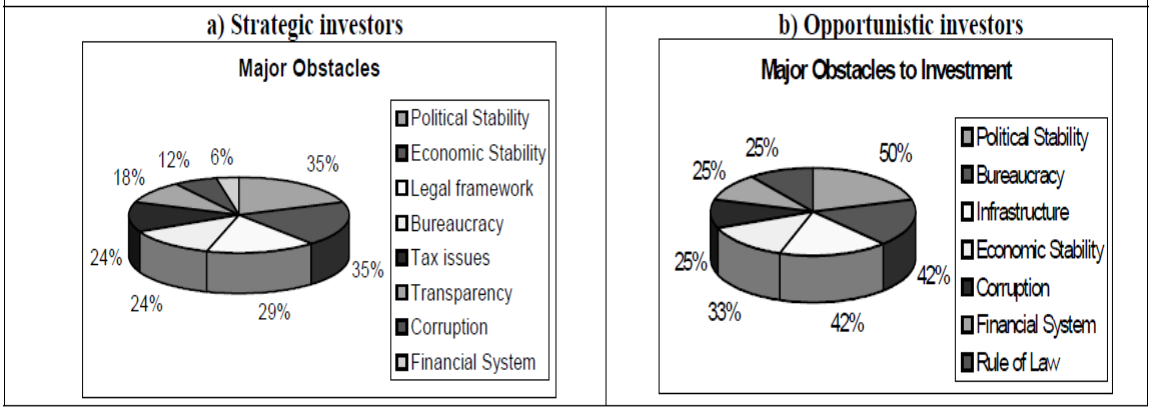
1. 2. The second approach: taxation is not the factor determinant of investment

Balanced against the first approach, many scholars continue to consider that taxation system could affect the investment but it is not the determinant factor. Otherwise, it is a factor among others affecting the decision of investment.

The OECD treats also the issue of the impact of taxation on investments, and it analyses the impact of the tax incentives in comparison between Middle East and North Africa (MENA) and non-MENA countries, and gives some empirical evidences on effectiveness of tax incentives on the foreign direct investment. The analysis takes the factors affecting the decision of investment: "*transparency, simplicity, stability and certainty in the application of the tax law and in tax administration, tax rates and tax incentives*." However, it confirms that "*host country taxation and international investment incentives generally play only a limited role in determining the international pattern of the foreign direct investment (FDI)*", and it found that other factors like

market characteristics, relative production costs and resource availability explain most of the cross-countries variation in the FDI inflows. According to the same study, the taxation issue constitute around 24% of the investment obstacles while the rest is explained by other factors, but it insists that this result is correct because investment in the hydrocarbon sector should be a strategic investment (OECD, 2007).

Figure 1. Major obstacles to investment



Source: OECD (2003).

This study includes two main points: the first is about the geographical area that includes all the MENA countries and compares the taxation policy with other non-MENA countries, which means that the results are not the same when we take the Algerian case alone. The second concerns the nature of taxes, because this study takes all kind of taxes (direct, indirect, taxes on sales and taxes on revenue …), which means that the analysis could be different when we take only the hydrocarbon taxes.

It is necessary to understand that the hydrocarbon resources are not similar to any other good and the rules recognised in the economic theories are not directly applied into this sector. Otherwise, the neutral law could not work on the hydrocarbon

sector view the specificity of its market and the specificities of the oil and the gas themselves. Therefore, Amor Khelif observes that the Algerian government took wrong decisions because it built its policy on incorrect data and it promulgates an incoherence text that contains lot of dispositions unfavourable for SONATRACH and even against the interest of the country. He considers that oil and gas are not available everywhere in the world and new explorations are continuously decreasing, hence, the competition to attract investors on hydrocarbon sector does not exist in fact. Despite, the competition is more increasing between investors and multinational corporations. Finally, he considers that the evolution of the prices since 2004 confirms that the world is facing some kind of "lasting structural imbalance", thus oil and gas are becoming rare good and the efforts to adjust offers to demands shall be inversed to adjust demand to offer (Amor Khelif, 2005). Otherwise, and on the contrary of the Minister of Energy justifications, the taxation is not the main factor that forces the adoption of the new legal framework, because in 2001, Algeria was the first attractor of hydrocarbon investors in the world. This law made lot of discussions and was rejected by almost all the population but the government preferred its promulgation. Moreover, this law should reduce the results of hydrocarbon taxation and could have some negative effects on the macroeconomic equilibriums (Muhammad Hachemaoui, 2005).

2. The Political Economy of Hydrocarbons

Hydrocarbons have become important since the end of the First World War, and it has become a principal variable on international relations since the beginning of the second half of the 20th century. The history of hydrocarbon sector shows the role and

the importance of the developed countries in production and commercialisation activities as a natural impact of technologies monopole and imbalances between offer and demand, and an inequitable system of prices definition.

2.1. World production of oil and gas

The oil was discovered for the first time in the 19th century, and it becomes the most interesting energy product after the end of the First World War. This period was characterized by the Seven Sisters[1] monopoly on all the operations of production and commercialisation. However, the evolutions after the Second World War and the independence of many producer countries reinforced the tendencies demanding the revision of the hydrocarbon business rules. Since 1970, many countries preceded to the nationalization of them hydrocarbon resources, which accelerated the adoption of the new system of production and commercialization.

It worth mentioning that specialists distinct between oil and gas, although most studies interest on oil because it is also a raw material of many other industries but gas is becoming interesting as cleaner and cheaper source of energy.

Concerning oil, OPEC is the main player; it is an international organisation created in 1960 in order to correct the imbalances between the countries producers and the developed countries companies. It is for objective to "*co-ordinate and unify petroleum policies among Member Countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to*

[1] The group comprised Anglo-Persian Oil Company (now BP); Gulf Oil, Standard Oil of California (SoCal) and Texaco (now Chevron); Royal Dutch Shell; and Standard Oil of New Jersey (Esso) and Standard Oil Company of New York (Socony). (P. Jacquet et F. Nicolas, 1991)

consuming nations; and a fair return on capital to those investing in the industry." (OPEC, 2013). The OPEC is important because it is responsible of more than 70% of the total world reserves of oil and more than 40% of the total world production, which give her more opportunity of negotiation in order to raise the prices (BP, 2013).

Table 1. evolution of OPEC oil reserve (1000 million barrels)

	1991	2001	2005	2009	End 2011
Total World	1032,7	1267,4	1357	1518,2	1652,6
OPEC	769	855,5	927,8	1068,6	1196,3
Percentage OPEC/World	74,46%	67,50%	68,37%	70,39%	72,39%

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

Nevertheless, the role of the OPEC countries is limited on oil activities and it has no way to control the gas production or commercialisation that belongs to the Gas Exporting Countries Forum (GECF). GECF was created in 2001, "*it is a gathering of the world's leading gas producers and was set up as international governmental organization with the objective to increase the level of coordination and strengthen the collaboration among Member countries.*" It has not the same impact as the OPEC, but it becomes more important regarding its part on the total world reserves and its participation on the production of gas in the world (the Gas Exporting Countries Forum, 2013).

Behind the OPEC and the Gas Exporting Countries Forum many other countries participate on the production of oil and gas, and its decision affect the level of prices in the world. The following graph shows the participation of OPEC and non-OPEC

countries in the international scene of oil.

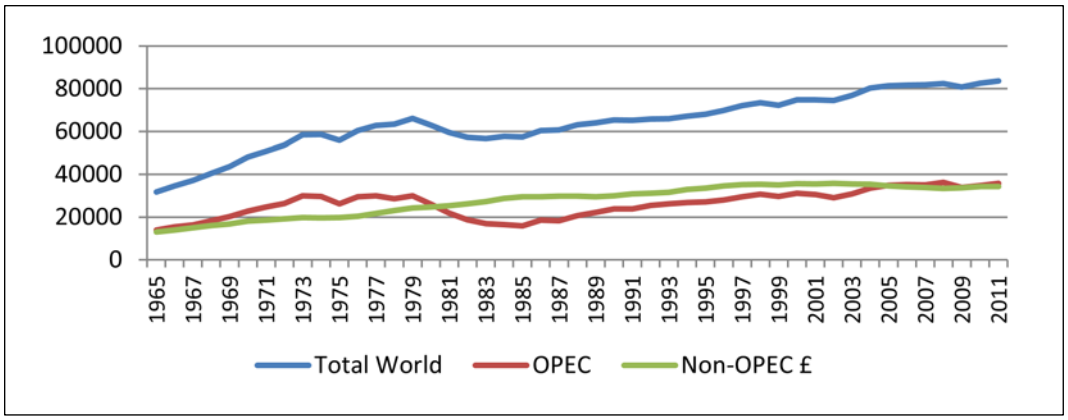


Figure 2: Evolution of oil production in the world - Thousand barrels daily

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

2.2. The demand of hydrocarbon products

The total world consumption is increasing continuously since its discovery, except the periods of crisis, and it has been doubled three times from 1965 to 2011. Certainly, the developed countries are more demanding, and the available data shows: US is always the major consumer of oil products and its consumption is bigger than European Union consumption. The consumption of the OECD is almost stable since the end 1990s, but it decreased at the end 2008 because of the economic crisis. Concerning China, its consumption is increasing rapidly since the beginning 1990s, this is a natural result of its fast economic growth that requires more energy resources.

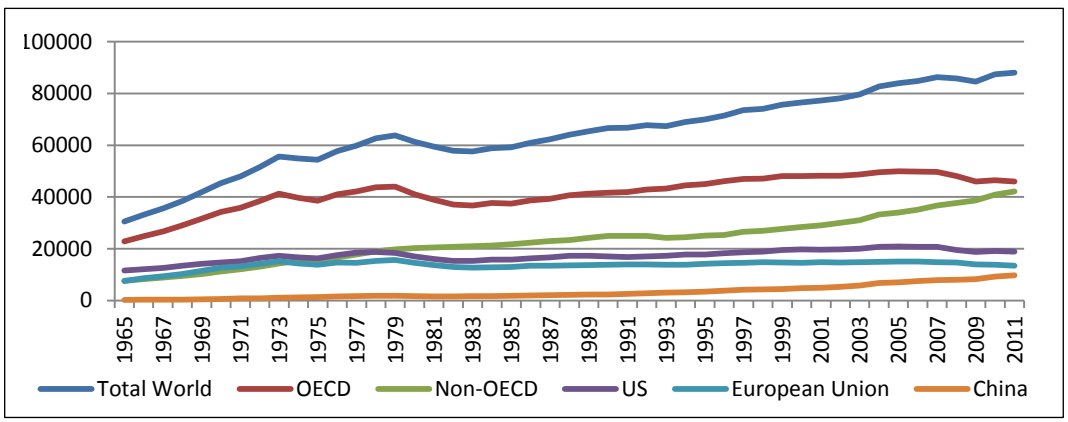


Figure 3: evolution of the consumption of oil in the world: Thousand barrels daily

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

The available data illustrates also that the total world gas consumption has increased very fast and it has been doubled more than four times during the period (1965-2011). Moreover, it was not affected seriously by the economic crisis because the contracts of purchasing are often for long periods. US is always the main consumer of gas products, more than European Union and China, but the consumption of the Non-OECD countries is increased rapidly since the beginning of the last decade view its part on the production and the easy possibilities to use gas without important industrialisation compared with oil that requires lot of annex refining and chemical industries before proceeding to the final consumption.

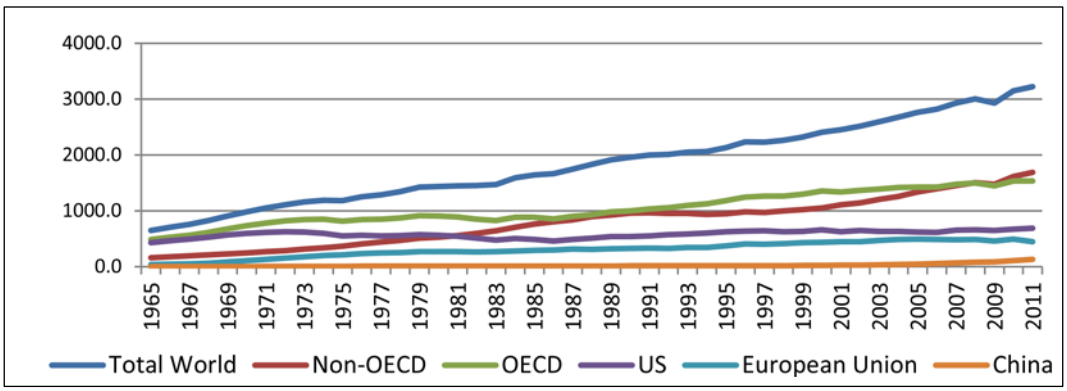


Figure 4: evolution of the gas consumption in the world- Billion M^3

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

2.3. Hydrocarbons markets and prices

The hydrocarbons market depends to the offer and the demand, but many exogenous factors participate in the definition of the final price: political issues, wars, climate and new energies, etc. This study focuses on the economic endogenous variable because the other variables require other independent studies.

Concerning oil, there are two types of markets: physical oil market for the transactions of less than 15 days and the future oil markets that work as any stock

market in order to realise the future oil transactions (le groupe MonFinancier, 2013). The markets of gas products are different from oil regarding the nature of each one and the importance of oil for other productions activities. Otherwise, gas trading is based on pipeline transportation and its markets are often regional. Additionally, the intern prices of gas differ according to the market structure, it "*differs between a monopoly gas sector and a competitive market"* (International Energy Agency, 1998).

