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<Invited Article>

Global Interdependence, Energy Security and Domestic Industrial Development: Japan Foreign Oil Relations with Brazil

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Abstract:

From the around 2013, following long bilateral government and corporate discussions, all major Japanese trading companies, industrial and engineering groups and shipbuilders and energy related companies entered the Brazilian oil and gas upstream offshore market in partnership with Brazilian firms. The partnerships followed long, high level bilateral discussions and were supported by Japanese government agencies' finance and technical assistance and received preferential loans from Brazil's development bank BNDES. However, within a few short years, in the wake of the Car Wash corruption scandals that hit almost all their local partners, nearly all Japanese companies abandoned their new businesses in Brazil resulting in huge losses. Over the course of the last decade and into the current one, Brazil's national oil company Petrobrás awarded multiple contracts to a pool of Japanese companies led by MODEC, a subsidiary of Mitsui & Co., and to Mitsubishi Corporation in partnership with the Dutch company SBM Offshore to build and operate twenty FPSOs. Over this period, Japanese government agencies extended project finances and credit lines upwards to US $ 10 billion. This paper analyzes these dual contrasting trajectories of Japanese oil relations with Brazil to explore the crossed effects of the countries' global interdependence on the respective domestic policies and institutions and discusses the impacts in shaping future development orientations and state policies in both countries. It argues that Japan's foreign oil relations with Brazil are driven, first, by the continued need to meet an independent development ratio of 40% in 2030, from 26.6% in 2017. Second, by the goals established by its Third Plan on Ocean Policy, the promotion of marine industries and strengthening of their international competitiveness. Finally, it provides a boost to stave off the long decline of its ailing shipbuilding and shipping industries, whose survival is a pre-condition to the previous goal.

Keywords: global interdependence, oil & gas, Brazil, Japan, foreign relations, industrial development, seabed mining, energy security

Introduction

Brazil is now the ninth largest oil producing country and accounts for around 25% of global deepwater oil output. One third of global reserves discovered in the last five years were found in Brazil, including the major find in the offshore deepwater "pre-salt" layers off the South East coast. By 2020, Brazil is aiming to be a top five global oil producer.
(Mergers Alliance/BroadSpan Capital, Spring 2018. Brazil O&G -M&A Update)

On the one hand, Japan's postwar development has been almost dependent on energy imports. The country, following the March 2011 Fukushima nuclear disaster and the shutdown of all its nuclear power plants, Japan replaced its lost power with energy generation from imports of natural gas, crude oil, fuel oil, and coal. On the other, Brazil's combined deep-water and ultra-deep-water pre-salt assets' projects, discovered from 2005, will be among the largest in the coming decade. As from 2005 to 2010 when they drove the boom and bust in the domestic shipbuilding industry, they present a unique opportunity for the consolidation of the evolution of a domestic manufacturing supply chain competitively integrated into an innovation-driven global value chain. Between 2018 and 2025, about $790bn will be invested in 615 upcoming oil and gas fields globally, with conventional oil capex alone 44% ($350bn). Brazil O&G industry represents the single largest capex during this period: $80.7bn or over 10.2% of total capex.

Until the early 1990s, industry led the consumption of oil in Japan, followed by the transportation. In the aftermath of the 1990 burst of the asset bubble, the Japanese economy experienced sluggish economic growth and recession, a period also known as the lost decades. In addition, industrial consumption declined as it also shifted a major share of its production from Japan to other Asian countries to meet the competitiveness challenge from emerging countries, particularly China, and take advantage of the growing demand in the region. Nowadays, due to the expansion of energy efficiency programs, the rise of hybrid cars in the country, the negative slope of industrial demand and the increased substitution for liquefied natural gas (LNG), demand for oil is declining. Although oil remains the country's main energy source, its share in total energy consumption declined from 80% in 1973 to 43% in 2011 (Taghizadeh and Rasoulinezhad 2015). Furthermore, despite the Japanese government's efforts over the past decades to improve energy self-sufficiency, following the 2011 disaster, the rate dropped to just 6% (versus approximately 25% before), the second lowest among 34 OECD countries. Thus, several authors have made the following energy policy recommendations: diversification of energy supplying countries, expansion of energy diversification development of domestic resources, reduction of procurement risks and removal of energy subsidies (Phoumin and Kimura 2014; Taghizadeh-Hesary, Yoshino and Rasoulinezhad 2017).

Explanations of the evolution of oil governance in Japan have generally been based on high-level diplomacy, national security, arguments (Bielecki 2002; Vivoda 2012). Recently, Hugues (2014) has shown how firm characteristics from past 'industrial compacts', bargained outcomes of negotiations between oil companies and the government in earlier stages of the industry, influenced changes in oil market governance in the 1980s and 1990s, following transformations of the international oil market in the previous decade that altered the risks and opportunities faced by firms[1]. Although industrial demand had a key competing lobbying role in the distributional terms of the debate in the last major transformation of the industrial compact in the 1990s, which liberalized oil trade, changed the institutional arrangement and simultaneously reduced and refocused subsidies. This finally succeeded in effecting a rationalization in both the upstream (exploration and production) and downstream (refining, trade, marketing and distribution) segments; industrial suppliers of the O&G upstream segment were never the object of analytic attention in the literature until recently.

Recent studies of the evolution of Japan's oil policy point out that Japan's declining oil consumption, projected to decline from the current levels of 4 Mb/d to 2.5 Mb/d by 2040 according to IEA estimates, marks a diminished relevance of the Japanese market for exporters and, more importantly, questions the logic and the necessity for Japanese oil development policy (Thorarinsson 2018).

On the one hand, as Japanese oil policy faces new challenges, without abandoning the critical energy security drive which has over the past two decades propelled Japanese O&G firms and their industrial suppliers to pursue a more ambitious and international strategy, recent shifts in global interdependence in the O&G upstream offshore industry, particularly transformations in the global supply chains, raised new consequences for policy choices: "Governments face more complex demands from domestic industries facing global economic competition, and act strategically in response to the actions of other governments and firms in the global economy. (Meckling and Hughes, 2018: 468). On the other hand, the government faces the paradoxical policy demands to sustain its shipbuilding industry under the conditions of increasing global competition and declining markets due to trade slowdown and to continue promoting the technological evolution and industrial competitiveness in the marine sector in view of the long-term strategic goal of developing a seabed mining industry.

This paper argues that Japanese oil policy is being transformed in two ways. First, the need to continue developing offshore technology and maintain industrial and financial capability in shipbuilding and related marine equipment, systems and parts & components to attain in the future

the new strategic policy goal of seabed mining. Second, to both deepen and diversify global interdependence to sustain the growing competitiveness of upstream Japanese oil companies in the face of projected declining domestic revenues and profitability. And, particularly, that the growing interdependence with Brazil in this sector presents promises to make significant contributions to resolve domestic challenges, but also many market and political perils. It seeks to integrate the findings of the literature on the role of industrial compacts in shaping the transformation of Japan's oil governance (Hugues 2014) with the questions raised by emerging literature on global interdependence (Farrell and Newman, 2015; 2014 and 2010; Meckling, 2018; Meckling and Nahm, 2018), suggesting based on the foregoing case analysis that its analytical framework needs to expand its analytic focus on mechanisms of transnational change to include that innovating off a new sector (Hughes and Meckling, 2018) to understand both domestic and foreign policy, next to multi-level policy feedback and cross national policy sequencing.

