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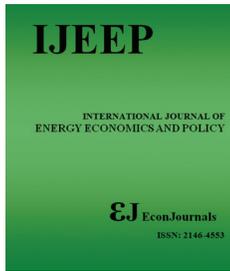
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The Optimal Time to Privatize Oil Public Sector in Saudi Arabia

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ABSTRACT

Based on Jiahua Che dynamic model of privatization (2007) and the experience of privatizing the Mexican petroleum company (Pemex) in 2013, this paper tries to answer this question: Is it time to privatize Aramco? The paper concludes that Aramco will not be privatized, at least during the year 2018, due to the Saudi budget dependence on oil, low level of private property rights, lack of transparency and absence of financial disclosure.

Keywords: Saudi Arabia Economy, Privatization, Government Ownership, Private Ownership

JEL Classifications: O53, L33, L20

1. INTRODUCTION

Saudi Arabia is the second top oil producer in the world with (572 million tons)¹. Oil represents more than 90% of Saudi exportations and 70% of annual government revenues. Oil participates in 45% of Saudi Arabia gross domestic product (GDP)². Oil is the main force of Saudi Arabia economy. Since 2013, KSA has started suffering from the collapse of oil prices. Despite the big amount of international reserves worth 763 \$billion³, the economy in the years 2015 and 2016 seems to be negatively suffered from the cut of government spending and the rise of local fuel prices in order to reduce a record budget deficit for the year 2015 (\$98 billion) which represents 15% of GDP. The deficit for the year 2016 is \$87 billion represents about 14.5% of GDP. For the first time in more than 80 years, Saudi Arabia declares⁴ that there is a tendency to privatize its oil public sector by selling shares in the giant state owned oil company Aramco. This crucial step came after the collapsing of oil prices to below 30 dollars a barrel. The privatization of Aramco is supposed to foster radical economic

reform in Saudi Arabia and to bring billions of dollars in foreign direct investments to the country.

The main objective of this paper is to focus on knowing whether the privatization of Aramco will take place or not in 2018 as it was declared by the Saudi crown Prince, Mohammad Bin Salman in January 2016? In other words, is it the optimal time to privatize Aramco?

This question will be answered based on Che dynamic model of privatization (2007) that advances three main scenarios for choosing the optimal time.

In addition to the theoretical analysis of Che, the Mexican privatization process concerning the state owned company, Petroleos Mexicanos (Pemex) in 2013, will be evoked in order to learn lessons and make some comparisons with the Saudi case.

This study is organized in seven sections. In Section 2, definitions of privatization will be reviewed. The justifications and objectives of public sector privatization in general and in Saudi Arabia in particular will be advanced. In other words, why the Saudi government has decided to privatize its public sector as Aramco itself is a part of a vast program of privatization. In order to have a clear picture of the Saudi economy, the readers can review Foudeh (2017, p. 174-177). The most important economic indicators are reported there in seven tables over the period (1990–2015): GDP

1 The International Energy Agency, World Energy Outlook 2016. p. 13. https://www.worldenergy.org/wp-content/uploads/2017/03/WEResources_Oil_2016.pdf.

2 The source of these data: http://www.indexmundi.com/saudi_arabia/economy_overview.html.

3 The Financial Times, January 11, 2015. <http://www.ft.com/intl/cms/s/0/dbdf2806-99a0-11e4-a3d7-00144feabdc0.html#axzz403dUpXBG>.

4 Prince Mohammad Bin Salman interview, The Economist, Jan 7th 2016.

growth rates, inflation rates, budget deficit, gross capital formation, international reserves and many other indicators.

Section 3 provides a literature review summarizes previous studies that dealt with the optimal time of privatization. The Mexican unsuccessful experience in privatizing Pemex will be reviewing in Section 4 in order to draw lessons and make some comparisons with Aramco. Therefore, the main performance indicators of Aramco and Pemex will be highlighted. Section 5 summarizes the most important possible scenarios presented by Che (2007) concerning the optimal time for that privatization takes place. His analysis can help the decision makers to know if they should prematurely privatize, delay or delete. Finally, I conclude in Section 6.

2. DEFINITIONS, JUSTIFICATIONS AND OBJECTIVES OF PRIVATIZATION IN SAUDI ARABIA

According to Boubakri et al. (2009), privatization constitutes a fundamental structural change of ownership which is transferred from the public to the private sector, leading to a drastic shift in the underlying incentives of the respective owners and in the objectives of the firm from politically oriented to profit oriented Boubakri et al. (2009. p. 17).

In this regard, Filipovic (2005) defines the process of privatization as an effective way to bring about fundamental structural change by formalizing and establishing property rights which directly create strong individual incentives Filipovic (2005. p. 1). He believes that the free market economy largely depends on well-defined property rights in which people make individual decisions in their own interests. For further and more definitions of privatization and its objectives please review Foudeh (2013. p. 85-87).