Table 2. Pricing Approaches Under Different Market Structures

	Monopolistic		**Competitive**	
Market structure	Pure monopoly	A. Pipeline to pipeline competition only	B. Mandatory third-party access (TPA)	
			1. competitive wholesale market (TPA to high-pressure system)	2. Full retail competition (TPA to entire system)
Pricing approach	Price discrimination between customers. Netback market value, cost-plus or mix or both	Restricted form of discriminatory netback market value (depending on extent of competition)	Inter fuel competition and gas to gas competition (depending on gas supply curve)	Same as for competitive wholesale market
Example	Algeria, Italy, Belgium, Spain, France	Germany	United States, Canada	Britain

Source: International Energy Agency (OECD), 1998

In the economic theory, the price of any product is determined by the interaction of demand and supply, but hydrocarbons are not as any other product because it is a necessary good but at the same time inelastic in term of production and refining view the huge amounts of money and the high technologies required. In term of consumption, it is also inelastic because it depends to some necessary activities (transports, other productions, weather, etc.), which limit the possibility to use the classical approaches of production and consumption (F. Yaci, 2000).

The evolution of the hydrocarbons prices shows some instability. In fact, it was very low during the first half of the 20th century, because of "the seven sisters" oligopoly but it increased rapidly during the 1970s because of the nationalization

tendencies and the impact of the two oil crises (1973 and 1979). Since the beginning of 1980s, the prices decreased again, it declined in 1986 and it stayed very low until the end of the 20th century but it started to increase again and it got its maximum level on 2012 around 111 USD/barrel.

Nevertheless, this analysis is subject to wide critics because of the inflation negatives effects (OECD, 2004). For this raison, the evolution of the oil prices using the refference US dollars (2011) is not permanente; the oil was increased too much during the decade (1970-1980) view the two oil crises, and it got it worst level on 1998. After that it started to increase again and it got the highest level on 2011 and 2012.

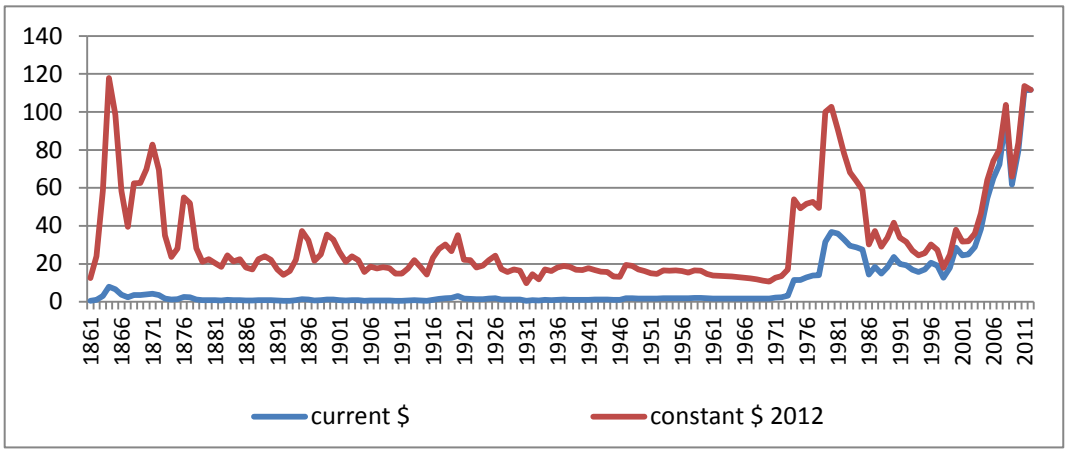


Figure 5: Evolution of the oil prices (USD)

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

In the other side; the taxation effects play an important role in the determination of the final price since most hydrocarbons taxes are quantities taxes. OPEC asked seriously the question: "*who gets what from a litre of oil?*" because analysis confirmed that taxation represent, in many countries, more than 50% of the price (case of EU countries). The changes on prices are due not to the changes on crude oil price, but because of changes on taxation in every country.

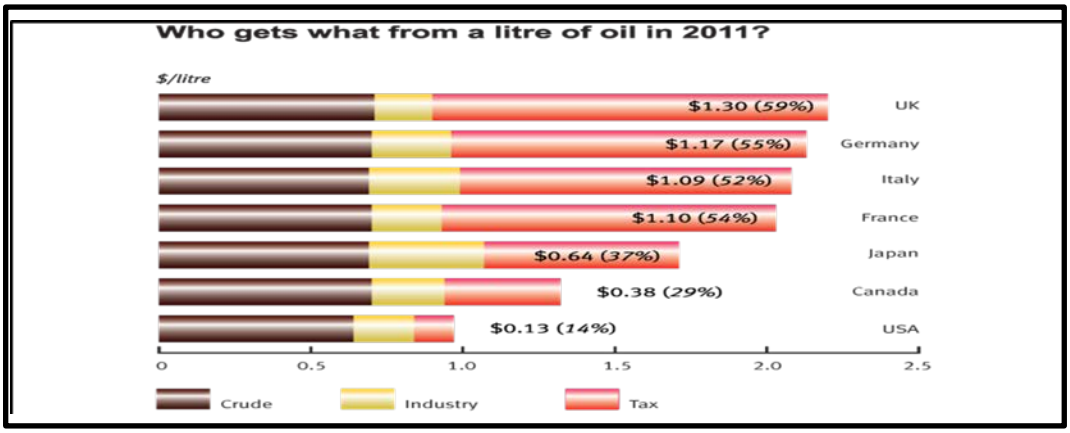


Figure 6: impact of the taxation on the price of oil products

Source: http://www.opec.org/opec_web/en/data_graphs/333.htm

3. Foreign intervention in hydrocarbon activities in Algeria

The role of the foreign investment in the hydrocarbon sector is very important regarding the high technologies and the huge amounts of money needed. Obviously, the Algerian government realizes that SONATRACH, with its experience of 50 years, is incapable to assume all the hydrocarbon activities in the whole of the national territory. Therefore, the evolution of the national legislation pertaining to the hydrocarbon, since the independent, has given big importance to the foreign investment.

3.1. Evolution of the foreign investment production

The available data shows that the part produced by foreign investors comparing with the total production and SONATRACH production is in permanent increasing. The primary structure of production increases from 5% in 1996 to more than 30% in 2007. Therefore, the efficiency of the rule of 51-49% is becoming a serious issue for many specialists who ask the question: "*who is controlling the oil production in Algeria*?" This situation concerns the same branches of production that represent the permanent evolution of the foreign investors' part comparing with SONATRACH' part.

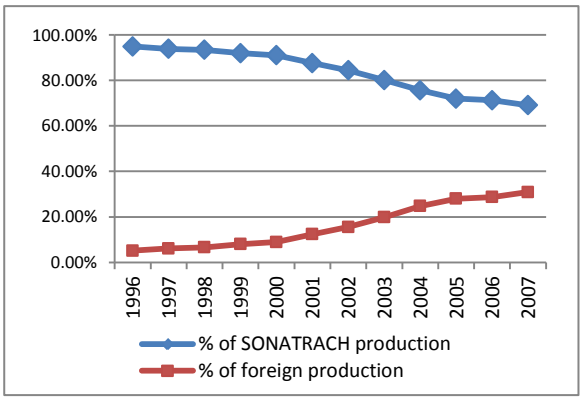


Figure 7: structure of foreign primary production

Source: SONATRACH (2007). Annual rapport, 29

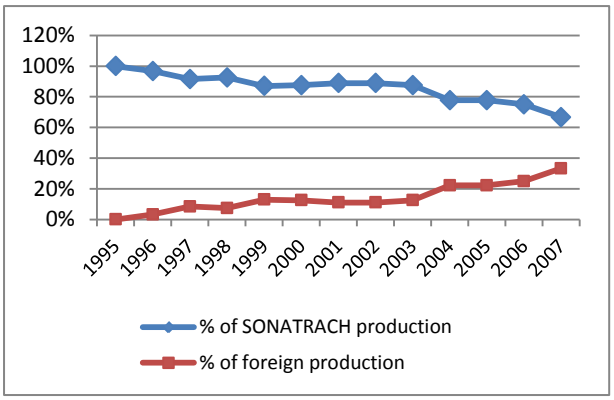


Figure 8: evolution of the foreign production of GPL

Source: SONATRACH (2007). Annual rapport, 29

However, SONATRACH is always the main actor of the primary structures of production, but the part of the foreign investors increases continuously since 1999, and it got its maximum in 2007. Concerning the crude oil, the role of foreign investors is very determinant, and it represents more than 45%, which might limits the decision power of SONATACH. Otherwise, the efficiency of the rule of 51-49% may be very limited since the part of foreigners is turning around 50% (Amor Khelif, 1999).

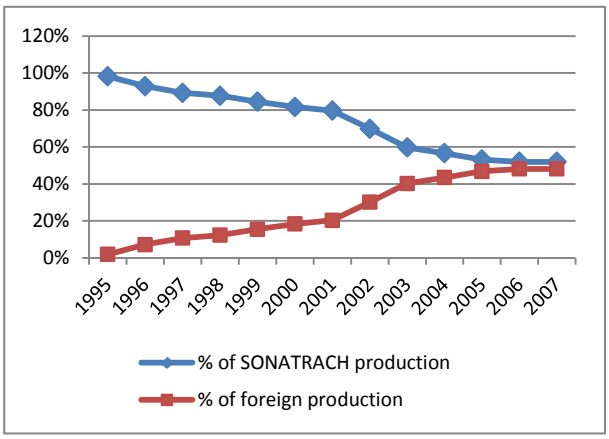


Figure 9: evolution of foreign production of crude oil

Source: SONATRACH (2007). Annual rapport, 29

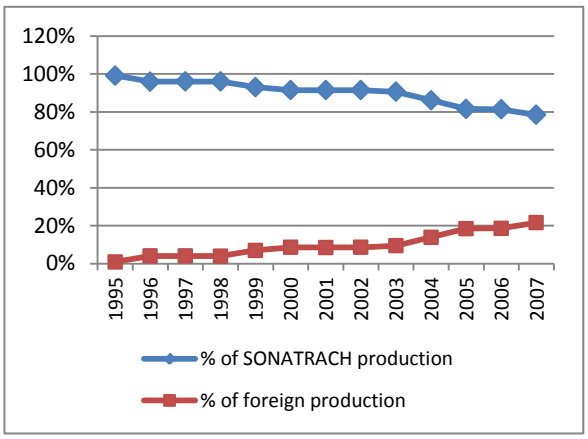


Figure 10: evolution of foreign production of the NG

Source: SONATRACH (2007). Annual rapport, 29

The same case is correct for the other products as the liquefied petroleum gas (GPL) and the natural gas, the participation of the foreign partners is increasing continuously at the expense of SONATRACH part. This situation is not healthy

because if it continues like this, the control of the national energy resources will be hold by the hands of those multinational companies (Amor Khelif, 1999).

3.2. Impact of the foreign investment on the hydrocarbon sector

The foreign investment in the hydrocarbon sector was always a serious issue for the Algerian government, and a topic of discussion for specialists. Some of them consider that the foreign investment is indispensable element to explore the hydrocarbon resources, view the high technologies required and the necessary experiences to realise those activities. Therefore, the Algerian government has reinforced the role of the foreign investors in the sector since 2005 and the results came very quickly: more than 12 new deposits were discovered with an investment of more than $13 billion only during 2006 (Aissa Mekild, 2008).

However, other specialists continue to argue that foreign investment has some negative impacts, because the case of Algeria is different, since oil and gas revenue are always the pillar of the national economy of Algeria (it represents more than 95% of the exportation and more than 50% of the budget revenues). They suggest to deals with the hydrocarbon activities view the risks of losing control on the sector, and they defend the choice to maintain the rule of 49-51% (National Office of Statistics, 2013).

III. LEGAL FRAMEWORK OF THE TAXATION SYSTEM ON HYDROCARBONS

Only two year after its discovery in Algeria, hydrocarbons got its independent legal framework (Saharan law of 1958), which included the rules of the taxation system. After the independence in 1962, the government promulgated many laws in order to develop the sector and to insure the conservation of the rights of future generations. However, the analysis confirms that the legal framework evolution is not only a national issue, but it depends to regional and international variables. To understand the fundamental of the current situation and the new law on hydrocarbons, it is necessary to know about its evolution during the fifty years since its discovery.

This study shows briefly the evolution of the legal framework of the taxation system for the period before 2005, which consists of two (02) main periods: the socialist period and the period under the law 86-14 and its modification on 1991 by the law 91-21. The current period is taken with some detail; it starts by the promulgation of the law 05-07 of April 28, 2005 that was modified only fifteen months after its promulgation by the ordinance 06-10 of July 29th, 2006. [1]

[1] The ordinance is legal text promulgated by the President in the exceptional periods and it is in the same level with the Law. According to the Article 124 of the constitution: "The President of the Republic can legislate by ordinance in case there is a vacancy of the People's National Assembly or in the inter sessions periods of the Parliament."

1. Evolution of the legal framework of the hydrocarbons taxation system

Since its discovery in 1956, the French government had extended the application of the law of April 21, 1810 pertaining on the mining and quarries (French Republic, 1810) on the hydrocarbon sector until the promulgation of the law pertaining to the exploration and mining of oil and gas in the desert (Saharan Law).[1] The law 57-27 of January 10, 1957 relative to the exploitation of liquid and gaseous hydrocarbons in Sahara devoted the independence of the hydrocarbon taxation from the common law applied on mining. The article 62 of the law 58-11 announced that oil corporations are liable for their research and exploitation in the department Oasis, and Saoura to the *Oil Royalties* (12.5% of the value of the oil production and 5% for the gases production) and to the *direct tax on profits* (50% of the gross result).