It presents and discusses preliminary results of an ongoing project on MNC changing strategy, institutional underpinnings, and state challenges in the globalization of the upstream offshore O&G industry in Asia towards the Americas, particularly the pre-salt areas in Brazil and the Gulf of Mexico, which will account for almost 2/3 of the industry's capex in the next 20 years. The next section presents Japan's recently reformed oil governance and its outcomes and discusses its energy and maritime policy long term strategic goals. The following presents the evolution of Brazil-Japan oil relations, focusing first, on the early Japanese-state driven developments that led to the attraction to Brazil of several Japanese shipbuilding firms to enter into business and technical agreements to revitalize ailing Brazilian strategic shipyards for deep-sea oil exploration and production. Next, the section briefly discusses the case studies of two Japanese firms in the Brazilian offshore upstream sector and their contrasting trajectories: Mitsui Ocean Development & Engineering Company (MODEC) and Mitsubishi Corporation, pointing out the critical financing role played by Japanese government financial institutions in their O&G strategy in Brazil. Finally, the concluding remarks discuss three points. First, how the results obtained converges/diverges with the literature on the changing nature and future impact of Japan's oil governance and predictions of the role of oil firms. Second, the limits and opportunities of oil global interdependence for national oil governance. Third, the implications of future developments in Brazil and the global O&G offshore upstream industry.

Japan Oil Governance & Ocean Policy Long Term Strategy

In a recent assessment of the Japanese oil governance and policy and its future orientation, Thorarinsson (2018: 6) calls attention to four issues:

> "1) Oil security has been, and will remain, a key concern in Japan;
>
> 2) Government overseas oil policy and its mechanisms have played an important role in shaping the Japanese oil industry, largely centering on decreasing oil dependency by increasing self-developed oil, sometimes at very high cost;
>
> 3) Japanese oil firms are historically fragmented and are, to a varying degree, independent actors with different objectives, capabilities, and relationships both with their own government and with those in oil-producing countries.
>
> 4) Resource diplomacy is constrained by the Japan–USA security relationship but is primarily driven by practical Japanese national and corporate interests."

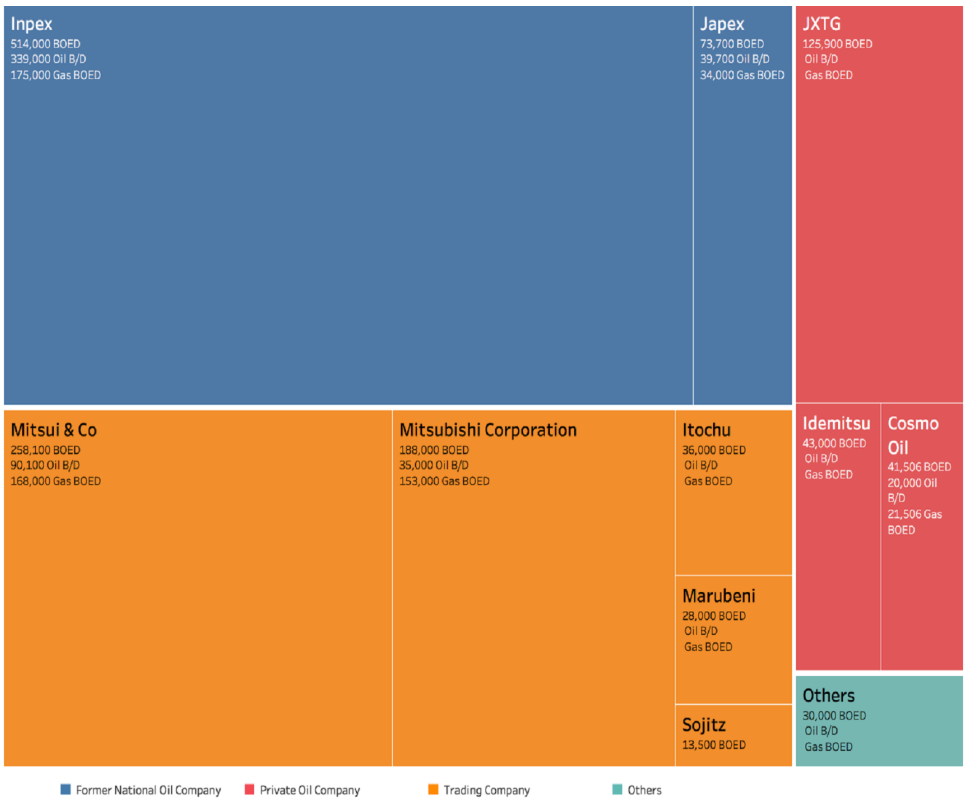
In 2016, Japan was the fourth largest oil consumer in the world, with a declining 4,037 million barrels per day (Mb/d) and oil import dependency close to 100 per cent. The Middle East supplied almost 90 per cent of the total: Saudi Arabia (37.4 per cent) and the United Arab Emirates (23.7 per cent)[2]. Gas imports in 2016, however, were more diversified and exhibited a lower dependency on the Middle East (23.6 per cent). Since the 1990s, Middle East dependency increased (partly because available supply from Indonesia and Mexico decreased as a result of the decline of their oil industries) and remained at 87.2 per cent by 2017[3]. Beyond this, oil importance in the country's energy import matrix is amplified by a low rate of equity oil, lack of viable short -to-medium term supply diversification options in the current global context, geographic isolation, and Japanese oil refinery production technology (Thorarinsson 2018).

According to Thorarinsson (2018), from the late 1960s, Japanese policymakers led by the Ministry of Economy, Trade, and Industry (METI) and the Ministry of Foreign Affairs (MOFA pursued oil security and the strengthening the industry. First, since the major 2004 institutional reform with the creation of Japan Gas, Oil and Metals National Corporation (JOGMEC), in substitution of its predecessors Japan National Oil Corporation (JNOC) and Japan Petroleum Development Corporation (JPDC), Japan pushed for a reduction in the Independent Development Ratio by financially supporting Japanese oil companies overseas exploration and by promoting national oil projects. Conversely, JOGMEC ceased loans to upstream projects, set a ceiling of 50 per cent of total project size in equity contributions and loan guarantees, and was stripped of its mandate to invest directly in national projects. Second, a revamped subsidy structure continued to encourage both vertical and horizontal integration to promote international competitiveness and enhance bargaining

power in relation to oil-producing countries. Third, foreign oil economic policy towards the Middle East was geared to strengthen economic interdependency with oil-producing countries in order to insure oil supply and make easier for concession agreement extensions and new production sharing contracts (PSC) to happen.