The council of Ministers' resolution No. 60 of the year 1997⁵ defined the objectives of privatization in Saudi Arabia as following:

1. Enhance the efficiency and competitiveness of the national economy to face regional and international challenges.
2. Encourage private sector investment and its effective participation in the national economy, in order to increase its share in GDP in a manner that would realize growth in the national economy.
3. Broaden participation of citizens in the ownership of productive assets.
4. Encourage national and foreign capital to invest inside the Kingdom. Privatization can help develop the capital market by attracting capital from abroad.
5. Increase job opportunities and optimal employment of national labor and continue to realize an equitable increase in per capita income. The privatization program attaches particular importance to it, including (saudization), by developing appropriate regulations and incentives to encourage the private sector to hire Saudi citizens.

5 Privatization objectives and policies, privatization strategy for Saudi Arabia, Chapter 1 - Paragraph C <http://www.mafhoum.com/press3/112E15.htm>.

6. Provide affordable and timely services for citizens and investors.
7. Rationalize public expenditure and alleviate the burden on the state budget allowing the private sector to finance some services which it can operate and maintain.
8. Increase government revenues through the returns generated by activities that are to be privatized, and the financial returns accruing from granting concessions and from privatization of government shares in projects.

These eight objectives of Saudi privatization program are in accordance with the six specific objectives articulated by Megginson and Netter (2001).

The Decree No. 60⁶ emphasizes fundamental principles that must be taken into consideration when implementing the privatization process in Saudi Arabia:

2.1. Transparency

All activities should be carried out in a transparent manner and announced, in accordance with recognized commercial standards. Prior to and during completion of the sale, the public must be made aware of all aspects of the process to the extent possible, by means of the following:

- Preparing a memorandum announcing the offer for sale of any project.
- Publishing complete information on the financial, administrative, and other aspects of the establishment to make them readily available to investors.
- Preparing and publishing standards for the classification of bids.
- Opening the bids in a public forum.
- Publishing the valuation of assets and details of the bids.
- Publishing the names of investors, the amounts paid, and conditions of the sale after it is completed.

2.2. Rapid Implementation

It is extremely important for the success of the privatization process, and a realistic timetable should be developed for each stage of the process, as activities that proceed slowly are more susceptible to failure.

2.3. Changing the Management Style

Bringing about effective change in the style and methods of management is considered a basic objective of every privatization process. Without such change it is not possible to achieve the targeted benefits of privatization. This does not necessarily mean replacing the current managers, but rather involves improving performance and implementing private sector management practices.

It is to be mentioned that Aramco was not among the list of firms⁷ announced to be privatized by the Saudi government when it launched its privatization program in the year 2002.

6 Privatization Objectives and Policies, Privatization Strategy for Saudi Arabia, Chapter 2- Paragraph B <http://www.mafhoum.com/press3/112E15.htm>.

7 The Saudi electricity company, telecom services (STC), SABIC, The saline water conversion corporation, sewage services, national commercial bank, sea ports and the Saudi Arabian mining company (Ma'aden), aviation services, Saudi Arabian Airlines.

In fact, the idea of privatizing Aramco was never put forward even though oil prices in the years 1990s were lower than they are now (Table 1 last column). The justification is the unprecedented high fiscal deficit as percentage of GDP occurred in the last years 2015 and 2016 (14.963% and 13.458% respectively) compared to an average deficit of (5.353%) for the period of (1990–1999) (Table 1, fourth column).

3. LITERATURE REVIEW

Barbara and Owen (1993) discuss the optimal time of privatization at macroeconomic level. The authors present a model in order to choose an optimal time path of privatization that maximizes total output over the specified period taking into account the level of unemployment at the end of the period, the improvement of labor productivity and the reemployment rate of redundant workers of new privatized firms.

The authors consider three groups of firms in the economy: The remained SOEs, the privatized firms and the newly created private firms. The privatization of the former SOEs will generate fired redundant workers who are supposed to be the labor source for the newly emerging third group of firms. If the available positions in the third group are not filled by those unemployed due to privatization, then the wage in the last group exceeds that of the first in order to attract some workers. It is expected that the wage rate in the second group is greater than the first group no matter the path of prices of the good because the labor productivity

is assumed to be greater in the second group. As privatization plan proceeds, the degree of competition will increase over time between the first firms remaining nationalized and the growing number of private firms. This will improve efficiency of the first group of firms. In contrary, Kay and Thompson (1986) indicate that privatization doesn't promote economic efficiency; only governments can collect revenues by selling SOEs. Parker (1999) thinks that privatization hasn't any effect on efficiency. It leads only to redistribute income and economic power. It is to be noted that Barbara and Owen (1993) analyze the privatization of SOEs with the assumption of full competition where there are a big number of firms. This analysis doesn't fit the Saudi case of Aramco.