The period after the independence in 1962 until the promulgation of the law 05-07 in 2005, Algeria has recognized many laws regulating the hydrocarbon sector; however, it could be divided on two main periods following the politic and economic regime of the country:

1.1. Legal framework of the taxation system during the socialist period

In 1962, Algeria got its independence and the new government had maintained the application of the Saharan law according to Evian accords.[2]However, in 1965, new round of negotiation was started to review the nature, the limits accorded to the French

[1] The Saharan Law is a group of texts promulgated by the French government on 1958-1961: the Ordinance 58-1111, the Ordinance 58-1112, the Decree 59-1334 and the Decree 61-1045.

[2] The Évian Accords comprise a treaty that was signed in 1962 in Évian, between France and the F.L.N. (Front de Libération Nationale). The Accords put an end to the Algerian War with a formal cease-fire proclaimed for March 19, and concluded to Algeria independence.

corporations, and it resulted in the signature of Algiers-Accords that opened the sector for the first time to non-French investors (especially US investors).

Before that, in 1963, the Algerian government, in front of the crisis with French companies, decided to construct alone its pipelines and it decided the creation of the national corporation SONATRACH (Decree 63-491) that will be the main actor in the hydrocarbons sector for the next coming 50 years. In 1969, Algeria joined OPEC to support its energy policy and it has received a significant support to achieve the nationalization of its resources in February 24th, 1971.

The nationalization of the hydrocarbon sector made end to the Saharan law and directly affected the two main taxes: first, *the Oil Royalties* became more universal to all hydrocarbon activities and its rate was increased to 14.5% in 1971 and to 20% in 1975 for the oil products, and maintained on 5% for the gas products (Ordinance 74-82). Second, *the Oil Direct Tax (IDP)* was increased from 50% to 85%, with some other details relatives to the methods of calculation (Ordinance 75-14).

The comparison of those texts shows that the government increased continuously the taxes on oil because its extraction is easier comparing with many other OPEC countries and its quality is among the best in the world (Ministry of Energy, 2004). However, the gas taxes were always maintained on the 5% because the production and the distribution of the gas products were more difficult and it was less useful on the industrial activities.

1.2. Taxation system within the law 86-14 and its amendments

In 1983, the hydrocarbons prices started to decrease very quickly and it was almost declined in 1986 (Wahiba, Machedan, 2005), which pushed the Algerian authorities to promulgate the law 86-14 of August 19, 1986 pertaining on the exploration and research of hydrocarbon resources and its transportation by pipelines (modified on 1991 by the law 91-21). This law devoted two principles: the State ownership right delegated to SONATRACH that was the governmental instrument on the activities of prospecting, exploration and exploitation of the hydrocarbons, and the rule of 51-49%, which must be respected in any association with foreign intervention (A. Mostefaoui, 2002)

According to the same law, the two main taxes were amended: the first modifications concerns the scope of *the oil royalties*, which was enlarged to the whole of the quantities extracted from oil or gas deposits after deduction of the legal accepted charges. Its rate was 20% and it is possible to be reduced to 16.25% for the zone (A) and 12.5% for the zone (B). Its payment must be fulfilled before the 10^{th} of every month according to the method announced by the Ministry of Energy (it could be monetarily or on quantities of oil and gas).

The second modification concerns *the Tax on Oil Revenues*, which concerned the upstream activities, transportation of oil by pipeline and liquefied gas processing and separation of crude oil. Its rate was 85% but it could be reduced to 75% in the zone-A, and to 65% in the zone-B (decree 87-157 of July 21, 1987 pertaining to the classification of the zones).

2. Legal framework of the taxation system within the law 05-07

The now law on hydrocarbon determinates again the role of players and devotes new rules to access the sector (for national and foreign investors). Since the nationalization of the hydrocarbons on 1971, the role of the players was unclear, especially for SONATRACH, which is a commercial company and it played at the same time the role of regulator institution. Specialists and investors criticized this situation, and the government adopts new legal framework to clarify the role of the different institutions and to determine the tasks of each player. It devotes three main principles:

- The State's ownership rights (Article 3 of the law 05-07);
- The regulation authority is henceforth the competence of two independent national agencies: *the Hydrocarbon Regulatory Authority (ARH)* and *the National Agency for the Development of Hydrocarbon Resources (ALNAFT)*;
- The new role of SONATRACH, which becomes an ordinary hydrocarbon corporation (John P. Entelis, 1999).

In the other hand, the law on hydrocarbons modifies the rules of access to the hydrocarbon sector in order to insure the government control on the national resources. Therefore, the Article 2 of the ordinance 06-10 of July 29, 2006 devote that SONATRACH must have a stake of at least 51% in all new exploration and/or exploitation contracts and in all transportation and refining activities (Article 6 of the law 05-07, and KPMG, 2007). In addition, the government has devoted since 2001, the mechanism of the bidding, which is for objective to insure the maximum efficiency on the hydrocarbon activities (A. Ouchene, 2008).

2.1. Taxation of hydrocarbon activities (upstream activities)

The taxation of hydrocarbon activities is for objective to insure the financial stability of the budget resources and to attract the maximum investors to the sector. The law 05-07 devotes the same taxation principles applied since the colonial period: separation between the hydrocarbon activities themselves and the firms exercising the activity. The upstairs taxes are set in the Part VIII of the law 05-07:

- First, *the surface area tax (TS)* is an annual tax calculated based on the surface defined in square kilometres (km²) on relation with the unit amount that depends to each area according to the following table:

Table 3. unit amount of the TS rate

Years / Zones	Research period			Retention Period And exceptional period	Operation Period
	1, 2 & 3	4 & 5	6 &7		
Zone A	4000	6000	8000	400 000	16 000
Zone B	4800	8000	12 000	560 000	24 000
Zone C	6000	10 000	14 000	720 000	28 000
Zone D	8000	12 000	16 000	800 000	32 000

Source: Article 84 of the law 05-06 pertaining on hydrocarbon.

- Second, *the oil royalties* is a monthly payment relative to the whole of the quantities extracted from each area determined in the prospecting authorization, collected conjointly between ALNAFT and SONATRACH. Its rate changes from 12% to 20% according to the geographical areas (A, B, C, and D).
- Third, the *tax on oil revenues (TRP)* is an annual tax of 30 to 70% of the hydrocarbons quantities extracted from each area of the prospecting authorization, payable in monthly instalments using the results of the previous year following to the general rule of annual taxes (Art. 86 of the law 05-07 and the executive decree 07-147)

- Forth, *the additional tax on earnings (ICR)* is an annual tax of 25% of the total profit due to all operations of hydrocarbon exploration and exploitation. It includes the annual revenue after deduction of the production charges.

- Fifth, *the property taxes* (other than operating property) is due every year to all property built or not built and is calculated on the basis of the lend (km^2) but it is different than propriety tax applied in the common law (Art. 241 to 261 of the law of Direct Taxation).

- Sixth, *the Farm-out (FO)* is due to the transfer of the property rights between investors; it is for objective to reinforce the stability of the hydrocarbon activities and to avoid any kind of speculation. According to the Article 31 of the law 05-07, "*Farming out a stake in an exploration and/or exploitation contract is subject to a 1% tax based on the value of the transaction. The tax is charged to the assignor.*"

- Seventh, *the gas flaring tax (TT)* relative to the protection of the environment as concretization of the government policy on this issue, especially after the adoption of many laws and the adhesion to many specialised international agreement conventions. Therefore, the Article 52 of the law 05-07 prohibits the gas flaring (except for SONATRACH). Nevertheless, ALNAFT can give an exceptional authorisation for 90 days in return of payment of the Gas flaring tax (TT). The TT is a specific non-deductible tax of eight thousand (8000) dinars per thousand normal cubic meters (Nm^3).

- Finally, *the tax on the use of water (TE)* is also for objective to protect the water view the high potential of pollution. It is a specific non-deductible tax for the use of water of 80 DA for each cubic meter (M^3) used for production.

2.2. Taxation of hydrocarbon companies (downstream taxation system)

The law on hydrocarbons does not provide any specific taxation system for the hydrocarbon companies. Otherwise, the activities of downstream (transportation by pipelines, refining, storage and marketing, gas liquefaction and separation of liquefied petroleum gas) are taxed according to the common law. Then, hydrocarbon firms are treated as any other corporation according to the common rules as determined in the taxation laws. However, those firms benefit some exemptions because of the sector specificities and the huge charges relative to research and development. The taxation system distinguishes between the sales taxes and the income taxes.

Concerning the sales taxes, it is relative to the hydrocarbon companies and it concerns three main taxes: the professional tax activity (TAP), the tax on oil products (TPP) and the value added tax (TVA).

- First, *the tax on professional activity (TAP),* is an annual tax of 3% due on the gross revenues (after reduction of 75%) recorded by the taxpayers activating on the fields. It concerns the transportation by pipeline, the liquefaction and treatment of natural gas and the separation of liquefied petroleum extracted from deposits (the Article 219 of the law on Direct Taxation).
- Second, *the tax on petroleum products (TPP)* is created by the Article 82 of law of finance 1996 for an exhaustive list of products: the essences, the gasoil and the LPG / fuel (liquefied petroleum gas for use as fuel). It is calculated on the factory price for every litre of petroleum products.

Table 4. Tariff and amount relative to the tax on petroleum products

Tariff	Product	Tax (DA)
Ex. 10.27	The essences N	01 DA
Ex. 10.27	The essences S	01 DA
Ex. 10.27	The essences SP	01 DA
Ex. 10.27	The gasoil	01 DA
Ex. 10.27	LPG / fuel (liquefied petroleum gas for use as fuel)	01 DA

Source: Article 28 of the law of finances 2005

This tax was created essentially to help the general effort of the environment protection via decreasing of hydrocarbons consumption. The list of concerned products had included more gas-products in 1996, but it was reduced in 2005 to those five oil-products because the new government found that gas-products are less pollutants comparing with oil-products.

- Third, *the Value Added Tax (VAT)* is the main sale tax because its rate is 17% and it concerns all the activities of production, processing, transportation and wholesale (exclusively) on petroleum products refining. However, the crude oil is not subject to the VAT.[1]

Concerning the income tax, it includes especially the *tax on corporate profits (IBS)* relative to the moral persons because the taxation of physical persons is subject to the *global income tax (IRG)*. In this study, the analysis concerns only the IBS since all the hydrocarbon companies are moral persons. The *tax on corporate profits (IBS)* is an annual tax of 25% applied on the corporations' profits realized in Algeria on the

[1] The application of the VAT on the downstream activities permit to increase its part of the budgetary resources of 1996 from 98 on 1994 to 110 milliards DA (12.25%), and it was almost doubled on 1999 (185 milliards DA). The Law of finances 1994, 1996 and 1999 and the Law 95-27 of December 30th, 1995 pertaining on the Law of Finance 1996.

domains of production, processing, transportation and wholesale (exclusively) on petroleum products refining or processing of crude oil (the Article 135 and 137 of the law on direct taxation). The taxable income corresponds to the income from the previous activities, carried out by the hydrocarbons firms, "*including the transfer of some assets, either during, or at the end of the period of operation. It is determined on the basis of accounting income before taxes, corrected in order to take the fiscal impact into account*." (KPMG, 2006).

In addition, it is worth mentioning that the taxation law introduces some *specials dispositions relative to the foreign firms*, because the Algerian law devotes the rule of residency to determine the juridical status of any corporations, in application of the Non-discrimination between national and foreign firms, which become an universal principle announced by many agreements as the OECD Model Tax Convention on Income and on Capital which devotes the same principle in the Article 24-1: *"Nationals of a Contracting State shall not be subjected in the other contracting State to any taxation or any requirement connected therewith, which is other or more burdensome than the taxation and connected requirements to which nationals of that other State in the same circumstances, in particular with respect to residence, are or may be subjected. This provision shall, notwithstanding the provisions of Article 1, also apply to persons who are not residents of one or both of the Contracting States."* (OECD Committee on Fiscal Affairs, 2010). However, the taxation law establishes some exceptional rules relatives to the foreign investors depending to the Tax Convention with the firms' origin country, which become more interesting regarding the magnitude of the foreign investment in the hydrocarbon sector.

IV. ECONOMETRIC ANALYSIS OF THE TAXATION SYSTEM IMPACT ON INVESTMENT IN HYDROCARBON SECTOR

This chapter explains the relationship between the investment on the hydrocarbon sector and the taxation system. Based on the two approaches and the specificities of the hydrocarbon sector; the model proposed to explain this relationship should take into consideration, not only the taxation as main variable, but also other variables as the price, the level of reserves, the production and the consumption.

For this aim, two regressions models are proposed: the first one take into consideration the comparison with the entire world, and the second take into consideration only North African countries view the specificities of the oil and gas markets.

1. Methodology

To evaluate the impact of the taxation system on investment on the hydrocarbon sector, this chapter will use quantitative data, and to be more explicative and to take the maximum factors on relation; some quantitative data are ratios which examine a percentage between two absolutes values during the period from 1967 to 2012.

The hydrocarbon investment is a long-term engagement and requires a careful planning before taking the final decisions where and how much to invest. Each period among the previous is different, even the similarities on the general framework exists. In fact, the law 05-07, which was modified very fast comparing with the previous laws,

is the object of this study because it was subject of wide critics from many scholars and even from the Minister of Energy himself (Youcef Yousfi, 2012).