Thorarinsson (2018) suggests that policy outcomes were mixed. The 2028 Fifth Strategic Energy Plan goal that Japan should increase the 'independent development ratio'[4] of oil and natural gas to over 40% by 2030 was not met. In fact, in FY 2017, the ratio decreased from the previous year to 26.6% (1,452 Mboe/d), a few percentage points above that of FY 2009 at 23.1%. Recently, as shown in Figure 1, the industry remains vertically and horizontally fragmented and is comprised of previously national oil companies, private oil companies, and trading companies.

Figure 1: Oil and gas production by company type (boe/d)



Source: Thorarinsson 2018: 26.

For example, Japan's oil companies middling economic performance has been partly attributed to the established practice of the use of the government-controlled companies as landing posts and generous *amakudari* rewards for post-retirement career MOF and METI officials. METI holds equity of 19% and 34% respectively in Inpex and Japex, oil exploration and refining companies, besides the fact that they have mutual cross-shareholdings. The Chairman and President of each company is currently, and has been historically, a retired METI official and outside directors represented one-third or less of the total number of directors in each (Nikkei Asian Review, June 11, 2019)[5].

Japan Oil, Gas and Metals National Corporation (JOGMEC)[6]

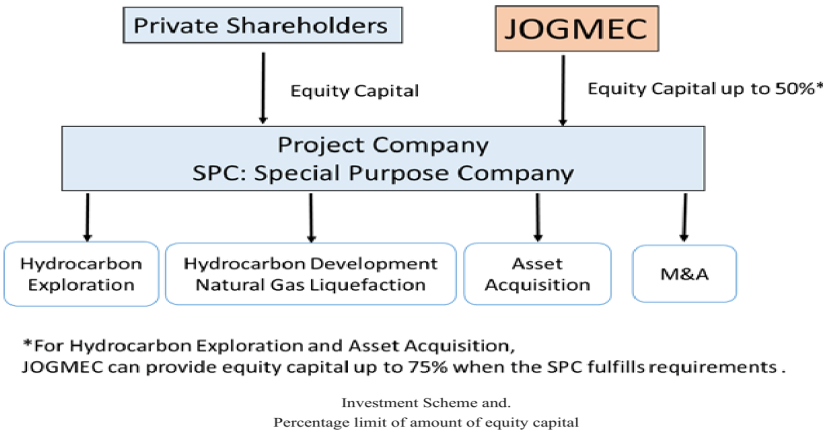
JOGMEC was established on February 29, 2004 pursuant to the Law Concerning the Japan Oil, Gas and Metals National Corporation, promulgated on July 26, 2002. It absorbed the mandates and functions of the former Japan National Oil Corporation, previously in charge of securing a stable supply of oil and natural gas, and of the former Metal Mining Agency of Japan, charged with keeping a stable supply of nonferrous metal and mineral resources and implementing mine pollution control measures.

To meet the former goal, JOGMEC support various areas including survey, research, development and production. Further, it assists Japan's resource diplomacy, cooperates with national oil companies, and provides advanced technical training for experts such as geologists and geophysicists from established and upcoming producing countries.

JOGMEC also provides financial support to Japanese companies towards their exploration, development and production activities through equity capital and liability guarantees to reduce their risks. Following commercial discovery of oil or gas reserves, JOGMEC can also give additional liability guarantees to projects sustain their financial track record.

Following a standard practice in the oil and gas industry (as well as in the mining industry in some regions), a Japanese company often establishes a project company to enter a new oil and natural gas exploration and development project. Then the project company raises funds for exploration by issuing new stock. JOGMEC can provide equity capital through the purchase of such stock. However, once a decision for commercial development is made, JOGMEC's policy directive is to divest its capital holdings. Finally, development projects, asset acquisition and M&A are also within the purview of JOGMEC's equity capital actions. JOGMEC's total amount of equity capital for 54 projects reached US$ 5.3 billion in January 2019.

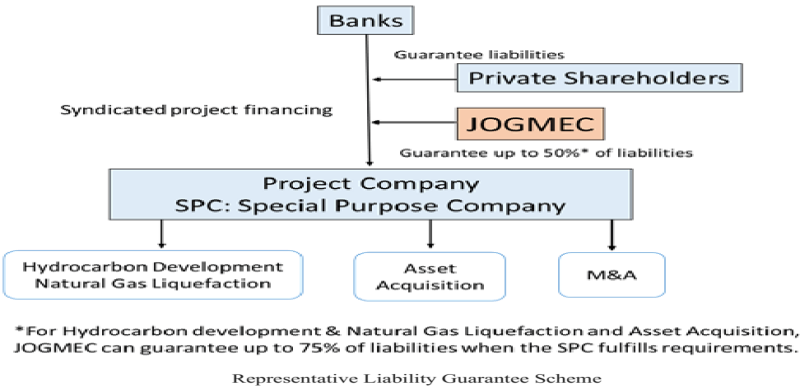
Figure 2: JOGMEC Equity Finance Mechanisms of O&G E&P Projects



Source: JOGMEC - Financial assistance to Japanese companies.
http://www.jogmec.go.jp/english/oil/oilgas_10_000007.html [Accessed: March 15, 2019]

Next, JOGMEC gives liability guarantees to Japanese companies' finance of oil and natural gas development projects, asset acquisition and M&A, and completion guarantees for projects. Its outstanding balance of liability guarantees for 11 projects reached US$ 7.7 billion in January 2019.

Figure 4: JOGMEC Liability Guarantee Mechanisms of O&G E&P Projects



Source: JOGMEC - Financial assistance to Japanese companies.
http://www.jogmec.go.jp/english/oil/oilgas_10_000007.html [Accessed: March 15, 2019]

As shown in Figure 4, at the end of March 2017, JOGMEC financial support to O&G spawned all continents. In the Americas, it had financed 6 companies/projects through equity (out of a total of 30), of which 3 in South America, 2 in Brazil, and provided liability guarantees to 3 companies/projects (out of a total of 11), none in Brazil so far.

Figure 4: JOGMEC O&G E&P Projects Finance

Source: JOGMEC - Financial assistance to Japanese companies.
http://www.jogmec.go.jp/english/oil/oilgas_10_000007.html [Accessed: March 15, 2019]

Finally, JOGMEC engages in diverse actions to increase recoverable resources through support of state-of-the-art technological development, such as technological challenges in methane hydrate, GTL and other related new areas, always emphasizing the preservation of the environment.