The theoretical study of Murrel and Wang (1993) address three main questions. The second one is interested in the appropriate timing of privatization in the ex-communist countries. They applied different strategies to make the transition to capitalism.

The authors show that fast privatization is less likely to be desirable the less significant the reforms undertaken by the old communist leaders. Their conclusion indicate that delay in privatization might be a consequence of the real economic costs of privatization and that delay could be evidence of a viable transition program so long as the other basic elements of strategy are in place.

In Saudi Arabia the economic policy maker has to take in consideration the social costs of the privatization of Aramco. Important crucial reforms must be undertaken by the Saudi

Table 1: The main economic indicators in Saudi Arabia for the period (1990–2016) in (U.S \$)

	GDP at current prices	Deficit - surplus in government budget	Fiscal account/ GDP*** (%)	Nominal oil price (OPEC BASKET)****
1990	1.16778E+11	-6670000000	-5.711	22.26
1991	1.31336E+11	**	**	18.62
1992	1.36304E+11	-8530000000	-6.495	18.44
1993	1.32151E+11	-7410000000	-5.607	16.33
1994	1.34327E+11	-10670000000	-7.943	15.53
1995	1.42458E+11	-4000000000	-2.807	16.86
1996	1.57743E+11	-4930000000	-3.125	20.29
1997	1.64994E+11	-1600000000	-0.97	18.68
1998	1.45773E+11	-12027000000	-8.250	12.28
1999	1.60957E+11	-11700000000	-7.269	17.48
2000	1.88442E+11	6065000000	3.218%	27.60
2001	1.83012E+11	-7195000000	-3.931	23.12
2002	1.88551E+11	-5466.666667	-2.899	24.36
2003	2.14573E+11	9600000000	4.447	28.10
2004	2.58742E+11	28558000000	11.04	36.05
2005	3.2846E+11	58096000000	17.69	50.64
2006	3.769E+11	74763000000	19.84	61.08
2007	4.15965E+11	47081000000	11.32	69.08
2008	5.19797E+11	1.54913E+11	29.80	94.45
2009	4.29098E+11	-23101000000	-5.383	61.06
2010	5.26811E+11	23395000000	4.44	77.45
2011	6.69507E+11	77625000000	11.59	107.46
2012	7.33956E+11	99758000000	13.59%	109.45
2013	7.44336E+11	54993330000	7.388	105.87
2014	7.46249E+11	-11733000000	-1.572	96.29
2015	6.5427E+11	-97900000000	-14.963	49.49
2016	6.46438E+11	-87000000000	-13.458	40.76

Sources: This table is elaborated by the author based on the data collected from: World bank dataset 2015 and 2016 available online at the official website: <http://data.worldbank.org>. Except deficit or surplus in government budget, the source is ministry of finance. **Saudi budget was not announced in this year due to the Gulf war. ***Calculated by the author by dividing deficit or surplus in government budget by GDP at current prices. ****Saudi Arabian monetary authority, oil statistics section, annual report 2015 and annual report 2016. Nominal prices are in US. \$ per barrel (period average)

government in order to facilitate and accelerate the privatization of Aramco with less economic and social costs. Otherwise, the privatization can be delayed.

Savas (2000) believes in the necessity of a continuous role of government during and after the privatization process in order to supply risk capital.

Villalonga (2000) indicates that privatization is by definition a change, which needs to be addressed dynamically by looking at a given firm's evolution and transition between its private and public stages within a given firm. The political decision to privatize the firm in a period of industrial or economic recession, when the industry or economy starts to recover; or the organizational inertia encountered by the newly-privatized firm's management, as the initial resistance to change begins to be overcome. All these are reflections of the transition inherent to any privatization process, as a result of which, political and organizational factors not only may influence the observed effect of privatization on efficiency, but also the timing of this effect on efficiency.

Choosing a wrong time to privatize SOEs can have negative undesirable effects on the economy. A dynamic model of privatization developed by Che (2007) advanced several scenarios concerning the timing to privatize or delay or not privatize a SOE. By using a dynamic model of privatization, the author indicates that the value of a firm in the short term under private ownership is determined in terms of the change in the firm's profit immediately after the privatization. It is determined endogenously by the equilibrium timing of privatization:

1. If privatization occurs within an efficient timing (at the time when the value of the firm under private ownership just begins to overtake that under government ownership), the firm's performance improves marginally in the short run.
2. If privatization occurs within an inefficient timing, the short run performance faces two possibilities:
 - a. Either it improves, if the privatization process is delayed.
 - b. Or it deteriorates, if the privatization process is premature.