1.1. Data collection

To examine the relationship between the investment in the hydrocarbon sector and the taxation system, this study analyses data coming from many resources: the first resource is the British Petroleum that has published in 2013 a very detailed document about energy in the world. The second source is the OECD.Stat, via the website of the KDI School of Public Policy and Management. The third source is the Algerian Ministry of Finance (the General Direction of Taxation and the General Direction of Budget). The fourth source is the National company SONATRACH and the Ministry of Energy, which have jointly published many data concerning the hydrocarbon sector. The last source is the OPEC, which publishes every year some data about the production, the consumption and the prices of oil.

1.2. Descriptive statistic of Data

This part is for objective to analyse the data used in the evaluation of the relationship between the investment on the hydrocarbon sector and the taxation system. It is essentially descriptive statistic.

a) The number of investors

It is represented by the prospecting authorization or the licence permitting the engagement on hydrocarbons activities that reflects the number of investors engaging to realise hydrocarbon activities during a determined period of time (01 year). Although, many studies take, to measure the investment, the cash flow (the total amount of money

engaged in a project of investment) but this study is taking the number of investors. Two raisons behind choosing this variable: first, the objective of this study is the evaluation of the impact of the taxation system on the number of investors, comparing between the points of the government and the point of scholars against the law 05-07. Second, the financial effect of the hydrocarbon law takes time (more than 01 year) because it needs, before its application, the adoption and the promulgation of the law of Finance that is a very specific law and requires lot of application texts to be executed. In addition, investors need to finish with many administrative procedures including the necessary authorisations before proceeding to the financial phase of the investment.

Starting from this approach, the financial part of the law 05-07 pertaining on hydrocarbons was not applied in the same year, and many application texts come very late (until 2012). In fact, this situation creates some contradictions with the principle of the direct effect of laws and regulations, but the hydrocarbon sector is an exception.

In the other side, the number of investors depends only on the Law pertaining on hydrocarbons and it does not need any other text. As a result, it should be more explicatory than the cash flow or the total amount of foreign investment in monetary term.

The available data show that the number of investors was not stable, but its evolution could be divided on three periods:

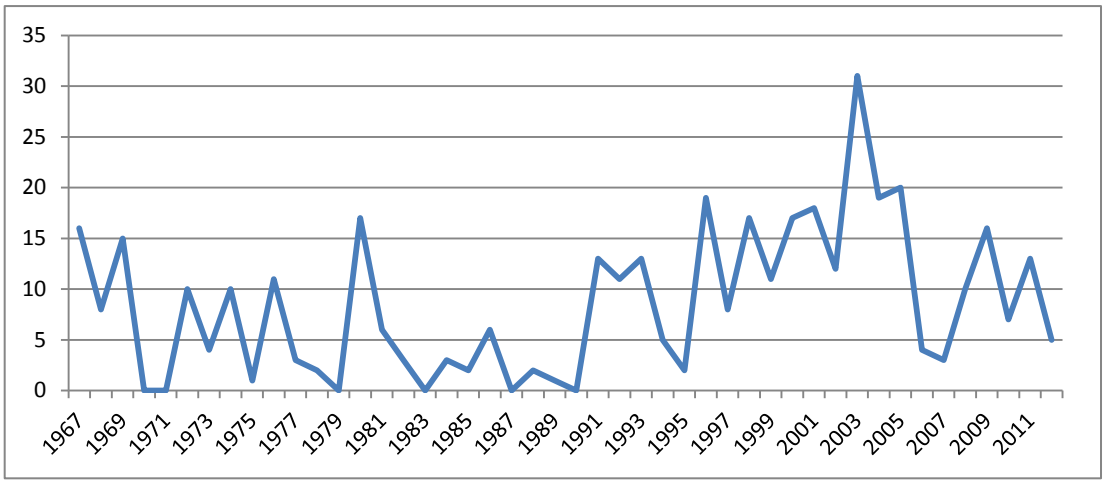


Figure 11: Evolution of foreign investors in hydrocarbon sector.

Source: OJ from 1967 to 2012

- The first period during the first 20 years after the nationalization of the hydrocarbons until the promulgation of the law 91-21; the number of investors was very small and it got its maximum by 17 investors on 1980;
- The second period started from the promulgation of the law 91-21 until the promulgation of the Law 05-07; the number of investors was almost more stable than the first period and it got its maximum on 2001 by 31 investors;
- The last period: started from the promulgation of the law 05-07 until 2012; the number of investors was less important and less stable than the previous two periods, and it got its maximum on 2009 by 16 investors.

b) Hydrocarbon taxation

The Algerian law of Finances contains a permanent chapter pertaining on the hydrocarbons taxation, but the modifications of such dispositions are made via the law pertaining on hydrocarbons (nowadays this chapter is not detailed on the law of

finances).[1] The last part contains the dispositions relative to the General State' Budget. Three tables are annexed to each law, the table "A" relative to the resources, the table "B" relative to the operation expenditures and the table "C" relative to the equipment expenses.

This study is interested to the table "A" that is divided on two parts: (1) the ordinary resources that contain the taxation resources, custom resources and national domain resources. (2) The hydrocarbon resources that contain the resources of the hydrocarbon taxation as it is explained in the previous chapter.

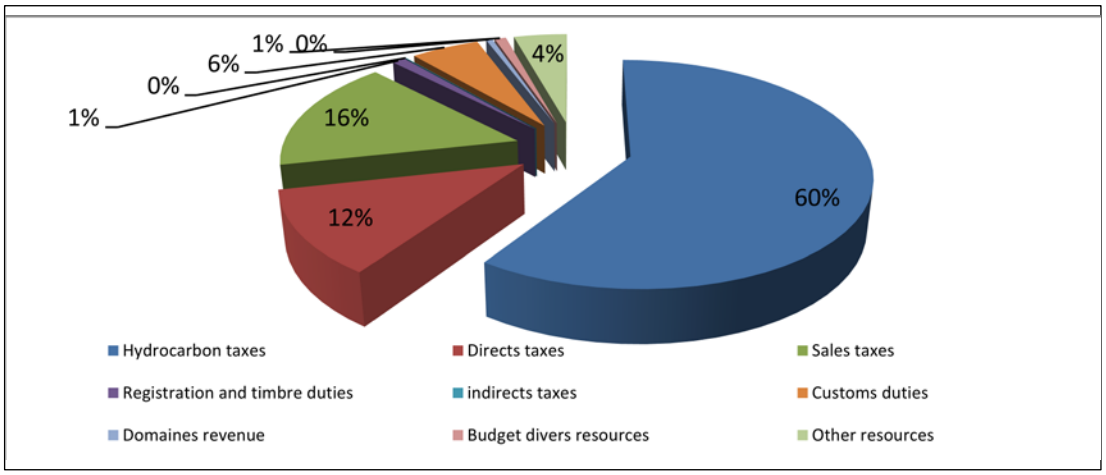


Figure 12: distribution of budgetary revenues in 2010

Source: DGI (2010) vos impôts 2010 [your taxes 2010]

c) Oil - crude prices

This variable measures the evolution of the crude-oil prices and it reflects also the prices of gas, thus it is used to expresses both prices of oil and gas. Theoretically, the price of crude oil has direct impact on investment and a positive sign is expected

[1] In fact, it is maintained, but just to respect the general structure of the Law of Finances as determined by the Law 84-17 of July 7th, 1984 pertaining on the Laws of Finances (OJ 28 of July 10th, 1984, 1040)

because as price increases, profits of hydrocarbon firms increases. However, investors take into consideration the evolution of prices and its direction because these investments require huge amounts of money and it gives results within long period. Therefore, the impact of the price should be indirect, otherwise, it is not the price but the prices evolution that affects the decision of investment.

d) Hydrocarbon reserves

This variable is to measure the evolution of the Algerian part on the total World (or North African) reserves of oil and gas. Economists interest to oil stock and gas reserves available in a pool or field in order to determine the number of operating years or the period of supply security and the future generations' rights. The Ministry of Energy publish every time the evolution of oil and gas reserves, and the available data shows that reserves of gas were very small but after the promulgation the law 91-21, many discoveries have placed in the south of the country: Hassi Remel and Ain Aminas, etc. In 1994 Algeria became for its first time in the first ranking of countries discoverers of oil and gas (Aberazzak Ouchene, 2008).

According to the statistical data, Algerians reserves of oil would be 164 billion tonnes (more than 1200 billion barrels) and it is in constantly evolution, except for the last two years when it becomes stable, but comparing with the evolution of the total world reserves or the OPEC reserves, it is in permanent decrease since 1991. The case is not the same for the gas, because Algeria is ranked in the 10^{th} position in term of gas reserves and 9^{th} in term of the production and the exportation. Its reserves represent more than 2.16% of the total world proved reserves (BP, 2013).

e) Hydrocarbon Production

As we mentioned in the theoretical part, oil and gas production affects the importance of any country among the hydrocarbons producers' countries. The investment in a big producer country helps investors to benefit from the previous advantages of infrastructures and negotiations. Therefore, a positive sign is expected.

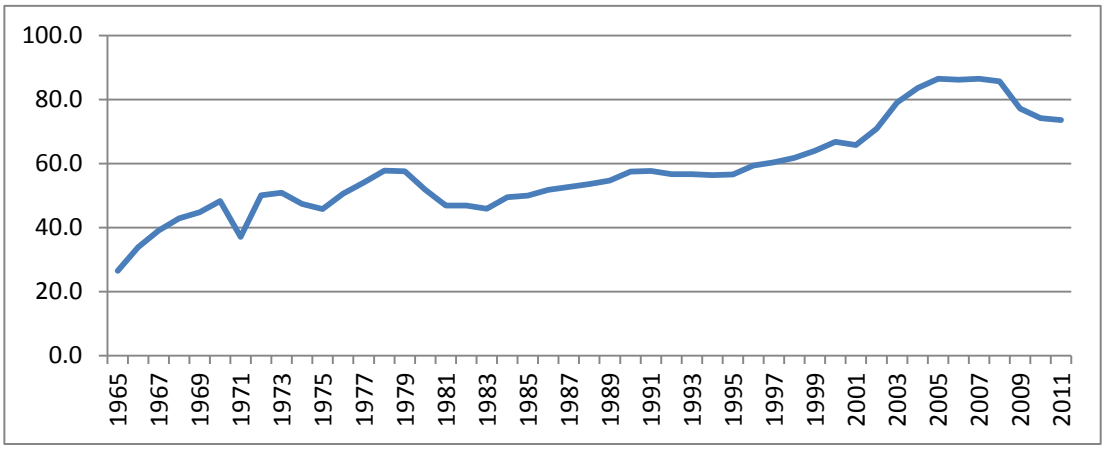


Figure 13: Evolution of the Algerian production of oil (Million tonnes)

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

Data shows that Algeria is an important country in the global energy picture; it ranks 17th in terms of production and exportations (OECD Data Lab, 2013) with refining capacity of 22 million tons/year in 2005 (BP, 2013). However, the production is not stable and it depends on many factors: reserves, total world demand, capacity of production, and level of prices. It got its maximum on 2007 but it has started to decrease since 2008 because of the diminution on explorations (SONATRACH, 2011).

f) Hydrocarbon Consumption

The hydrocarbon consumption affects directly the level of prices and profits of investors (companies). In fact, investors take into consideration, not the current consumption, but the evolution or the growth of the consumption because they believe

that the investment in the hydrocarbon sector is for a long period. Therefore, for this variable, a positive sign is expected.

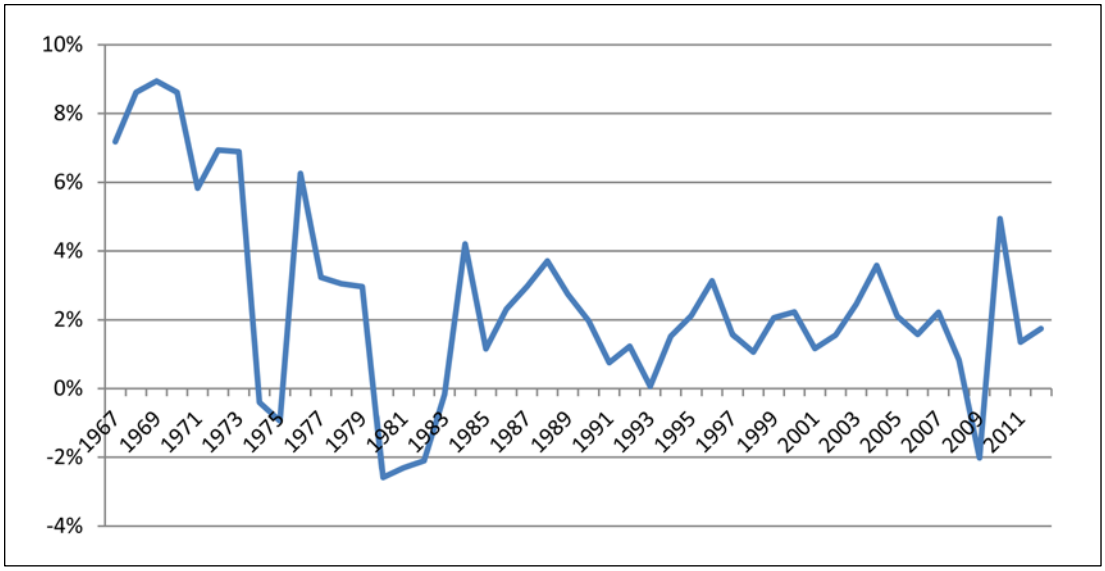


Figure 14: Evolution of World consumption of oil

Source: British Petroleum Company (BP): Statistical Review of World Energy 2013

The available data show some instability in term of the total world oil consumption, but in general it is always positive except the period of crisis where it decreases: the first oil crisis (in 1973-1974) because of the oil embargo exercise by the OAPEC members against US and eastern countries, the second oil crisis (1979-1980) because of the Iranian Revolution, and the last one (2008-2009), because of the financial crisis.

g) Hydrocarbon export

Foreign investors are interested to invest more in the big exporters countries and they believe that the stability and the evolution of the hydrocarbon exports reflect the political stability and the stability of the external relations of the specified country. Otherwise, and the same case of the production, investors prefer engaging them

projects in stable countries with good extern relations. The available data shows important stability in Algerian exports, but it could be divided on three periods:

- The first period, from the hydrocarbons nationalization until the second oil crisis (1979); exports were almost more than 40 million tonnes/year;
- The second period, from 1979 to 2000, during this period, and because of political instability, hydrocarbons exports were less than the previous period but it was stable and turnaround 30 million tonnes/year;
- The last period, since 2000, exports increased again and it got its maximum on 2005 around 58 million tonnes/year.