Among JOGMEC's key objectives is the implementation of the 5-year Third Basic Plan on Ocean Policy, approved on May 15, 2018 by the Meeting of the Cabinet's Headquarters for Ocean Policy and then followed by Cabinet decision. In its evaluation of the 19 years since the enactment of the Basic Act on Ocean Policy, JOGMEC acknowledges an awareness in the current situation of "having promoted initiatives relating to marine resource development, according to changing circumstances concerning ocean industries," the plan sets out among its 5 basic principles: "Develop a win-win relationship between the sustainable development and use of the ocean by sound marine industries on the one hand , and environmental protection on the other." The Basic Policy for Other Main Measures, under the heading 'Promotion of industrial use of the ocean' advances, includes 'Develop energy resources derived from the ocean such as methane hydrate, seafloor polymetallic

sulfides, rare-earth elements and yttrium-rich mud,' among others. Further, under its Specific Measures to 'Promote industrial use of the ocean' the plan line '(1) Promote development and use of marine energy and mineral resources', point g., states 'Promote initiatives to develop and demonstrate marine resource technologies for use with marine and mineral resources at depths of more than 2000 meters including rare earth muds and other embedded marine resources in SIP Next-generation Technologies for Marine Resources Exploration.' In addition, line (2) aims to 'Promote marine industries and strengthen their international competitiveness.'[7]

On 27 January 2014, in Tokyo, the International Seabed Authority and JOGMEC of Japan signed a 15-year contract for prospecting and exploration for cobalt-rich ferromanganese crusts in the presence of State Minister Midori Matsushima of METI. JOGMEC will have exclusive rights for exploration for cobalt-rich ferromanganese crusts over 3,000 square kilometers of the seabed in the Western Pacific. It became the fourteenth entity to be granted exploration licenses by the International Seabed Authority yet the first one to sign a contract for exploration for cobalt crusts.[8]

As the Japanese government develops and implements policies and mechanisms to promote its oil and gas companies (including those related industrial manufacturing and engineering service companies) and companies in offshore shipbuilding and naval construction (including those related to machinery equipment and marine engineering areas), it aims for greater integration in the global offshore O&G supply chain.

Soon thereafter, Japanese upstream oil companies and suppliers were awarded contracts by JOGMEC to pursue development work in seabed mining. Japan Petroleum Exploration (JAPEX), Japan Drilling Company (JDC), and INPEX in response to a public invitation by JOGMEC for a proposal concerning "Support Work Related to Studies on the Basic Policy and Plan for the Medium and Long-Term Offshore Production Test of Methane Hydrate" signed a contract with JOGMEC on June 2014, comprising: (i) Support for the formulation of the basic policy (draft), (ii) Technical studies necessary for the formulation of the basic plan for the test: 1) Studies on drilling/completion method, 2) Study on the production test system, and 3) Other technical studies; and (iii) Collection of technical information. Previously, JAPEX has been engaged in field works of methane hydrate research programs, including the world's first offshore production test (March 2013) on commission from JOGMEC; JDC had been commissioned in engineering work, including design, development and operation of the test system, as well as in drilling operations. INPEX, together with JAPEX, was awarded a contract for exploratory test well in FY2003 in the Tokai Oki-Kumano Nada area. The development study results were to subsidize JOGMEC for making the basic policy and plan for

medium and long-term offshore production tests the Ministry of Economy, Trade and Industry (METI) is planned to conduct in Japanese waters (MH21 2014).

In parallel, as Thorarinsson (2018) shows, from the 2000s, METI and MOFA had been coordinating a 'multilateral resource diplomacy' comprising of diplomatic, economic, and private engagement with oil producers, not exclusive to the oil and gas sectors and METI also introduced a New National Energy Strategy that calling for the involvement of key government institutions – such as the Japan Bank for International Cooperation (JBIC) and NEXI – to assist oil-producing countries in diversifying their oil-dependent economies. He (2018: 31) aptly summarizes this policy development:

> "The multilateral approach and the move away from simple imports of oil solve two issues at the same time: 1- The procurement of oil and gas is facilitated. 2- Business opportunities for Japanese firms are opened up. Multilateral resource diplomacy fundamentally seeks to outgrow business relations that are solely confined to energy and to extend them to other fields."

Japan Foreign Oil Economic Policy Toward Brazil

Beyond the fact that Brazil has the largest population of 'nikkei' Japanese descendants (1.4 million in 2000), Japan and Brazil have a long, historical record of economic relations. In 2015, the 120th anniversary of the Friendship Treaty of Trade and Navigation was commemorated. In the previous year, Prime Minister Shinzo Abe visited Brazil and established with President Dilma Roussef a 'Global and Strategic Partnership,' launching an annual dialogue between the foreign ministries to strengthen bilateral talks, 'Dialogue Brazil-Japan.' However, the golden era of this bilateral economic relationship in the 1970s, has been followed by a slower growth and more recently by a decline. Bilateral trade (which however represents less than 1% of imports and exports of Japan) and Japanese FDI in Brazil peaked in 2007 after a sharp growth from 2000[9]. Further, from 1990 to 2010, whereas the cumulative number of bilateral agreements of Brazil with Japan was 16, the similar figure for China was 84. Between 2011 and 2015, China had 10 against 5 for Japan (Uehara 2016). Still, between 2000 and 2014, the five-year total investment was multiplied by ten, from US$457 million (2000-2004) to US$2,549 million (2005-2009) to US$4,814 million (2010-2014). In 2013 Japan had the 6th position in terms of FDI in Brazil, accounting for 5% of the total.

Since 1974, business groups of Brazil (National Industrial Confederation) and Japan (Keidanren-Federation of Japan Economic Organizations) have been meeting regularly, 11 in Brazil and 7 in Japan - alternating between Tokyo and different Brazilian cities - under the Joint Committee

of Economic Cooperation Brazil-Japan. Until 2015 oil was not a topic of discussion. In 2004, the Brazil-Japan 21st Century Council was established with members from the public and private sectors, which presented a series of proposals to the Lula and Koizumi government. As a result, the Wise Man Group Brazil-Japan was established in 2007. It held five meetings until the end of 2015, continuously showing interest in the Economic Partnership Agreement (EPA) discussed throughout the years between CNI and Keidanren. In the August 2014 meeting held in Brazil between Prime Minister Shinzo Abe and President Dilma Rousseff the bilateral relation was elevated to the status of 'Global and Strategic Partnership.' Next, in the September 2015 Committee meeting the report 'Brazil-Japan: Roadmap for an Economic Partnership Agreement' with 12 topics for inclusion in the EPA, including 'Natural resources and energy.' was presented (Horisaka 2016) Although oil was not a sub-topic, it was indirectly the object of a proposal: "Restrictions (such as local contents requirements and foreign capital ceilings) should be eliminated or reduced, as appropriate, so as to promote joint projects and technical transfer related to natural resources and energy development."(CNI and Keidanren 2015)[10].

From the start of the second decade of the twenty first century, following these long bilateral government and corporate conversations, all major Japanese trading companies (Mitsubishi Corporation), industrial and engineering groups (Mitsubishi Heavy Industries, Kawasaki Heavy Industries, Toyo Engineering[11]) and shipbuilders (IHI, JGC, JMU, Imabari, Namura e Oshima Shipbuilding) entered the Brazilian oil and gas upstream offshore market in partnership with Brazilian firms. The technical partnerships established in 2014 between Japanese shipbuilding companies and recently established expanding Brazilian shipyards, driven by the announced demand for vessels to exploit the oil in the pre-salt, were supported by Japanese government agencies' finance and technical assistance and received preferential loans from Brazil's development bank BNDES. On August 1st, 2014, the Joint Statement on Naval Construction Cooperation to Promote the Development of Offshore Resources stated: "Brazil and Japan recognize that current naval cooperation is due to the relationship of trust between the two countries" (SINAVAL 2015).