The privatization is either delayed or premature when the manager's limited financial resources prevents him from offering a price attractive enough to induce the government to privatize at the efficient social optimal time. The government initially prefers to delay privatizing the firm until the time when there is better protection of private property rights (PPR); because the firm which is better protected is encouraged to advance better effort, leading to more rent being available for the government to extract, despite the fact that its ability to extract rents from the firm -under better protection of PPR - is limited.

Che relates the equilibrium timing of privatization to firm characteristics, by examining how the equilibrium timing is affected by the size and the quality of the firm, the manager's financial constraints and the manager's effort to the firm's profit. Finally, he explains how the firm is priced in equilibrium with different timing of privatization.

Gupta et al. (2008) examine the determinants of sequencing of privatization in Czech Republic by using firm-level data. They

advance four reasons why the government prefers to sequence the privatization of SOEs:

1. The privatization of all firms at the same time may have high transaction costs (restructuring costs of preparing firms for privatization and costs of obtaining information about the firms).
2. The government can reveal information about the firms to investors especially in the case of the lack of transparency and disclosure levels. The potential buyers can observe the quality of the firms which were privatized earlier.

In the Saudi case it is very important that the government starts revealing right information concerning Aramco. In addition, there are many successful stories concerning some Saudi SOEs which were privatized earlier. For example, Saudi telecom company and The Saudi electricity company. Therefore, the potential buyers can use them as references which may encourage them to invest in the Saudi oil public sector.

3. Instantaneous privatization may lead to costly unemployment; therefore the optimal timing path to privatize may be gradual. It is to be mentioned that 55466 Saudis work in Aramco⁸. The Saudi government has chosen a partial and gradual privatization of Aramco which will start by selling 5–10% of its shares.

4. Political opposition to radical reforms can lead the government to choose the gradual path of privatization.

Based on strong evidence concerning the Czech case using micro-data from large-scale privatization program, the authors show that the government privatizes first the more profitable firms despite the fact that it isn't consistent with maximizing Pareto efficiency. The study indicates that if the government's objective is to maximize revenues, the profitable firms with large market shares are more likely to be sold in the beginning of privatization process. The privatizations of the more profitable and efficient firms first are likely to have less surplus employment. But, if the objective is to maximize the efficiency, the least efficient firms should be privatized first.

Kallianiotis (2009) believes that profits and value maximization of the firm must not be superior to social welfare maximization of the society at any time. Although he admits that SIP can broaden and deepen domestic markets, increase investment opportunities and potentially economic growth, he warns from the risk involved by the lack of enough buyers, so prices can be low, capital gains insignificant and transaction costs very high. Thus the stock market will be an inefficient tool to allocate capital.

Onour (2012) shows in his paper how slow the Saudi program of privatization has been since the announcement of the privatization strategy in 2002. He criticizes the slow privatization program because it demoralizes workers and managers in the SOEs announced to be privatized. A rapid and well planned privatization of SOEs is to be preferred. In addition, he indicates that the Saudi capital market is imperfect with poor auditing standards and weak access to accurate reliable information about the firms due to delays in the publication

⁸ Source: Annual review 2016, Aramco, p. 79.

Table 2: Net profit (loss) of Pemex (million pesos)

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
-26,345	-76,282	-45,252	-18,309	-112,076	-94,662	-46,527	-106,942	2,600	-170,058	-265,542	-712,567	-45,879

Source: This table is elaborated by the author based on the consolidated statements of operations (Petróleos Mexicanos Annual Reports: 2005, 2006, 2007, 2011, 2013, 2014, 2015 and 2016)

of annual reports. This can delay the privatization process as the potential new buyers require hiring accredited accounting firm to revalue the firm using more than one valuation methods.

4. THE MEXICAN EXPERIENCE IN PRIVATIZING PEMEX

Pemex is a state-owned oil company. It was established in 1938. Oil is granted to be totally controlled by the state according to article No. 27 in the Mexican constitution.

A vast program of privatization started in the year 1984 in order to create additional public revenue as a main goal. In this regard, during the period of privatization (1984–1993) about US\$ 22 billion were the total sum collected from privatizing 945 SOEs⁹. In addition, Privatization in Mexico aims at increasing capital investment in its infrastructure, reducing government budget deficit and receiving annual revenue from taxes imposed on the newly privatized companies. As it is mentioned by Stojanovski (2008), Pemex has suffered from:

1. Inefficient control by the government that turns the company into a state financial instrument rather than being a full energy company. The tax system strips Pemex of surplus revenues. Pemex finances between 30% and 40% of government budget.
2. Managers stripped of autonomy by the government. The company has to negotiate its budget with the government. Therefore, it is unable to improve its performance.
3. Tight legal constraints that prevent it from pursuing domestic joint ventures or other equity contracts.

I can add by looking at the firm financial statements that the company has suffered from bad results since 2004. Table 2 shows subsequent net losses for the period (2004–2016) except for the year 2012.