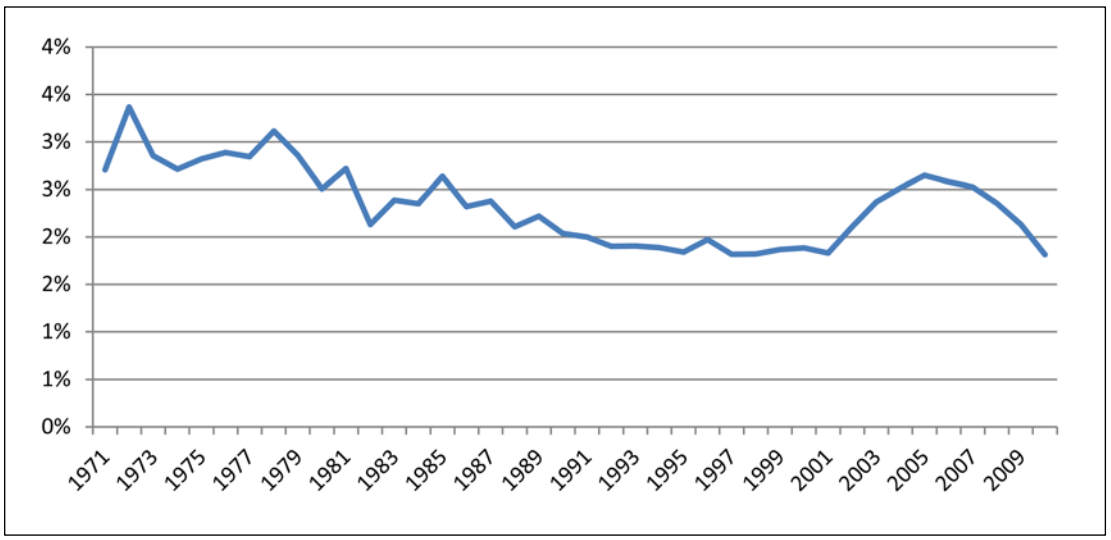


Figure 15: Evolution of Algerian Export of hydrocarbon products.

Source: OECD and Algerian ministry of Finance (Custom administration)

2. Regression model

The quantitative evaluation of the taxation system impact on investment in the hydrocarbon sector will be estimated using the regression analysis based on the ordinary least squares (OLS). Based on the theoretical framework, there are many independents variables that could affect the decision of investment: some of those

variables are qualitative and difficult to be measured on numerical value (the politic stability, the security and the wars, the climatic changes, the preferences of consumers, etc.). Therefore, this study will not take those variables; rather it will focus on the economics variables.

a) The dependent variable : The number of the foreign investors per year.

b) The independents variables : Six independent variables are chosen:

- *The hydrocarbon taxation*: negative sign is expected, because as the taxation increase, the number of investors decrease;
- *The oil price*: positive sign is expected for this variable because when the prices increase, investors could realise more profits;
- *The hydrocarbon reserve ratio*: positive sign is expected, because the more reserves the country has the more investors are willing to invest;
- *The consumptions ratio*: positive sign is expected for this variable;
- *The production ratio:* positive sign is expected for this variable;
- *The export of hydrocarbons:* positive sign is expected for this variable.

For better explaining the relationship between the number of investors and the taxation system, two estimation methods will be used in this chapter:

The first one is based on the *change of calculation of hydrocarbon taxes* because it is possible to use the effective rate (ratio) of hydrocarbon taxes or the evolution of those taxes (growth on the taxation rate).

- This study will use the effective tax rate and not the legal tax rates, because there are more than 15 different taxes and rates, some of them are ad-valorem others are excise

taxes. Additionally, investors take into consideration also the method of calculation, the depreciation and the accepted charges, etc. Therefore, the effective rate could explain better the impact of the taxation system on the decision of investment.

- To present the evolution or the changes of hydrocarbon taxes, this study will use the function *Log (tax amount)* because we expect that the evolution on hydrocarbon taxes should affect the number of investors.

This study will use also the *Lag Variable* for the taxation variable, because the available data consists of time series data, and a tax variable is predicted based on its present and past values. Otherwise, investors take into consideration not only the current taxation, but also the previous year tax effective rate. This approach is based on the principle that some taxes are calculated based on the results of the previous years, but paid on the current year (tax on oil revenues, and tax on corporate profits, etc.); thus, investors need time to evaluate the effective rate of taxes in order to take decision.

The second one concerns *the changes in the geographical area* because the hydrocarbon sector is affected by the situation of the country, especially gas transported by pipelines. Moreover, stable areas are more attractive of foreign investors, because political instability in Libya or Mali should affect the investment in Algeria. Two levels are used: world and North Africa.

2.1. Estimation model (1): Regression analysis in comparison with the World

The first method is aiming at detection of the association between the number of foreign investors on the hydrocarbon sector and the taxation of the hydrocarbon activities. The argument begins with the following hypothesis:

$$Invest_t = \alpha_0 + \alpha_1 Log(\text{Tax}_t) + \alpha_2 Log(\text{Tax}_{t-1}) + \alpha_3 Log(\text{Tax}_{t-2}) + \alpha_4 \text{Consumption}_t + \alpha_5 \text{Production}_t + \alpha_6 \text{Price}_t + u$$

The following table summarises the different variables used in this model:

Table 5. Description of variables

N°	Variable	Explanation	Expected sign	Data source
-	Invest	The number of foreign investors (prospecting authorizations)	Dependent variable	Ministry of Energy
01	Tax	Hydrocarbon taxation $Tax = Log$ (Amount of hydrocarbon tax)	-	Ministry of Finances (Algeria)
03	Prices	Oil - crude prices Current USD	+	BP
04	Consumption	Hydrocarbon Consumption Ratio $\text{Consumption} = \text{Growth of World Consumption}$	+	BP
05	Production	Hydrocarbon Export Ratio $\text{Exports} = \frac{\text{Algerian production}}{\text{Total World production}}$	+	OECD BP

a) Descriptive statistic

The following table describes the summary of the variables used in this model of analysis. Summary statistics like the mean, the standard deviation, the minimum, and the maximum are included.

Table 6. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment	46	8.565217	7.203864	0	31
LogTax	46	9.691756	.5562323	8.198626	10.41339
Prices	46	29.34931	27.5632	1.8	111.67
Consumption	46	.0252944	.0282377	-.0258633	.0894743
Production	46	.019794	.0039114	.0113948	.0257003

These data shows that the mean of investors turn around 8 per year, which is little bit small comparing with the Algerian capacities. The standard deviation is important because the minimum is zero and the maximum is 31. All the means of the other variables are positives.

b) Results of regression study

The impact of the taxation on investment in the hydrocarbon sector was examined using the multiple regression analysis with six independents variables and the number of foreign investors as the dependent variable:

$$Invest_t = \alpha_0 + \alpha_1 Log(\text{Tax}_t) + \alpha_2 Log(\text{Tax}_{t-1}) + \alpha_3 Log(\text{Tax}_{t-2}) + \alpha_4 \text{Consumption}_t + \alpha_5 \text{Production}_t + \alpha_6 \text{Price}_t + u$$

To test whether there is a significant linear relationship between the six independents variables and the number of the foreign investors, we will use the *F-test* by using 5% level of significance. Where the null and the alternate hypothesis are:

$$\begin{cases} H_0: \text{the independents variables don't have any effect on the number of investors} \\ H_1: \text{the independents variables have effects on the number of investors} \end{cases}$$

Using *STATA* to do the calculations, the model is presented as below:

Table 7. Regression analysis with the 6 factors.

Source	SS	df	MS		
Model	865.878128	6	144.313021	Number of obs	44
Residual	1412.75824	37	38.182655	F(6, 37)	3.78
				Prob > F	0.0049
				R-squared	0.3800
				Adj R-squared	0.2795
Total	2278.63636	43	52.9915433	Root MSE	6.1792

Investment	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LogTax	14.5856	7.794349	1.87	0.069	-1.20725	30.37845
LogTax1	-.8703533	9.078793	-0.10	0.924	-19.26573	17.52503
LogTax2	-11.117	6.647289	-1.67	0.103	-24.58568	2.351691
Consumption	8.699932	56.9767	0.15	0.879	-106.7458	124.1457
Production	1124.064	317.9069	3.54	0.001	479.9231	1768.204
Prices	-.0514266	.0510406	-1.01	0.320	-.1548447	.0519916
_cons	-38.80946	41.94467	-0.93	0.361	-123.7974	46.17851

The *p-value* is 0.0049; thus, we reject the null hypothesis and conclude that the independents variables have indeed a significant effect on the number of investors.

We have also R^2=0.38, which means that this model explain only 38% of the decision of investment and the rest 62% is explained by other factors.

For each variable, we do the following test:

$$H_0: \alpha_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

We can say that only the production ratio is significant, but the other variables are insignificant.

Finally the regression model can be defined as:

$$\widehat{invest}_t = -38.80946 + 14.5856 * Log(\widehat{\text{Tax}}_t) - 0.8703533 * Log(\widehat{\text{Tax}}_{t-1}) - 11.117 * Log(\widehat{\text{Tax}}_{t-2}) + 8.699932 * \widehat{\text{Consumption}}_t + 1124.064 * \widehat{\text{Production}}_t - 0.0514266 * \widehat{\text{Price}}_t$$

As we expected, there is a negative relationship between the taxation rate and the number of investors for the period $_{(t-1)}$ and $_{(t-2)}$, but for the period $_{(t)}$, the relationship become positive, which is against the hypothesis. However, the taxation is always insignificant factor that corresponds more to the second approach. For the other variables, as we expected, the consumption and the production have a positive relationship with the number of investors, but they are not significant. On the contrary, we expected a positive relationship between the investment and the price, but data show negative relationship.

2.2. Estimation model (2): Regression analysis in comparison with North Africa

The same as the previous one, this second method is aiming to detect the association between the number of foreign investors on the hydrocarbon sector and the taxation of the hydrocarbon activities. The argument begins with the following hypothesis:

$$Invest_t = \alpha_0 + \alpha_1 \text{Tax}_t + \alpha_2 \text{Tax}_{t-1} + \alpha_3 \text{Price}_t + \alpha_4 \text{Reserves}_t + \alpha_5 \text{Consumption}_t + \alpha_6 \text{Exports}_t + u$$

The following table summarises the different variables used in this model:

Table 8. Description of variables

N°	Variable	Explanation	Expected sign	Data source
-	Invest	The number of foreign investors (prospecting authorizations)	Dependent variable	Ministry of Energy
01	Tax	Hydrocarbon tax ratio $TaxRatio = \frac{\text{Amount of hydrocarbon tax}}{\text{Amount of hydrocarbon production}}$	-	Ministry of Finances (Algeria)
02	Reserves	Hydrocarbon Reserves Ratio $\text{Reserves} = \frac{\text{Algerian reserves}}{\text{Total North Africa reserves}}$	+	BP
03	Prices	Oil - crude prices $\text{Growth of the Current price (USD)}$	+	BP
04	Consumption	Hydrocarbon Consumption Ratio $\text{Consumption} = \text{Growth of World Consumption}$	+	BP
05	Exports	Hydrocarbon Exports Ratio $\text{Exports} = \frac{\text{Algerian Exports}}{\text{Total North Africa Exports}}$	+	OECD

a) Descriptive statistic

The following table describes the summary of the variables used for this model of analysis. Summary statistics like the mean, the standard deviation, the minimum, and the maximum are included.