The mutual trust between the two countries is exemplified by the awarding on November 2017 of Brazil's highest decorations, The Order of Rio Branco, to Masami Iijima, Chairman of Mitsui & Co. It recognized his key role in contributing to the revitalization of the Brazilian economy by leading, as Chairman of the Japan-Brazil Economic Committee of Keidanren (Japan Business Federation), the participation of Japanese business in seven Japan-Brazil Economic Cooperation Committees since 2011. In addition, he was proactive in supporting recommendations centered on business infrastructure at the 'The Wise-Men Group of the Japan-Brazil Strategic Economic

Partnership' ("Wise-Men Group"), a high-level meeting of economic luminaries from both countries, contributing to the consolidation of the historical ties between the two countries.[12] In parallel, In December 2013, Brazil National Service of Industrial Learning (Senai) and Japan International Cooperation Agency (JICA) signed an agreement for the training of Brazilian workers in the shipbuilding industry. For four years, JICA will invest R $10 million in the training of skilled labor and in the training of technicians and professors in the areas of naval mechanics, management of naval production and welding of composite materials. The training centers will work in four units of Senai in Rio Grande do Sul, in Rio de Janeiro, in Bahia and in Pernambuco, which are going to train staff for three large Japanese companies that invested, together, R $1.6 billion in shipyards in Brazil in the last three years. In addition to the technological modernization of the SENAI schools, the partnership with the Japanese agency will allow the training, in the next four years, of 100 technicians and professors in areas such as naval mechanics, naval production management and welding of composite materials, used in shipbuilding. The first Japanese specialists in naval industry were to come to Brazil at the beginning of 2014 for training courses to begin in the month of April. In addition to the training of manpower, teachers were to train 100 Brazilian technicians and instructors in the first two years of the course.

However, within the next few years, with the start of the decline of oil prices from the high 2012 (fell by half in 2015) and in the wake of the Car Wash ("Operação Lava Jato") corruption scandals that hit almost all their local partners, nearly all Japanese companies quit their business partnerships in Brazil incurring in huge losses and creating a blemish in the countries' frail economic relations recovery.

Table 1. Naval Construction Partnerships Brazil-Japan

Brazilian Naval Yard	**Japanese Companies**	**Share acquired / Price**
Estaleiro Atlântico Sul EAS (Pernambuco state)	Ishikawajima-Harima Heavy Industries IHI Co. (leader) Japan Gas Co. Japan Marine United Co.	25% / R$ 207 million
Estaleiro Enseada do Paraguaçu (Bahia state)	Kawasaki Heavy Industries Ltd.	30% / R$ 300 million
Estaleiro Ecovix-Engevix (Rio Grande do Sul state)	Mitsubishi Heavy Industries Ltd (Leader) Imabari Shipbuilding Corporation Ltd Namura Shipbuilding Corporation Ltd Oshima Shipbuilding Corporation Ltd Mitsubishi Co.	30% / R$ 300 million

Source: Author's own elaboration.

The revelations brought by the "Car Wash" operation challenged the sustainability of Brazil's local content policy in oil and gas as an industrial development tool (Kasahara and Botelho 2019). From the late 1990s, and particularly after the pre-salt discovery in 2006, the local content policy made use of government procurement and quantitative targets as part of concession and production-sharing contracts, to promote a national supply industry by setting up overambitious targets and using the global leader in deep-offshore Petrobrás. Many "national champions" created by the policy, including the government financed vessels and drilling rigs broker Sete Brasil and those national shipyards linked to its scheme, shut down, sought bankruptcy protection, or left with huge excessive capacity. This led to steep employment reduction in the naval industry, which went from about 80,000 employees in 2014 to around 30,000 in 2018 (Lima-de-Oliveira 2019).

JOGMEC O&G Activities in Brazil

Barely a year after its creation, at the end of 2005, JOGMEC and PETROBRÁS entered a Memorandum of Understanding for collaboration on mutual benefit oil and gas exploration and production activities, HSE related matters, and R&D activities of the oil and gas sector. The first collaborative research study on Monocolumn Hull Floating, Production, Storage and Offloading (MPSO) system, was started in 2006 and it was finished successfully in 2009 with excellent and fruitful results. It had the participation of Brazilian universities and Japanese oil and related companies MODEC and JGC (JOGMEC 2011). Next, in April 2011, JOGMEC and Petrobrás signed a Specific Agreement to commence a second collaborative development study of development of High Corrosion Resistance Flexible Riser for Ultra-deep Water for practical oil production in pre-salt area that ended in 2013 (JOGMEC 2011). Following those, in November 2015, JOGMEC and Petrobrás signed a MOU to further strengthen their relationship and to cooperate in the oil and gas development technology field.

A few years earlier, in June 2009, JOGMEC announced the first oil production in Brazil by Japanese companies and only the third led by non-Brazilian companies to produce crude oil in Brazil since the opening of Brazilian oil market to foreign companies in the late 1990s. Frade Japão Petróleo Limitada (FJPL, 18.3%), together with its partners Chevron (operator, 57.1%) and Brazil's national oil company Petrobrás (30%), started crude oil production from the Frade Field [13] (JOGMEC 2010). Frade is a subsea development with wells tied back to a floating production, storage and offloading (FPSO) vessel. The total capital investment was around 3 billion US dollars[14]. FJPL share of oil production was exported to Japan through a swap exchange[15].

Next, in February 2010, JOGMEC announced the provision of equity finance for oil and gas exploration in two blocks off the Brazilian coast by INPEX Petróleo Santos Ltda., a subsidiary of INPEX. In addition to a 20% participation in Block BM-C-31, located in Campos Basin, acquired from Shell Brasil Ltda. (Shell) earlier in October 2008, INPEX Petróleo Santos Ltda. had recently gained the approval of the Brazilian oil regulatory authority, ANP, regarding its participation in Espírito Santo Basin Block BM-ES-23, of which a 15% participation interest had been also offered by Shell. INPEX (51%) established a new subsidiary INPEX Northeast Offshore Brazil to control INPEX Petróleo Santos, in partnership with JOGMEC (49%) and thus was able to obtain JOGMEC's financial support for up to 75% of exploration expenditures, for a total amount of equity financing over 2009-2015 of JPY 17 billion (US$ 16 billion). JOGMEC's release then stated: "A number of oil and gas fields have been discovered in the region, and the newly acquired two blocks are also considered promising. These projects are expected to enhance Japan's exploration and development activities, as well as to reinforce Japan's energy security when successful." It further provided the following 'reasons for adoption': "1-Satisfying JOGMEC's technical, economical (sic), political and business-elated criteria; 2-Expecting to increase the competitiveness of Japanese upstream industry, and 3-Providing eligibility for 75% equity financing because of large expected reserve and technical difficulties." (JOGMEC 2010).