Despite what has been mentioned above and although Pemex has been suffered from declining levels of competitiveness, low productivity and corruption, the Mexican government failed in 2013 to privatize it. Huizar (2007) conducted a study that answered why Pemex remains a SOE despite the in-depth privatization program in the years 1980s and 1990s? In his conclusion, he articulated three main reasons:

1. The heavy dependence of federal government on oil revenues. Pemex provides over 30% of the total federal government's revenue. It is the largest tax contributor of the Mexican government. There is a similarity concerning Saudi Arabia as 70% of Saudi annual government revenues are from Aramco. Since 2017, as a response of oil prices collapse, the Saudi government has started lowering its dependence on oil by diversifying its income sources.

2. The political significant power of the petroleum workers union in Mexico with a membership of about 127000 workers. In this regard, it is to be mentioned that there doesn't exist any union of labor forces in Saudi Arabia.
3. The strong opposition of the majority of the Mexican people (60% are against allowing foreigners to invest in Pemex). In the Saudi case, there is no democracy, so the government has the freedom to privatize whatever it wants at any time without any real opposition.

Pemex publishes every year an annual report that contains total oil crude production, total cost, operating expenses, total revenues, net profit (loss), total assets and total liabilities with all the details¹⁰. While on the Saudi case, Aramco has never published any financial statement¹¹. The only disclosures published every year by Aramco are the facts and figures concerning the crude oil production, exports and oil reserves. Therefore, the degree of transparency is near to zero. There doesn't exist any auditing or any known international accounting standards adopted by Aramco. In an article published in the New York times, Krauss confirmed that: Saudi Aramco has never released the kind of financial statements that Western companies do routinely. That could be a problem if the company pushes for a New York stock exchange listing, as expected, since the securities and exchange commission would insist on precise disclosure of proven undeveloped reserves, which must be developed within five years to remain on the books. Such decisions have been kept strictly secret by the Saudis¹². This contradicts the Decree No. 60 concerning the fundamental principles issued by the Saudi Privatization Strategy¹³. Although Aramco doesn't publish any financial statement, some comparisons between it and Pemex can be made. Tables 3 and 4 show clearly that Aramco occupies an advanced place comparing with Pemex at all levels. It is in the first place as the largest oil company by 11.9 million oil barrels per day, while Pemex is in the ninth place with 2.3 million barrels per day (Table 3). Even if Aramco isn't in the list of companies by sales due to the absence of financial disclosure, it is by logic in the top five, based on 7,5 million barrels exported per day (Table 4). Therefore, it is far away from Pemex which is only in the 15th place concerning its sales (Table 3).

5. THE DYNAMIC MODEL OF PRIVATIZATION

The theoretical analysis presented by Che (2007) concerning the social optimal time of privatizing SOEs helps us to better

9 Source of data: Keith (1997. p. 192).

10 The official site of Pemex: <http://www.pemex.com/en/about-pemex/reports-and-publications/Paginas/default.aspx>.

11 The official site of Aramco: <http://www.saudiaramco.com/en/home.html>.

12 Krauss Clifford "For I.P.O., Saudi oil company may have to give up some of its secrets," New York Times, March 7, 2017. <https://www.nytimes.com/2017/03/07/business/energy-environment/saudi-aramco-oil-ipo.html>.

13 p. 3.

Table 3: Top petroleum companies by crude oil production and by sales (2015)

Company	Country	Thousand barrels per day	Rank	Company	Country	Millions of US \$
Aramco	KSA	11,948	1	China National Petroleum	China	299,271
NIOC	Iran	3,920	2	Sinopec	China	294,344
INOC	Iraq	3,504	3	Royal Dutch Shell	UK/Netherlands	272,156
Rosneft	Russia	3,303	4	ExxonMobil	USA	246,204
China national	China	3,209	5	BP	UK	225,982
petroleum						
KPC	Kuwait	3,110	6	Total	France	143,421
PDVSA	Venezuela	2,863	7	Chevron	USA	131,118
ExxonMobil	USA	2,345	8	Gazprom	Russia	99,464
Pemex	Mexico	2,267	9	Petrobras	Brazil	97,314
Petrobras	Brazil	2,197	10	ENI	Italy	92,985
Adnoc	UAE	2,165	11	Phillips 66	USA	87,169
Lukoil	Russia	2,052	12	Lukoil	Russia	84,677
BP	UK	2,045	13	Valero Energy	USA	81,824
Chevron	USA	1,744	14	China National Offshore Oil	China	67,799
QP	Qatar	1,705	15	Pemex	Mexico	67,786

Source: *Energy intelligence Group. PIW Ranking 2016 - with information as of 2015-and Petróleos Mexicanos. **Fortune and Petróleos Mexicanos