Table 9. Summary statistics (North Africa)

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment	46	8.565217	7.203864	0	31
TaxRatio	46	.4371397	.1787852	.1634924	.8327091
GPrices	46	.1507203	.4523843	-.4764151	2.519757
Reserves	33	.4284236	.0477327	.3513495	.5178321
Consumption	46	.0252944	.0282377	-.0258633	.0894743
ExportRatio	40	.3349263	.0672267	.1894483	.4633901

The data show that the mean of *the tax rate* is 0.437 per year, which is calculated on the base of ratio between the annual sales and the hydrocarbon taxation. The standard deviation is 0.179 because the minimum is 0.1635 and the maximum is 0.8327, this is a result of the method of calculation (Depreciation, Purchasing of new equipment, the charges relative to the research and development, etc.). In addition, the tax on revenue of each year is directly related to the exercise of the previous year.

b) Results of the regression study

The impact of the taxation system on investment in the hydrocarbon sector was examined using the multiple regression analysis with five independents variables and the number of foreign investors as the dependent variable:

$$Invest_t = \alpha_0 + \alpha_1 \mathrm{Tax}_t + \alpha_2 \mathrm{Tax}_{t-1} + \alpha_3 \mathrm{GPrice}_t + \alpha_4 \mathrm{Reservese}_t + \alpha_5 \mathrm{Consumption}_t + \alpha_6 \mathrm{Exports}_t + u$$

To test whether there is a significant linear relationship between the six independents variables and the number of investors, we have used *F-test* by using 5% level of significance. Where the null and the alternate hypothesis are:

$\begin{cases} H_0: \text{the six independents variables don't have any effect on the number of investors} \\ H_1: \text{the six independents variables have effects on the number of investors} \end{cases}$

Using STATA to do calculations, the model is presented as below:

Table 10. Regression analysis with the 6 factors.

Source	SS	df	MS	Number of obs =	31
				F(6, 24) =	2.57
Model	701.571057	6	116.92851	Prob > F =	0.0458
Residual	1092.10636	24	45.5044317	R-squared =	0.3911
				Adj R-squared =	0.2389
Total	1793.67742	30	59.7892473	Root MSE =	6.7457

Investment	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TaxRatio	23.8392	16.43302	1.45	0.160	-10.07689	57.75528
TaxRatio1	-2.242041	12.43583	-0.18	0.858	-27.90834	23.42426
GPrices	4.714201	6.639405	0.71	0.485	-8.988857	18.41726
Reserves	7.79132	68.57212	0.11	0.910	-133.7346	149.3172
Consumption	-34.55376	78.64612	-0.44	0.664	-196.8714	127.7639
ExportRatio	83.35504	35.86779	2.32	0.029	9.327551	157.3825
_cons	-30.98116	37.2557	-0.83	0.414	-107.8731	45.91083

The *p-value* is 0.0458; thus, we reject the null hypothesis and conclude that the independents variables have indeed a significant effect on the number of investors.

We have also R^2*=0.3911*, which means that the taxation with the other variables explain only 39.11% of the investment decision while the rest (60.89%) is explained by other factors.

When we do, for each variable, the following test:

$$H_0: \alpha_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

We can say that only the export ratio is significant, the other variables are insignificant.

Finally, the regression model can be defined as:

$$\widehat{Invest} = -30.98116 + 23.8392 * \widehat{TaxRatio}_t - 2.242041 * \widehat{TaxRatio}_{t-1} + 4.714201 * \widehat{\text{GPrice}}_t + 7.79132 * \widehat{\text{Reserves}}_t - 34.55376 * \widehat{Consumption}_t + 83.35504 * \widehat{Exports}_t$$

As we expected; there is a negative relationship between the taxation rate $_{(t-1)}$ and the number of investors; however, the taxation is insignificant, which correspond more to the second approach. concerning the other variables, as we expected, the growth of prices and reserves ratio have a positive relationship with the number of investors, but they are not significant. For the exports ratio it has positive sign as expected, and it is significant. On the contrary, we have expected a positive relationship between the investment and the consumption growth, but data show a negative relationship.

3. Results and discussion

The statistical analysis on this research shows that there is no evidence for a significant relationship between the taxation and the investment in the hydrocarbon sector in Algeria. The available data shows very week and instable relationship; investment is not significantly affected by the taxation of the year $_{(n)}$, rather it is affected more by the year $_{(n-1)}$ and the year $_{(n-2)}$, and the taxation is always insignificant factor, which is more compatible with the second approach as explained in the theoretical part. However, the government built its decision on the first approach and it has considered that the taxation should have direct impact on investment (A. Bouteflika, 2005).

Data shows also that the price is not a main factor of investment, because investors believe that oil and gas are necessary good that is not highly affected by simple changes on prices. Furthermore, data shows that investors are affected more by the prices growth, because they look to the nature and the direction of changes for a long period. The same data confirms the importance of the production and the exportations as main factors of investment, which is also an indicator of political stability and markets stability, based on the long-term delivery, especially for gas that is commercialised by pipeline to Europe (Italy, Spain, etc.).

There are many reasons that could explain the above situation within this study; as we have mentioned in the beginning of this chapter, this study did not take into consideration many variables as political stability (intern and extern), and mode of prospecting the authorizations delivering to foreign investors, etc.

Economists recognise the impact of the political stability on investment, because investors are not willing to take high levels of risk, especially when we talk about hydrocarbon sector that requires long-term investment, huge amounts of money and very developed technology. In the Algerian case, although, the country recognised a long period of political instability and insecurity troubles (1992 – 2000), there were at the same time a general consensus that hydrocarbon facilities are not concerned by those troubles. However, in January 2013, the Algerian hydrocarbon facilities in Tiguintourine recognised for the first time some troubles as reflect of the war in Mali, which has affected negatively the number of investors because some big companies as British Petroleum decided to reduce its investments in the "dangerous" areas. Few days later, the Minister of Foreign Affairs declared that the Algerian government assumes its responsibilities to insure security of all investments in those "dangerous" zones (Algerian Press Service, 2013).

The mode of delivering of prospecting authorization to the foreign investors is also a serious issue, but the regression model does not take this variable into consideration because it is not easy to find the best numerical value to evaluate it. In addition, and as we talk in the part relative to the legal framework of the taxation system, there were many forms and changes according to the governments and the choices of SONATRACH. However, since 2001, the government has devoted the international auction as principle and unique way to provide authorisations. This method has affected positively the number of investors for the last few years.

Another element that may affect the decision of investment depends to the quality of the oil and gas, and the cost exploitation and extraction. Because "*Sahari Blend*" is one of the best oils in the world since it includes very small percentage of

sulphur contents and its API gravity (The American Petroleum Institute gravity) is very high, that's way it is always more expensive than the "*Brent*".

V. RECOMMENDATIONS AND CONCLUSION

1. Recommendations: necessity to design an efficient taxation system

Theoretically, economists consider any taxation system efficient if it can be at the same time flexible, neutral, and stable. According to Silvana Tordo, the most interesting points for the government to insure the efficiency of its taxation system:

- *"Supports the stability by providing predictable and stable tax revenue flows;*
- *Permits capturing a greater share of the revenue during periods of high profits;*
- *Avoids the introduction of distorting effects through the fiscal instruments;*
- *Maximizes the present value of revenue receipts by providing for appropriations during the early years of production;*

An overall policy environment that is transparent, predictable, stable, and based on internationally recognized industry standards and the rule of law so that decisions can be made with reasonable confidence." (Silvana Tordo, 2007)

Concerning the Algerian case, and during the forty years after the nationalization of the hydrocarbons, the government got a large flexibility to make its policies concerning taxation and rules of investment that had some positives effects for the national company SONATRACH to receive continuous public supports. However, the coming years should certainly limit this flexibility, because of the future international engagements toward the World Trade Organisation (WTO) and the challenges relatives to the permanent decreasing of reserves per capita. Therefore, the

government is in critical situation, because it needs to change its taxation system to increase its revenues, but at the same time, it should take into consideration the demands of investors relative to the profitability that should not be highly affected by the taxation.

The current taxation system is also criticised because it is very complicated since it includes lot of kind of taxes and lot of methods of calculation, and it gives large flexibility to the taxation administration to accept or to reject many types of charges. This situation can constitute a serious obstacle and limits the willingness of investment (William Congdon and others, 2009).

To design an efficient taxation system the Algerian government should consider the following elements:

1.1. Necessity of the taxation system stability

The government should find the bests ways to insure the stability of its taxation system because this study shows some kind of instability. In fact, during the fifty years after the independence, the law pertaining on hydrocarbon was changed for six times and modified for more than twenty times. Moreover, the taxation system is modified also via the law of Finances that is promulgated every year, and sometimes twice a year. This situation should negatively affect the investment that requires more stability, because investors do lot of studies and evaluations before taking the decision of investment, especially for the hydrocarbon sector that requires huge amount of money for a long period (32 years). Consequently, the government should find the best way to insure the maximum stability for the longest period possible and to introduce modifications only in the extreme cases. The government should also avoid the “errors”

of 2005, because promulgating than abrogating the same law within 15 month could put in danger the credibility of the State itself.

1.2. Reinforcement of the separation between players

The law 05-07 pertaining on hydrocarbons devotes the principle of the separation between the role of the State as owner of the hydrocarbon resources, the two independent agencies in charge of sector regulation and SONATRACH as public commercial company active in the sector. However, the reality shows lot of confusion regarding the position of the Ministry of Energy that is at the same time the representative of the State, and it participates with the two independent agencies on the regulation of the sector. Moreover, SONATRACH also plays an important role in the regulation of the sector, since it is the main company and its participation is needed before granting any prospecting authorization to any foreign investor.

The role of the taxation administration is also confused with ALNAFT that is responsible to collect the oil royalty, and the other taxes are collected by the taxation administration. This situation is very favourable for tax evasion, because of overlapping jurisdictions that limits the efficiency of any farther control from specialised institution (General Inspection of Finances, National Audit Office, etc.). Hence, the government should find the best way to redefine correctly the tasks of each institution. Otherwise, it should recognise the collection of the taxes as exclusive mission of the taxation administration, SONATRACH should focus on its activities as economic company and the Ministry of Energy should focus on its tasks relative to promulgating regulations pertaining on the sector.

1.3. Possibility to use the taxation system to encourage the transfer of technologies

The taxation law recognises the importance of the research and development in the hydrocarbon sector and it devotes many advantages to those activities (The Art. 171 of the law on direct taxes). However, the government should use the taxation law not only to encourage the R&D inside companies but also to transfer the advanced technologies to Algeria. It could devote more advantages to the companies participating in the transfer of technologies or to give them more facilities of payment.

1.4. Impact of accession to the WTO on the taxation system

In 1987, a working parting was established and the Algerian government has started officially the negotiations to access the World Trade Organisation (WTO). This accession should have some directs effects on the public policies of the hydrocarbon sector because the government should take into consideration new variables and should respect new rules:

- According to the GATT, Art XI-1; it will be impossible to restrict the quantities to export, and this works against the government policy relative to the protection of hydrocarbons as national resource and against its international engagement with the OPEC and the Gas Exporting Countries Forum (GECF);
- According to the WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement), the subsidies given by the government to the national company SONATRACH should be reviewed because subsidies for exportation are strictly prohibited.

However, the Algerian government can use the exceptions of the general rules of WTO in order to protect its national resources, to protect its exportation and at the

same time to respect its international engagement with the OPEC and the GECF (The exceptions on the article 20-G relative to the protection of national resources).

2. Conclusion

The law pertaining on hydrocarbon is one of the most important laws in Algeria; it concerns all the population, affects directly or indirectly all the other sectors and determines the mode and the nature of the public interventions.

This study about the impact of the taxation system on investment in the hydrocarbon sector is a participation in the discussion about the evaluation of the decision undertaken by the government, eight years ago, and the possibilities and the perspective to introduce new modifications on the law pertaining on hydrocarbon. Youcef Yousfi, the Minister of Energy, has stated in 2011 "*The next version of the national hydrocarbons law is expected to improve the regulatory environment across the oil & gas sector.*" (Business Monitor International, 2012). He recognised that the country would review its energy legislation and take into consideration the limits and side effects of the current law.

More than any other law, the law pertaining on hydrocarbons was a subject of wide critics regarding obstacles and barriers it creates, especially the rule of accessing that requires state-owned SONATRACH to hold a 51% stake in all upstream projects. The taxation system of hydrocarbon activities was also subject of hard discussions because the contradiction between government and investors aims (Chakib Khalil, 2005).

The historical evolution of hydrocarbon sector shows that, except the nationalization in 1971, the modifications of the laws and the regulations were often a response to external challenges and international equilibriums. The law of 1986 was a response to the shock of the oil price, but the Algerian political instability and the security problem reduce the number and the nature of investments. According to P. Horsnell, the period between 1995 and 1998 was the worst in term of exploration (Paul Horsnell, 2000). The Law 05-07 was also promulgated in an exceptional period, according to its explanatory; the situation of the hydrocarbon sector was not stable because of new international challenges, the competition and the high chances of new exploration in the Middle East, Central Asia and America. Moreover, the modes of accessing and entering were changed in all countries and Algeria was the only country maintaining the unique method of association relative to the distribution of hydrocarbon products between the State represented by SONATRACH and foreign investors (Belkacem Serairi, 2008).

The government built its decision that modifying the taxation system could affect directly the number of investors that is still very small comparing with other countries. However, the available data confirms that the taxation could be a factor of investment, but not equally important in the hydrocarbon sector with any other sectors. Naturally, the hydrocarbon projects require huge amounts of money and very developed technology that was not affected too much because of simple variation on the taxation system. According to the international energy agency, "*the decision by foreign oil company to invest in a hydrocarbon project is based on a geological assessment of reserves, the legal framework of the country, the potential profitability of the investment, and an evaluation of the associated risks.*" (International Energy Agency, 1997)

New approach of the law pertaining on hydrocarbon should be for objective to insure more openness and more attractiveness, because it is true that the current number of 30 investors in the hydrocarbon sector is not sufficient and the government should find other mechanisms in order to attract more investors with the maximum efficiency and the maximum transparency. The coming few years should be determinant because the hydrocarbon reserves per capita are in permanent decreasing, and many countries have started seriously to look for other resources of energy as nuclear energy and other green energies.