The Promises of Foreign Oil Governance: MODEC and Mitsubishi in Brazil

MODEC

In the course of the previous decade and into the current one, Brazil's NOC Petrobrás contracted Japanese companies MODEC, a subsidiary of Mitsui & Co., in partnership with Mitsui O.S.K. Lines, Mitsui E&S and Marubeni; and Mitsubishi, in partnership with the Dutch company SBM Offshore, to build and operate on long term contracts almost twenty FPSOs. Over this period, Japanese government agencies extended project finances and credit lines upwards to US $ 10 billion.

Just in the last 5 years, MODEC, together with its Mitsui & Co. group partners was awarded five new FPSO construction and charter contracts by Petrobrás, assisted by critical financial assistance from the Japan Bank for International Cooperation JBIC. After the Car Wash scandal broke out, MODEC, together with its Mitsui & Co. group partners was awarded a further five new FPSO construction and charter contracts by Petrobrás, helped by JBIC project finance. Afterall, MODEC virtually had a market monopoly since fellow competitor Mitsubishi partner SBM Offshore was

banned from making offers in the tenders for corruption. At the end of 2017, MODEC was awarded the first FPSO contract for the Mero giant pre-salt field by Petrobrás, operator of the Libra Consortium (40% interest), in partnership with Shell (20%); Total (20%), CNPC (10%) and CNOOC Limited (10%). Takashi Nishino, MODEC Brazil president and global head of charter and operations, reflecting on this track record stated: "We are very proud of our quick growth in a relative short period. Brazil is a key spot for MODEC globally and we intend to continue our long-term business in the country" (Palmigiani 2018).

A recent report by consultancy Wood Mackenzie's Brazilian-based team suggested the streamlining of local content rules will allow Brazilian oil production to ramp up more efficiently than in the recent past, reaching a plateau of 5 million bpd by 2025, rather than the 3.7 million bpd rate forecast if old local content rules were still in place. Petrobrás has five more FPSOs coming on stream in 2018, two more entering production in 2019, and another six big units due online in 2021. Each unit typically demands about 18 subsea wells per vessel, bringing a promise of respite for the offshore sector.

The global market for FPSO vessels is in full swing again as operators open their wallets for offshore deep-water developments due to the recovery of oil prices, with Brazil expected to drive the bulk of FPSO demand and Petrobrás leading the charge. The state-controlled company awarded Japan's MODEC International two large FPSO contracts in recent months and is in negotiations with Belgium's Exmar to charter another floater, which ended up going to MODEC due to Exmar problems with financing, while simultaneously tendering for four additional units with much more activity on the horizon.

These include two mid-sized floaters for the revitalization of the ageing Marlim field, one unit for the integrated development of the Parque das Baleias complex and a large FPSO for the Mero pre-salt field. However, the new bonanza period comes after Petrobrás and other oil companies around the world faced some dark times in recent years. The oil price meltdown in late 2014 led to large investments being postponed, culminating in scant FPSO orders in 2015 and 2016, but the market started recovering in 2017 and the industry entered a new cycle of expansion.

With Car Wash in the rearview mirror, Petrobrás is now focusing on the future and is displaying a strong appetite to continue developing its pre-salt and post-salt projects in Brazil. "Regardless of Petrobrás having trimmed its demand compared to a few years ago, Brazil is by far the largest offshore market in the world. Most of the deep-water fields are located far away from the

coast with little infrastructure, thus requiring production systems that can store large amounts of oil, which favors the use of FPSOs," Chamusca tells Upstream.

"Brazil is and will continue to be the largest FPSO market in the world because nearly half of the demand is here, and I do not see this changing in the long-term." Recent licensing activity, which saw international oil companies such as ExxonMobil, Chevron, Shell, BP, Equinor, Total, Repsol, Galp Energia, Wintershall and many others buying acreage in Brazil, is also expected to generate additional floater orders over the next decade. "The arrival of new players is probably the most important moment in the Brazilian oil and gas industry since the end of Petrobrás' monopoly two decades ago, as no company in the world has the financial muscle to develop an entire country on its own," explains Chamusca.

Brazil's revamped local content regulations could also fast-track FPSO deployment and accelerate the pace of pre-salt oil production, according to a report from consultancy Wood Mackenzie. Juliana Miguez, Wood Mackenzie senior research analyst for Latin America upstream, believes the new local content policy will debottleneck FPSO construction by allowing operators to construct hulls in Asia and use Brazilian suppliers to build and integrate selected topsides modules. According to Wood Mackenzie, the more market-friendly rules may see all 36 FPSOs required to develop discovered resources, including the ones operated by Equinor and Shell for the Carcara and Gato do Mato pre-salt fields, respectively, operational by 2027. "In comparison, building the FPSOs under the old local content rules would significantly slow the pace of development, with only 26 FPSOs coming on stream by 2030," writes Miguez.

Japan's MODEC is no newcomer to the Brazilian offshore market, having built a solid track record over 15 years of operation in a country that hosts more than half of its fleet of floating production, storage and offloading vessels. Its first FPSO Fluminense began operation for Shell in 2003 in the Bijupirá and Salema oil fields development in the Campos Basin, the same year it opened its office in Brazil. MODEC has 10 of its 15 FPSOs in operation installed off Brazil, nine of which are chartered to Petrobrás and one to Anglo-Dutch supermajor Shell, with two more already under contract with the Petrobrás: Carioca, Guanabara and Almirante Barroso floaters for the Sepia, Mero and Búzios pre-salt fields, respectively. The latter contract was awarded in June 2019 and is the 15th FPSO/FSO vessel which MODEC provides to Brazil, as well as its 8th FPSO in the "pre-salt". Together with the Eni Mexico Area 1 FPSO for the Italian oil company in the Gulf of Mexico, the four FPSO under construction by MODEC in mid-2019 are for Latin America and MODEC is responsible for the engineering, procurement, construction, and installation (EPCIO, mobilization

chartering and operations and management (O&M), including topsides processing equipment as well as hull and marine systems. In addition, SOFEC, Inc., a MODEC group company, designs and supplies the spread mooring system.

MODEC employs about 2,100 people in Brazil, with project teams working on both the Carioca and Guanabara FPSOs actively engaging the local market for the execution of both units. The hulls and most topsides modules will be manufactured abroad, but MODEC is expected to contract part of the modules and complete integration of the two vessels in Brazil to comply with local content requirements. Conversion of the very large crude carrier Flandre into the Sepia FPSO hull started in February at Cosco's Dalian facility in China, with delivery scheduled for November 2019. Commercial output from both the Sepia and Mero-1 FPSOs is earmarked for the second half of 2021. "Sepia is a bit ahead at this moment because the project started earlier, but soon Mero-1 will also reach such stage," Nishino tells Upstream. Dealing with local content requirements was never an issue for MODEC in Brazil, explains Nishino, adding all its five FPSOs built with high local content percentages were delivered ahead of schedule. "One of the FPSOs produced first oil five months ahead of the schedule anticipated under the contract with the client. I see MODEC's experience achieving the required local content as successful so far," he says.