Table 4: Top petroleum countries by crude oil production and exports (2016)

Oil production (1)	Thousand barrels per day	Rank	Crude oil exports (2)	Thousand barrels per day
Russia	10,866	1	KSA (Aramco)	7,463
KSA	10,421	2	Russia	5,081
USA	8,879	3	Iraq	3,804
Iraq	4,400	4	Canada	2,742
China	4,015	5	UAE	2,408
Canada	3,641	6	Iran	1,922
Iran	3,551	7	Venezuela	1,835
UAE	2,987	8	Nigeria	1,738
Kuwait	2,848	9	Angola	1,670
Brazil	2,504	10	Kazakhstan	1,386
Venezuela	2,213	11	Norway	1,373
Mexico	2,154	12	Mexica (Pemex)	1,194

Source: (1) OPEP (annual statistical bulletin 2017) and Petróleos Mexicanos. (2) Oil and gas journal and CNH

understand the Mexican government decision of not privatizing Pemex. There are several scenarios that have been advanced and analyzed by Che (2007). Only three scenarios will be presented in order to help us predict the privatization or not of Aramco in the second half of the year 2018.

The analysis of Che starts from the idea that government ownership is more efficient than private ownership when property rights are insecure. One of the major forces behind privatization process is the improved PPR protection (IPPRP). While IPPRP reduces government ability to extract rents from the firm, it leads to better effort from the manager M under private ownership, allowing for more available rent to be extracted by the government G. Therefore, it is in the interest of the G to not privatize the firm until there is better protection of PPR.¹⁴ Jugovic et al. (2010), indicate that privatization method and not privatization per se that leads to permanent changes in ownership structure translated by

14 Reducing G's pay off derived from extracting the normal profit of private firm which is independent of M's effort. While the marginal return to M's effort under private ownership is low when PPR are secure as M makes big effort that allows G to extract more extra profit from private firm.

higher level of efficiency. Guriev and Megginson (2005) indicate that there are significant complementarities between privatization and other reforms, such as: Openness and competition, good governance, low corruption, hard budget constraints, property right protection and optimal regulation.

The equilibrium timing of privatization is affected by the manager's financial constraints and his effort to firm's profits. M is a budget constrained at $B \geq 0$, while G isn't. At the beginning, the firm is owned by G. At each time $t > 0$, M and G may negotiate over the firms ownership at take it or leave it price $q(t)$; $q(t) > 0$. At each point of time, given the ownership form, M exerts an effort $\alpha \in [0, 1]$, that enhances the firms profit, which consists of two parts: A normal profit with a value of $x \geq 0$, it doesn't depend on M's effort and with a probability α of a positive amount of extra profit ($\Pi > 0$) that depends on M's efforts and with a probability $1-\alpha$ of no extra profit is generated.

M aims at maximizing his share of the firm's financial returns net of the effort cost, while G aims at maximizing a combination of social surplus and financial returns that it is able to extract from the firm.

M chooses to maximize his instantaneous pay offs $w(t)$ which is the difference in the instantaneous payoffs for M between private ownership and government ownership at time t . $v(t)$ is the difference in the instantaneous payoffs for G between government ownership and private ownership. $W(t)$ is strictly increasing at t because there is a better PPR protection over time helps M to induce more rent for his effort under private ownership, while $v(t)$ is quasi-convex in t (Figure 1).

$w(t) - v(t)$ measure the instantaneous social gains of changing from government ownership to private ownership. Without PPR protection, $w(0) - v(0) < 0$ as M exerts no effort under private ownership, suggesting that government ownership is more efficient (generating more social surplus at a given time point) than private ownership. When $v(0) > 0 > w(0)$, government ownership actually Pareto dominates private ownership when there is no PPR. This is exactly what happened in the Mexican case where the tight legal constraints imposed by the constitution make oil the property of the Mexican nation. From the government social

point of view, the annual financial loss of Pemex at t (Table 1) is still acceptable comparing with the social gains realized by the government ownership.

$w(t) - v(t)$ increases over time and becomes positive when there is perfect protection of PPR. In fact, $w(t) - v(t)$ turns from negative to positive once at ¹⁵; the time point when $w(t) \geq v(t)$ and where privatization should be the only form of ownership transformation in equilibrium (Figure 1). Thus, $w(t)$ represents the instantaneous benefit of privatization to M at time t and $v(t)$ represents the instantaneous cost of privatization to G at time t . The long run total benefit of privatization for M is $W(t)$, while the long-run total cost of privatization to G is $V(t)$ which represents the minimal amount that M has to pay to compensate G for the ownership of the firm. Therefore, the evolution of $W(t)$ and $V(t)$ over time is important in order to explain how privatization takes place.