Finally, it is worth mentioning that it is difficult to take all parts of the hydrocarbon sector in Algeria because it is comprises of different subsectors. Therefore, future studies could be conducted to involve each subsectors result. Equally important, this study focus on the endogenous factors, but the reality shows that other exogenous factors could affect directly the investment as the political stability, the nature of the hydrocarbon resources, the cost of production and finally the other laws and regulations relative to the investment in the sector.

APPENDICES

Appendix I: Approximate conversion factors (1)

Crude oil*	To tonnes (metric)	kilolitres	barrels	US Gallons	tonnes/ year
From			**Multiply by**		
Tonnes (metric)	1	1,165	7,33	307,86	–
Kilolitres	0,8581	1	6,2898	264,17	–
Barrels	0,1364	0,159	1	42	–
US gallons	0,00325	0,0038	0,0238	1	–
Barrels/day	–	–	–	–	49,8

*Based on worldwide average gravity.

Products	To convert barrels to tonnes	tonnes to barrels	Kilolitres to tonnes	tonnes to kilolitres
		Multiply by		
LPG	0,086	11,6	0,542	1,844
Gasoline	0,118	8,5	0,740	1,351
Kerosene	0,128	7,8	0,806	1,24
Gas oil/ diesel	0,133	7,5	0,839	1,192
Residual fuel oil	0,149	6,7	0,939	1,065

Natural gas and LNG	To billion cubic metres NG	billion cubic feet NG	million tonnes oil equivalent	million tonnes LNG	trillion British thermal units	million barrels oil equivalent
From			**Multiply by**			
1 billion cubic metres NG	1	35,3	0,90	0,74	35,7	6,60
1 billion cubic feet NG	0,028	1	0,025	0,021	1,01	0,19
1 million tonnes oil equivalent	1,11	39,2	1	0,82	39,7	7,33
1 million tonnes LNG	1,36	48,0	1,22	1	48,6	8,97
1 trillion British thermal units	0,028	0,99	0,025	0,021	1	0,18
1 million barrels oil equivalent	0,15	5,35	0,14	0,11	5,41	1

Appendix I: Approximate conversion factors (2)

Units

1 metric tonne = 2204.62 lb.

= 1.1023 short tons

1 kilolitre = 6.2898 barrels

1 kilolitre = 1 cubic metre

1 kilocalorie (kcal) = 4.187 kJ = 3.968 Btu

1 kilojoule (kJ) = 0.239 kcal = 0.948 Btu

1 British thermal unit (Btu) = 0.252 kcal = 1.055 kJ

1 kilowatt-hour (kWh) = 860 kcal = 3600 kJ = 3412 Btu

Calorific equivalents

One tonne of oil equivalent equals approximately:

Heat units	10 million kilocalories
	42 gigajoules
	40 million Btu
Solid fuels	1.5 tonnes of hard coal
	3 tonnes of lignite
Gaseous fuels	See Natural gas and LNG table
Electricity	12 megawatt-hours

One million tonnes of oil produces about 4400 gigawatt-hours (=4.4 terawatt hours) of electricity in a modern power station

1 barrel of ethanol = 0.57 barrel of oil
1 barrel of biodisel = 0.88 barrel of oil

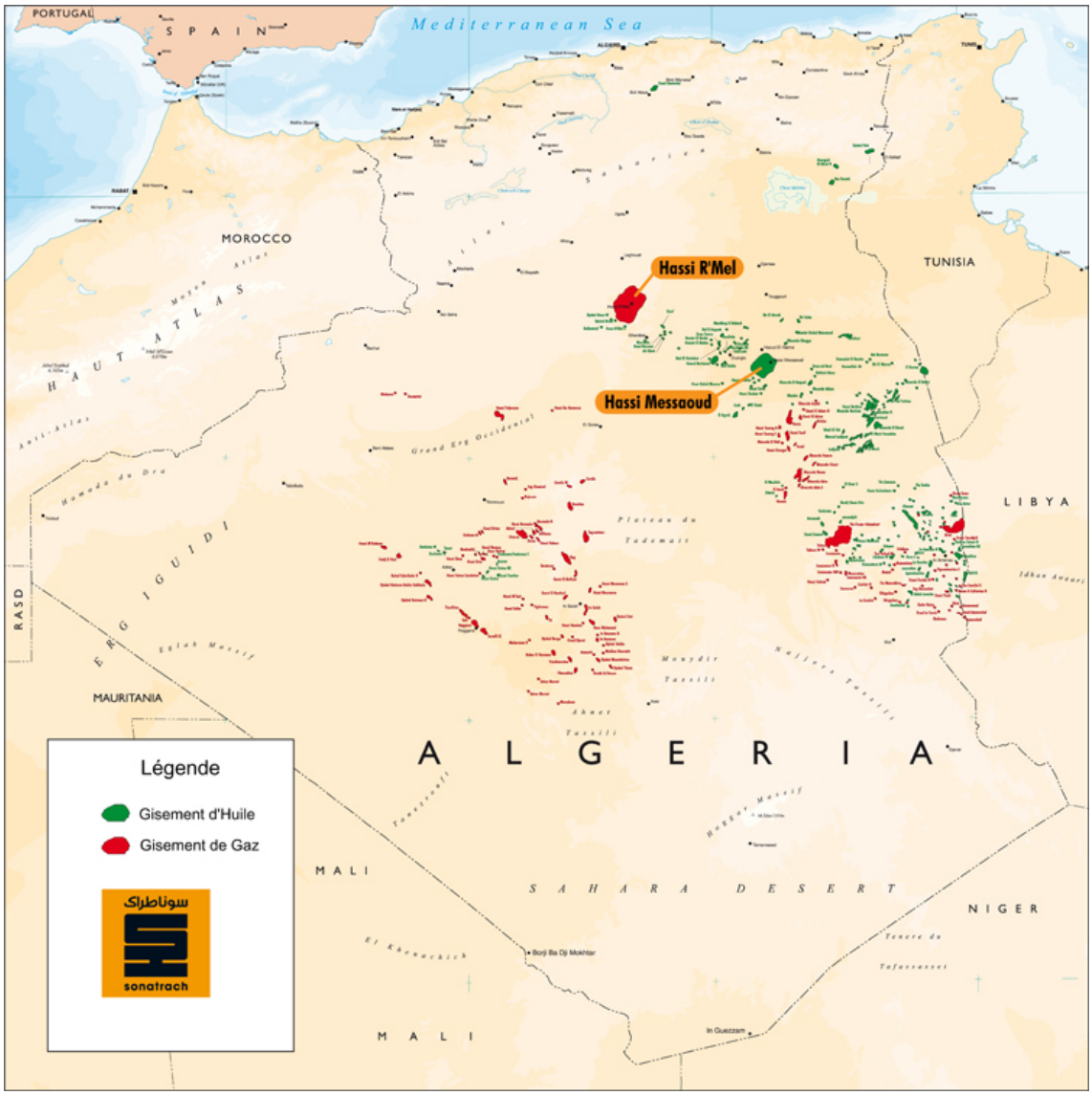
1 tonne of ethanol = .57 ton of oil

1 tonne of biodiesel = .88 ton of oil

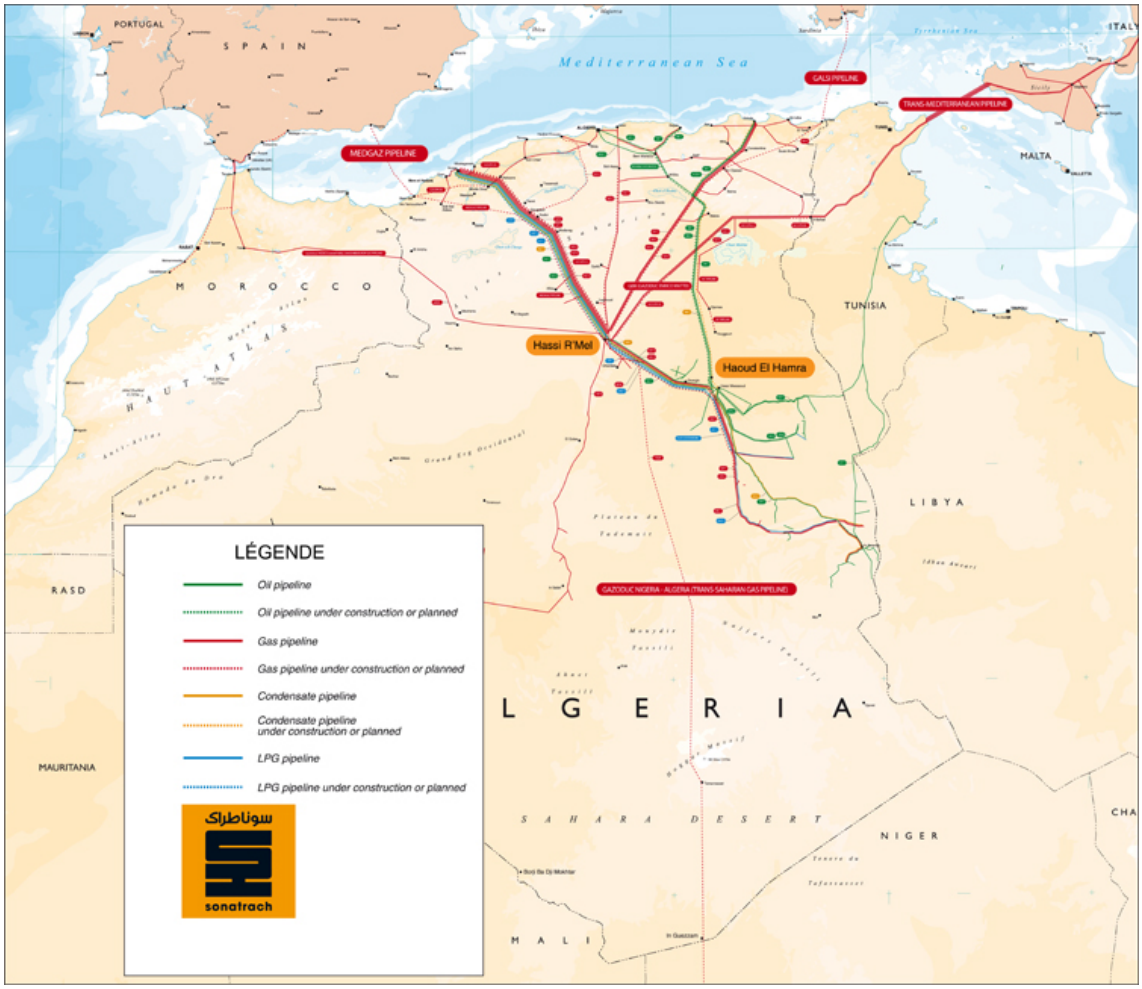
Other terms

Tonnes: Metric equivalent of tons

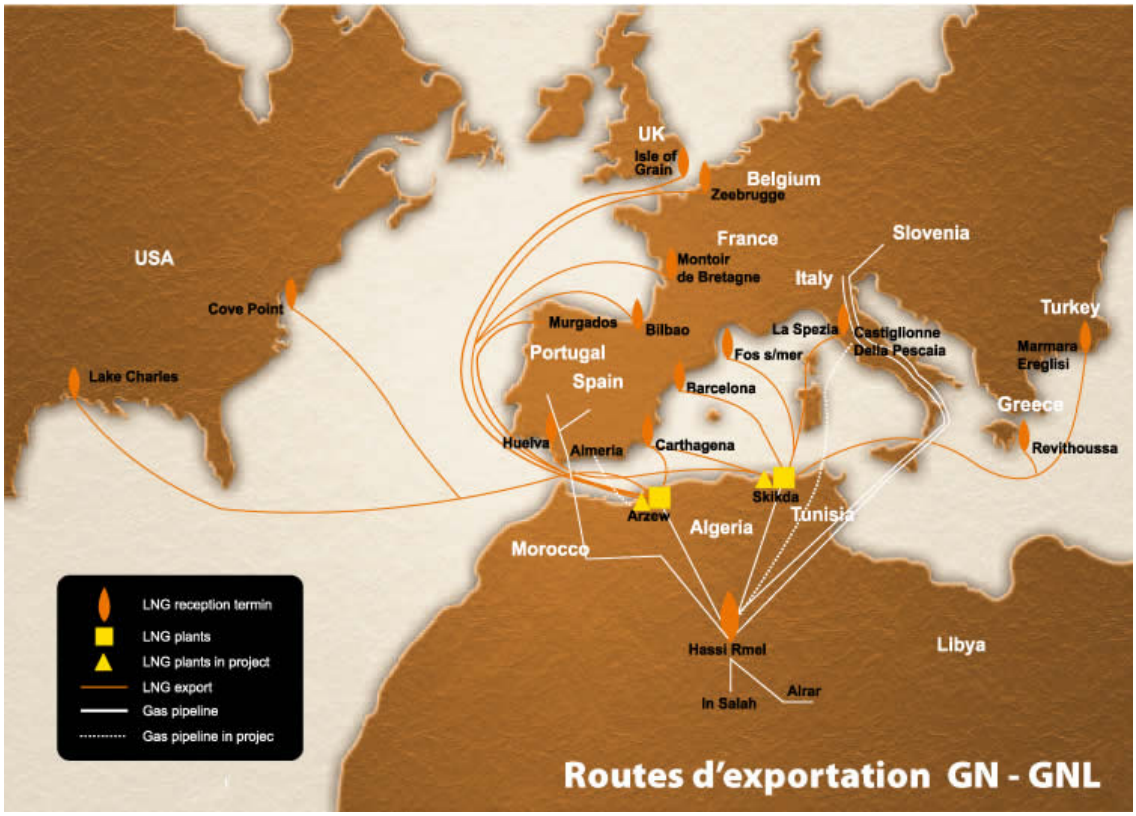
Appendix II: Situation of oil and gas deposits