Reaching that level of excellence was not easy. When MODEC won its first FPSO contract with high local content requirements in 2009, the company established its EPCI office in Brazil to work in connection with its operations office, active since 2003. At that time, a large group of people experienced in executing FPSO projects was assigned to better understand the characteristics of the local market, including suppliers' capabilities and applicable regulations. Nishino says: "Since then, we have developed a great knowledge in the local market and built a strong Brazilian team, which now gives us even more confidence to build projects with high local content."

To build on that knowledge, MODEC is gearing up to participate in Petrobrás' upcoming tenders, although the company admits it will likely target larger units over mid-sized floaters. One of the key aspects when bidding for large floater projects is the financial side. Over the past few years, MODEC was able to carve out partnerships with Japanese compatriots Mitsui & Company, Marubeni, Mitsui OSK Lines and Mitsui E&S Holdings to strengthen its business and mitigate risks for its FPSOs in Brazil. "We have to say it was not easy to structure the loan agreements for those very large-scale projects," admits Nishino. "However, with the combination of strong support from Japanese export credit agencies such as Japan Bank for International Cooperation and Nippon Export

and Investment Insurance, and commercial banks, we could manage the financing of these projects even though the credit rating of both Brazil and Petrobrás remain at the low investment grade."

MODEC is also working on new technologies and improvements, including techniques for handling reservoir fluids with high gas-to-oil ratios and high level of contaminants in the pre-salt province, which will likely demand larger and more complex FPSOs in the future.

Mitsubishi Corporation

In early 2011, Mitsubishi Corporation signed a long-term cooperation agreement with the Dutch company SBM Offshore, one of the leading players in the FPSO market, to jointly pursue FPSO lease and operate projects worldwide. Mitsubishi became an equity partner with SBM Offshore for the ownership and operation of FPSOs whereas SBM Offshore was to be responsible for the EPCI supply of these units and act as the operator. The companies had previously partnered in the past for the Yetagun FSO and Rang Dong FPSO lease contracts. Mitsubishi provides SBM Offshore with substantial equity capability for new lease projects, enabling the partnership to attract competitive financing from a wide range of sources and provide access to Mitsubishi Corporation's global business network with more than 200 bases of operations in 80 countries around the world. The deal, particularly, supports SBM Offshore in its ambitions to grow the portfolio in major markets such as Brazil, where several large FPSO projects are expected to be developed in the coming years, further bringing strong local knowledge and expertise in several other countries identified by SBM Offshore and Mitsubishi as potential growth areas.[16]

In mid-2013, a Mitsubishi Corporation (MC) joint venture entered into contract with a consortium led by Petrobrás for the charter, operation and maintenance of two FPSOs in Brazil (*Cidade de Maricá* and *Cidade de Saquarema*), to be deployed in development at the Lula Alto and Lula Central oil fields, operated by Petrobrás. The joint venture was established with Nippon Yusen Kabushiki Kaisha (NYK Line), SBM Offshore, and Brazilian private oil and gas service provider Queiroz Galvão Óleo e Gás S.A ("QGOG"). These projects marked the second and third such for MC based on the long-term cooperation agreement with SBM, since its participation in the development of an FPSO for use in the northern part of Sapinhoá oil field. Mitsubishi then expressed that it was actively continuing to expand its FPSO business worldwide, with the core of its activities in Brazil.

Mitsubishi Corporation participation in the consortium critically assisted SBM Offshore in the project financing. In mid-2015, SBM Offshore announced it had has raised $1.55bn for its FPSO

Cidade de Saquarema vessel, provided by a consortium of 16 international banks along with insurance cover, which was secured from four Export Credit Agencies (ECA) including Nippon Export and Investment Insurance (NEXI), *Servizi Assicurativi del Commercio Estero SpA* (SACE), Atradius Dutch State Business (Atradius), and UK Export Finance (UKEF).[17]

It represented the culmination of successful financing of $3bn for two sister units ($1.45bn project financing of FPSO Cidade de Maricá had been achieved in July 2014), destined for the Lula field in the pre-salt province. The vessels, which are to be owned and operated on a 20-year charter service for Tupi, a consortium that operates BM-S-11 block composed by Petrobrás (65%), BG E&P Brasil (25%), and Petrogal Brasil (10%), are owned by SBM Offshore and affiliated companies with 56% stake in it, Mitsubishi 20%, Nippon Yusen Kabushiki Kaisha 19% stake, Queiroz Galvão Óleo e Gás 5%.

In addition, in March 2012, Mitsubishi Heavy Industries Compressor Corporation (MCO), a wholly owned subsidiary of Mitsubishi Heavy Industries, Ltd. (MHI), received an order for six compressor packages to be installed on Tupi. The compressor packages are the core unit of equipment to export natural gas extracted from oil fields. MCO received the order from MODEC Offshore Production System (Singapore) Pte Ltd., a subsidiary of MODEC. MCO will be responsible for the design, procurement, manufacture and yard test of the compressor packages.[18]

Brazil Industrial Oil Policy: Local Content

In recent years, the Brazilian government's decision to remove the local content element from bidding criteria increased participation in licensing rounds, whereas an innovative approach to local content-related liabilities attaching to older acreage had a similarly powerful and more immediate effect. Local content commitments were introduced as bidding criteria in Brazil's fifth licensing round in 2003 and government controlled Petrobrás often imposed more stringent requirements of its own. Over time, these policies resulted in bottlenecking and delays in local supply chain companies, often resulting in non-compliance and liabilities for regulatory penalties. Brazil's hydrocarbons regulator ANP received 230 requests for waivers from companies arguing they could not meet local content requirements due to Brazilian market conditions.

In April, the Brazilian National Council for Energy Policy (CNPE) approved an ANP resolution that allowed companies to exchange local content on existing contracts for requirements that were much lower than previously, and greatly simplified. In the case of floating production, storage and offloading vessels, the new resolution allowed a broad local content of 40%, rather than

several earlier and generally much higher requirements. The ANP resolution was partly a response to the impasse between Petrobrás and Brazilian fabrication shipyards in relation to the former's application for waiver of local content obligations applying to the first FPSO tendered by the Libra (Mero) consortium.

The waiver application delayed contracting of the FPSO by almost two years, but the ANP decision, when it was given, still ordered significant local content, though within a greatly simplified set of categories. A recent report by consultancy Wood Mackenzie suggests these regulatory moves on local content, allowing a de facto shift toward Asian yards, will play a fundamental role in helping Brazil attain a faster production ramp up.

The Wood Mackenzie report suggests that operators will still be inclined to use Brazilian suppliers to fabricate around 12,000 tons of topsides per unit-especially the less complex modules-and carry out some topsides integration, but some local suppliers are not so sure about this. "If you take the case of Mero-1, MODEC is putting less in Brazilian yards than was required by the waiver decision. The local orders are so small that we lose economy of scale for items such as leasing heavy lifting equipment," says a source with one Brazilian yard.