Let $t_0^{16} = 0$ for all t when $W(t) > V(t)$. Privatization is feasible at t if $t \geq t_0$ and M is able to afford to compensate G for the total cost of privatization at t .

While $W(t) - V(t)$ measure the instantaneous social gains from privatization at time (t) , $W(t) - V(t)$ measures the long run total social gains of privatization. Given $w(t) - v(t)$ increases over time, the total social gains of privatization $W(t) - V(t)$ increases also over time and it must become positive before $w(t) - v(t)$ turns positive¹⁸. Thus, $t_0 < t_s$. This means that $W(t) - V(t)$ turns positive before t_s .

The efficient timing of privatization is determined by the time point when the total social gains from privatization are maximized. As $W(t) - V(t)$ is negative prior to t_s and positive afterward (Figure 1), the efficient timing of privatization is at t_s not at t_0 .

M affords Markov sub game perfect price at t , $\bar{q}(t)$. This price afford by M is less or equals the limited budget constraint of M:

$$\bar{q}(t) \leq B \tag{1}$$

At (t) there is a seller's surplus for G and a buyer's surplus for M. Thus, privatization at (t) is better than never privatizing at all where:

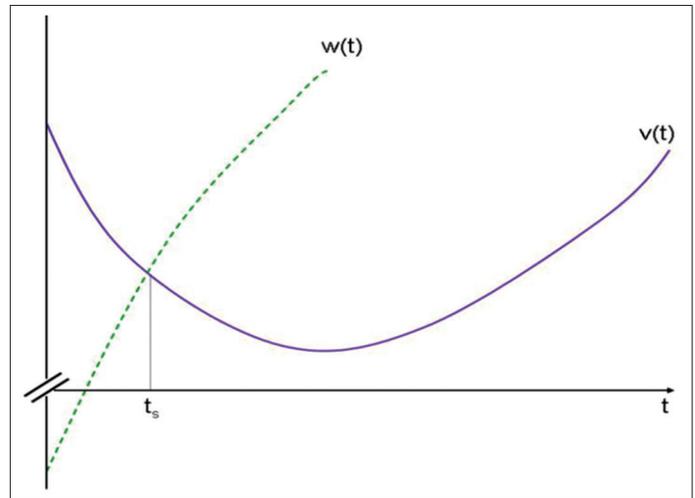
$$W(t) \geq V(t) \tag{2}$$

In order for condition (2) to hold, it is necessary that $W(t) \geq V(t)$.

Moreover, privatization at (t) is better than privatization later at $t' > t$. If privatization is to take place at t^e in equilibrium, then G and M will not only privatize later or never, but they also will not privatize earlier than t^e . So there doesn't exist $q(t) \leq B$ at any $t < t^e$.

Let t is the time point at which the long run total social gains of privatization reaches the minimum $V(t)$. In order that privatization takes place, M's budget constraint B must exceed the minimal cost

Figure 1: Instantaneous payoff differences between government ownership and private ownership



Source: Che (2007, p. 8).

of privatization to the government $V(t)$ (Figure 2). There can be two points that solve for $V(t) = B$, one when $V(t)$ is decreasing and other when $V(t)$ is increasing which is denoted t_1 (Figure 3).

In general, there are three main scenarios¹⁹:

1. Privatization doesn't take place if and only if either M's budget constraint is less than the minimal cost of privatization to the government: $B < V(t)$ or $t_1 < t_0$.
2. If t_s comes after t_1 , privatization takes place prematurely at t_1 where $B > V(t)$. This happens when t_1 comes after t_0 . In other words, if $t_1 \geq t_0$ and $t_1 < t_s$, privatization takes place prematurely at t_1 at price B .

Since $t_1 < t_s$, privatization at any time prior to t_1 has an instantaneous social loss $w(t) - v(t) < 0$. However, it is to be mentioned that at t_1 , despite the fact that privatization incurs an instantaneous social loss, the total social gains of privatization are positive. As privatization can't be postponed any longer, it takes place at t_1 . Naturally, the firm is priced at B at t_1 .

Propositions 1 and 2 are considered as two inefficient outcomes of privatization.