Appendix III: Pipeline transportation network



Appendix IV: Exports of Naturel Gas and Liquefied Naturel Gas



BIBLIOGRAPHY

The Algerian Ministry of Energy, " Parc de Production National [Parking of the national production]," the Ministry of Energy online, http://www.mem-algeria.org/francais/index.php?page=la-production-d-electricite-2(31/10/2013)

Annad, Djamila, "Fiscalité Pétrolière et Promotion des Investissements en Matière d'Hydrocarbures [Hydrocarbon taxation and Promotion of Hydrocarbon Investment]". *Annal de l'IEDF revue, (2002)*

Boufelih, Nabil and Laataf, Abdelkader, "*Efficiency of the Fund of Resources Regulation on the management of the petroleum revenue,*" University of Setif Journal, Algeria. (in Arabic, 2008) http://www.univ-ecosetif.com/seminars/ddurable/50.pdf (20/09/2013)

Bouklia-Hassane, Rafik, Zatla, Najat, "Investissements directs étrangers, croissance et convergence: une approche empirique [Growth and convergence of the foreign direct investment: empirical study]," *Cahiers du CREAD n°46-47, 4ème trimestre (1998) et 1er trimestre (1999).*

Bouteflika, Abdelaziz, *Speech of the Algerian President*: February 23rd, 2005, http://www.el-mouradia.dz/arabe/discoursara/2005/02/html/D230205.htm (06/11/2013)

British Petroleum, "Statistical Review of World Energy 2013," online statistic data http://www.bp.com/en/global/corporate/about-bp/statistical-review-of-world-energy-2013.html (31/10/2013)

Business Monitor International, "Algeria Oil & Gas Report Q4 2012 ", *Published by Business Monitor International Ltd (2012).*

Dib, S. A., "Evolution de la fonction Financière de la Fiscalité Pétrolière [Evolution of financial function of hydrocarbon taxation]," *Annal de l'IEDF revue (2002)*

Entelis, John P, "SONATRACH: the political economic of an Algerian state institution," *Middle East Journal, volume 53, N 01 (1999)*

French Republic, "Accord de cessez-le-feu en Algérie [Ceasefire in Algeria Agreement]," General Secretary of the Government, online: http://www.legifrance.gouv.fr (31/10/2013)

The Gas Exporting Countries Forum (GECF), "About us," on line database (2013) http://www.gecf.org/aboutus/about-gecf (31/10/2013)

Le groupe MonFinancier, Les marchés du pétrole, physiques et à termes [Petrol Markets ; physics markets and future markets], Le groupe MonFinancier online http://www.monfinancier.com/finances/actualites-patrimoniales-c2/finance-pour-les-nuls-r7/les-marches-du-petrole-physiques-et-a-termes-11696.html (31/10/2013)

Hachemaoui, Muhammad, "La nouvelle loi algérienne sur les hydrocarbures : les enjeux d'une libéralisation [New Algerian law on hydrocarbons : challenges of liberalization]," (2013). http://catalogo.casd.difesa.it/GEIDEFile/doss_SONATRACH.PDF (20/09/2013)

Horsnell, Paul, "Mediterranean Basin in the World Petroleum Market," *Oxford: Oxford University Press* (2000)

International Energy Agency, "North Africa Oil and Gas," *Organisation for Economic Co-operation and Development-OECD*, (1997).

_____, "Natural Gas Pricing in competitive markets," *Organisation for Economic Co-operation and Development-OECD*, (1998).

Jacquet, Pierre et Nicolas, Françoise, "Pétrole: Crises, marchés, politiques [Oil, crisis, market, policy]," *(Paris: Dunod, 1991).*

Khalil, Chakib, "Speech of the Algerian Minister of Energy on the Parliament," (March 19, 2005) http://www.apn-dz.org/apn/arabic/jod/sessionprint2005/jod_149.pdf (06/11/2013)

_____, "Speech of the Algerian Minister of Energy on the Parliament," (October 14th, 2006) http://www.apn-dz.org/apn/arabic/jod/sessionauth2006/205.pdf (06/11/2013)

Khelif, Amor, "La réforme du secteur des hydrocarbures en Algérie : de la dépendance économique à la dépendance économique. [Reform of hydrocarbon sector in Algeria: from the economic independent to economic dependent]". *Cahiers du CREAD n°50, 4-ème trimestre (1999).*

_____, "Les amendements de la nouvelle-ancienne loi sur les hydrocarbures : Une loi à contre-courant des fondamentaux du marché pétrolier international [Amendments of the new-old law pertaining on hydrocarbons: Law against the current of the fundaments of international oil market]," (2006) http://www.algeria-watch.org/fr/article/analyse/amendements_loi_hydrocarbures.htm (20/09/2013)

KPMG, "*Algeria Hydrocarbon Guide 2007,"* KPMG- Algiers (2007). http://www.algeria.kpmg.com/fr/Documents/Guide%20Hydrocarbures%202007en.pdf (20/09/2013)

_____, "*Investment guide to Algeria 2006,"* KPMG-Algiers (2006). http://www.kpmg.com/DZ/fr/IssuesAndInsights/Publications/Documents/Guide%20investir%20en%20Alg%C3%A9rie%202013.PDF (20/09/2013)

Lamache, R .Amina (2010). " *Impact of tax incentives on investment*". Magister T hesis, University of Algiers (In Arabic).

Lounaci, Ghania, "*Les mutations de l'économie mondiale en contexte d'emballement des prix de pétrole 1990 -2000. [The changes in the global economy: context of oil prices runaway 1990 -2000],*" Magister Thesis. University of Algiers (2007).

Mathieu, C atherine, *"Fiscalité pétrolière : quelles marges de manœuvre pour la politique économique ? [Petroleum taxation: what scope for economic policy?],"* In: Revue de l'OFCE. N °37 (1991) http://www.persee.fr/web/revues/home/prescript/article/tiers_1293-8882_2000_num411631413 (20/09/2013)

Mekild, Aissa, "Hydrocarbon s ector on the c ontext of e conomic c hanges," *Magister thesis, university of Batna. (In Arabic, 2008).*

Modigliani, Franco and H. Miller, Merton, "Dividend po licy, Growth and the valuation of shares," *Journal of Business (1961).*

Mostefaoui, Ahmed, "Fiscalité des h ydrocarbures et i nvestissement [Taxation of hydrocarbon and investment]," *annale de l'IEDF revue (2002).*

Muet, P ierre-Alain a nd S anvi, Avouyi-Dovi, "L'effet d es i ncitations f iscales su r l'investissement [Impact o f t he taxation i ncitation on t he i nvestment]," *In: Revue de l'OFCE. No.18. (1987)* http://www.persee.fr/web/revues/home/prescript/article/ofce_0751-6614_1987_num_18_1_1087 (20/09/2013)

National Office of Statistics, Résultats définifs d e l a première p hase [Final r esults o f the f irst step], N ational Office of S tatistics, Mohamed B elkacem -Oued K niss-Ruisseau-Algiers: http://www.ons.dz/-Resultats-definifs-de-la-premiere-.html (31/10/2013)

OECD Committee o n Fiscal Affairs, "Model Tax Convention on Income and on Capital," *OECD Committee on Fiscal Affairs, Volume I and II (Updated 22 July 2010).*

_____, "Evolution des prix du pétrole : moteurs, conséquences économiques et ajustement des po litiques [Evolution of o il p rices: Motors, E conomic C onsequences a nd pol icy adjustment]," *Perspectives économiques de l'OCDE 2/2004 (no 76)* http://www.cairn.info/revue-perspectives-economiques-de-l-ocde-2004-2-page-147.htm (20/09/2013)

_____, "Tax Incentives for Investment – A Global Perspective: experiences in MENA and non-MENA co untries", *OECD Committee on Fiscal Affairs*, (2004). http://www.oecd.org/mena/investment/38758855.pdf (20/09/2013)

OECD D ata L ab, w orld o il statistics, Organisation f or E conomic C o-operation a nd Development, online, http://www.oecd.org/statistics/ (26/07/2013)

The O rganization o f the P etroleum E xporting C ountries (OPEC), B rief H istory, The Organization o f the P etroleum E xporting C ountries (OPEC), onl ine , http://www.opec.org/opec_web/en/about_us/24.htm (31/10/2013)

Ouchene, A bderrezak, Mutations économiques et stratégies de valorisation des hydrocarbures en Algérie [Economics changes and development of h ydrocarbon strategies in Algeria (1986-2007): global approach]. Doctoral dissertation, University of Algiers (2008).

Pfister, M ike, "Une fiscalité o rientée v ers l 'investissement et l e d éveloppement [Taxation system oriented to incite the investment]," *Organisation for Economic Co-operation and Development* (2010) http://www.oecd.org/fr/developpement/publicationsdocuments/51/(20/09/2013)

Redha, Malek, *"L'Algérie à Évian : Histoire des négociations secrètes 1956-1962. [Algeria in Evian: History of the secret negotiations 1956-1962],"* ANEP, Algeria (2004).

Serairi, Belkacem, *The Role and the importance of Algerian hydrocarbon sector in the light of the new international economic reality and the perspectives to joining the World Trade Organization"*, Magister thesis, University of Batna. (In Arabic, 2008).

SONATRACH, *Rapport Annuel 2011 [Annual rapport 2011]*, D jenane E l Malik - Hydra - Algérie.17 (2011) http://www.sonatrach.com (20/09/2013)

Tordo, Silvana, "Fiscal Systems for Hydrocarbons: Design Issues," *World bank working paper. No. 123* (2007). http://elibrary.worldbank.org/content/book/9780821372661(20/09/2013)

Wali, Safia, "*Attractiveness of foreign direct investment via tax incentives: comparison between Algeria and Tunisia,*" Magister thesis, University of Media (In Arabic, 2012).

William Congdon, Jeffrey R. Kling and Sendhil Mullainathan, "Behavioral economics and tax policy", *Working Paper 15328, National Bureau of Economic Research* (2009). http://www.nber.org/papers/w15328

Yaci, Farid, "A p ropos des pr ix de s hy drocarbures e n t ant qu e r essources n aturelles non renouvelables [Prices o f h ydrocarbon a s non -renewable natural r esources],"*Cahiers du CREAD n°52, 2ème trimestre (2000)*

The Algerian Constitution of 1996 (Modified).

law of April 2 1st, 1 810 *Pertaining on Mining, the Meniere and Quarries.* http://admi.net/jo/loi1810.html (20/09/2013)

Ordinance 58 -1112 of N ovember 22nd, 1958 *Pertaining on the transport in Algeria of liquid and gaseous hydrocarbons from fields located in the departments Saharan.* http://www.legifrance.gouv.fr/jopdf//jopdf/1958/105/JO195810536.PDF (20/09/2013)

Ordinance 65 -287 of N ovember 18 th, 1965 *pertaining on Algiers agreements: Convention between Algeria and France relative to the hydrocarbon and industry development.* OJ 100 of December 07th, 1965.

Ordinance 7 1-09 of F ebruary 24 th, 1971 *declaring exclusive property of the state, the associated gas to liquid oil from all hydrocarbon deposits in Algeria*. OJ 17 o f February 25th, 1971.

Ordinance 75-13 of March 04th, 1975 *pertaining the modification of the Saharan law.* OJ 18 of March 04th, 1975

Ordinance 75-14 of March 04th, 1975 *pertaining the modification of the Saharan Law.* OJ 18 of March 04th, 1975

Law 86-14 of August 19th, 1986 *pertaining the activities of prospecting, exploration, exploitation and transportation by pipeline of oil.* OJ No. 35 of August 27th, 1986

Law 90-36 of December 31st, 1990 *pertaining on the law of Finance 1991*. OJ 57 of December 31st, 1990

Law 91-21 of December 04th, 1991 *pertaining of the modification of the law 86-14 of 19 August 1986*. OJ 63 of May 30th

Ordinance 95 -27 of December 31st, 1995 *pertaining on the law of finances 1996.* OJ 82 of December 31st, 1995

Law 03-10 of July 19th, 2003 *pertaining of the protection of the environment in the context of sustainable development.* OJ 43 of July 20th, 2003

Law 05-07 of April 28th, 2005 *pertaining on hydrocarbon*. OJ 50 of June 19th, 2005

Taxation Laws: *Law on Direct Taxation* and *Law on Sale Taxation.*

Decree 59-1334 of 22 November 1959 specifying the conditions of application of Ordinance No. 58-1111 November 22nd, 1958

Decree 61-1045 of September 16th, 1961 determining a standard agreement for a concession of oil deposit in the department OASIS and SAURA.

Decree 63-491 of December 31st, 1963 *Carrying the National Society of Transportation and Marketing of Hydrocarbons (SONATRACH) and approved its statutes*. OJ 4 of January 10th, 1964

Presidential Decree 04-144 of April 28th, 2004 *pertaining on the Ratification of the Kyoto agreement.* OJ 29 of May 29th, 2004

Decree 87-157 of July 21st, 1987 *pertaining to the classification of the zones*, OJ 30 of July 22nd, 1987

Executive Decree 07-147 of May 20th, 2007 *pertaining on the nature of exploitation and development of hydrocarbon and condition of its reduction from the tax on oil revenues*. OJ 35 of May 23rd, 2007