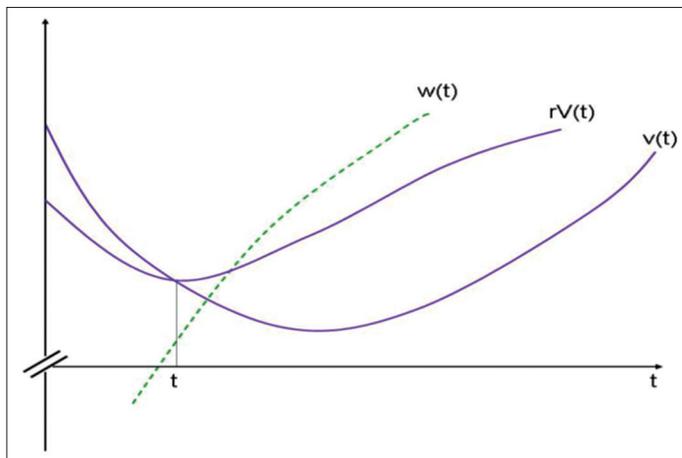
3. Privatization takes place with efficient timing at if and only if $B \geq V(t_s)$ and M is able to afford an annualized price that compensates G for the instantaneous cost of privatization at t_s ($rB \geq v(t_s)$). Privatization is feasible at t_s because $B > v(t_s)$. Therefore, the firm will not be privatized in equilibrium at $t > t_s$ because there is a price that encourages G and M to privatize earlier as $rB \geq v(t_s) = w(t_s)$.

We can remark that a larger budget of M brings the equilibrium timing of privatization closer to efficient timing.

15 t_s is the social optimal time of privatization.
 17 As $v(t)$ decreases over time, $V(t)$ decreases over time.
 As $v(t)$ is quasi-convex, $V(t)$ is quasi-convex too.
 As $w(t)$ increases over time, $W(t)$ increases over time, where $W(t) > w(t)$.
 18 In all figures, the intersection of vertical axis and horizontal axis don't correspond to $(0,0)$.

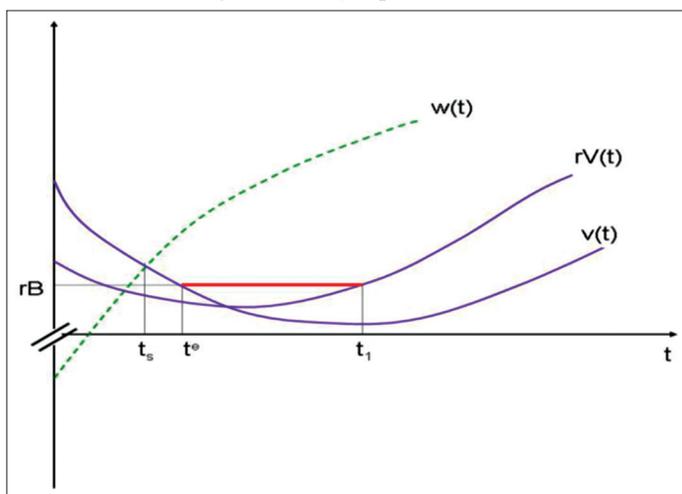
19 There are many other scenarios that have been analyzed by Che (2007), like for example the financial performance of the firm after privatization. I only presented from his analysis what helps us to understand the Saudi case of Aramco and to predict whether it will be privatized or not in 2018.

Figure 2: The averaged cost of privatization to G versus the instantaneous cost of privatization to G



Source: Che (2007, p. 12)

Figure 3: Delayed privatization



Source: Che (2007, p. 14)

6. CONCLUSION

Based on the theoretical analysis of Che (2007), as there doesn't exist a perfect protection of PPR in Saudi Arabia, the instantaneous social gains of changing from government ownership to private ownership $w(t) - v(t)$ will not turn from negative to positive at the social optimal time of privatization t_s . Par consequence, the total social gains of privatization $W(t) - V(t)$ will not increase over time and $W(t) - V(t)$ will not be maximized. This situation makes M unable to compensate G for the ownership of the firm. In fact, the PPR in Saudi Arabia are imperfect making government ownership Pareto dominates private ownership as $v(t) > w(t)$. In other words, government ownership of Aramco is still more efficient than private ownership as property rights are insecure.

Based on Che analysis and the unsuccessful experience of privatizing the Mexican petroleum company (Pemex), the privatization of Aramco will not take place in the year 2018 as it was announced by the Saudi authorities, or at least it will be

delayed until there will be a clear and better PPR protection and an acceptable degree of transparency concerning the financial statement of this company. Foreign investors are highly interested in knowing the annual financial results of the company where they want to put their capitals. Moreover, the secrets hold by the company concerning income statements, consolidated statements of operations and proven undeveloped reserves will not help the company to be privatized by selling it through international financial markets (New York exchange market or London exchange market).

Despite the fact that the Saudi government has started diversifying its revenues in order to lower its dependence on oil, Aramco is still the largest contributor of the Saudi government budget. This heavy dependence makes the privatization of Aramco somewhat difficult.

In addition to the above, oil market dislocations will not help privatize Aramco, the biggest oil company in the world. When British Petroleum CEO Bob Dudley was asked whether he believed Saudi Aramco's IPO was on track to take place in the second half of 2018, he replied "I don't know, I mean they say it will. I know there are lots of preparation works going on. I think little dislocations in the market will make them think again"²⁰.

7. ACKNOWLEDGMENTS

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²⁰ Interview, CNBC, Feb 6th 2018.

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