Brazilian sources say MODEC will fabricate little more than 1,500 tons of topsides locally for Mero-1 and a similar scale for the FPSO that will be supplied for the Sepia field. MODEC is expected to source its local content to BrasFels (owned by Singapore shipyard Kepper Fels), a yard with its own infrastructure in place and where the Japanese contractor has carried out fabrication and integration work on a sequence of recent Petrobrás floaters. The reconfigured Mero-1 project is still likely to generate non-compliance penalties, but there have also been regulatory moves to transmute financial penalties into future investment commitments. "Libra was a case that had the underlying objective to get to a solution in the shape of the local content resolution, and it was an important vehicle for getting both sides around the table. It was very contentious before this, but both sides were able to compromise in a way that could get the whole industry moving. Everyone benefits from the upside," says ANP director Felipe Kury.

Conclusion

In the decades ahead, Brazil O&G market will continue to be, even more so, an attractive one to Japanese oil companies and related machinery and services suppliers. Brazil's combined deep-water and ultra-deepwater pre-salt assets' projects, discovered from 2005, will be among the largest in the

coming decade. As from 2005 to 2010 when they drove the boom and bust in the domestic shipbuilding industry, they present a unique opportunity for the consolidation of the evolution of a domestic manufacturing supply chain competitively integrated into an innovation-driven global value chain. Between 2018 and 2025, about $790bn will be invested in 615 upcoming oil and gas fields globally, with conventional oil capex alone 44% ($350bn). Brazil O&G industry represents the single largest capex during this period: $80.7bn or over 10.2% of total capex.

Hughes (2014) results of the comparative case study of the politics of oil liberalization in Japan (with France and the United States) "shows that an endogenous explanation for liberalization and protection centered on the firm is possible." (205). The dramatic transformation in the structure of both demand and supply of the increasingly globalized global oil markets and industry was accompanied by similar changes in upstream supply chain due to the geographic fragmentation of oil sources and industrial capabilities. Further, the growing recognition of O&G industry economic importance for industrial and incomes growth exemplified by the experiences of Norway, and to a lesser extent Scotland and others, led to a proliferation of oil industrial strategies centered on local content policies in developing and emerging countries which became oil producers. Thus, as the nature of competition between oil firms and the type of support offer them changes, so does the nature and depth of its policies towards global interdependence. In the past Japanese domestic industry oil demand was a competing interest lobby that contributed to the changes in the oil governance change from the late 1990s which transformed the main institution, subsidies' mechanisms and goals and, ultimately the industrial structure. The relative policy success (although a globally competitive verticalized company never formed) is in the fact that the main company issued from the new governance upstream oil company consolidation, Inpex, today has become the largest E&P company in terms of reserves and production volume in Japan and has grown to rank globally among the mid-tier oil and gas E&P companies, with 70 oil and gas projects in more than 20 countries around the world. It is also moving toward gas verticalization by establishing a gas supply chain with the construction of Japanese gas infrastructure and leading by large-scale LNG projects such as the Ichthys LNG Project in Australia.

Further, Hughes (2014) findings also suggested that, in the current context of a highly diversified international oil market, as the strategies of firms and governments in both high consumption as well as oil producing developing and emerging countries seek to replicate those of developed nations in the previous decades, "the very success of government and firms in promoting

their competitiveness is likely to greater commercialization, rather than politicization, of oil policy in these countries." (208).

However, the results presented above of this case study of the recent evolution of Japanese foreign governance of oil toward Brazil show divergent outcomes that are partially at odds with these predictions. On the one hand, there are the dire results of the Japanese government's diplomatic efforts to convince Japanese shipbuilders and marine machinery producers to enter the Brazilian market since the early 2010s[19]. Luckily, beyond their significant losses, Japanese companies came out unscathed from the politically wrenching and raucous Car Wash (*Lava Jato*) and Big Oil (*Petrolão*) corruption scandals that brought down the country's NOC Petrobrás, the domestic oil market and industry and tore apart Brazilian society. On the other, Japanese government's financial subsidies and guarantees assisted their upstream oil industry engineering and service provider (MODEC) and machinery and equipment supplier (Mitsubishi) to secure significant sales in Brazil's growing pre-salt oil market in the case of the latter and dramatically expand its long term revenue stream, as well as benefit domestic sub-suppliers, in the case if the former. This provided evidence of the perils and promises of global interdependence of Brazil and Japan oil relations.

Since Fukushima, Japan has become the world largest importer of LNG. As China, driven by a need to clean up its environment, is set to soon surpass it this year and as competition heats up (Japan, China and South Kora account for 60% of global LNG demand) and may push prices up, Japan has continued to diversify its import sources and develop a LNG strategy. Japan's 'core company' first major success as operator (62% plus Total 30%, and other smaller partners) with the 20-year development of the large scale US$40 billion Ichthys gas project off Western Australia seems to finally mark emergence of a Japanese oil company in the big league in terms of engineering and technical capabilities. A key piece of Brazil's Ministry of Economy growth recovery is cheaper energy based on the expansion of natural gas in the country's energy matrix principally through regulatory changes that will create a market for the large pre-salt associated gas discoveries. This emerging development coupled with Japan's shift in oil and gas policy towards long-term investment commitments in global LNG projects, in substitution of previous strategy centered on the spot market, and last October's plan for a $ 10 billion public-private effort to build LNG terminals , power plants and other facilities, though mainly in Asia, may create new opportunities for rekindling Japanese oil companies FDI in and for industrial companies to translate their technological and industrial prowess into the upstream offshore O&G markets in Brazil and Latin America. Further, it will leverage Japanese manufacturing companies entry into a high-value added innovation-driven industry that will

help them finance their faltering growth and acquire new competitive advantage, and innovate the technologies for the development of future strategic industries such as seabed mining.

In the end, despite the high economic and political costs of the government-driven shipbuilding technology transfer agreements of the mid-2010s, the critical long-term marine resource development strategic stakes for Japan outweigh the perils of the country's foreign oil policy toward Brazil. As then JBIC Deputy Director Tomoyuki Miyaguchi (Division 1, Marine and Aerospace Finance/Financial Products Department, Industry Finance Group) poignantly put it:

> "the Government of Japan plans the commercialization of methane hydrate and submarine hydrothermal polymetallic ore at the sea near Japan, under its "Plan for the Development of Marine Energy and Mineral Resources." JBIC's continuing support for FPSO chartering services by Japanese companies of the deepwater and ultra-deepwater oil fields off the coast of Brazil and West Africa will lead them to acquire and improve technologies and knowhow regarding the operation of ultra-deepwater FPSO systems. I believe that it is important to strengthen the international competitiveness of Japanese companies in the marine resources development sector. Also, the future development of marine resources at the sea near Japan is expected through the technologies." (JBIC, 2014)

Recently, JBIC Director Chie Wakatsuki on the occasion of the signing in March 2018 of a loan agreement financing (co-financed with seven Japanese and foreign private-sector banks for a total USD987 million.) for the long-term ultra-deepwater vessel chartering services (leasing, operations, maintenance, etc.) to be provided by SEPMV30 (a Dutch company incorporated by MODEC, Mitsui & Co., Ltd., Mitsui O.S.K. Lines, Ltd., Marubeni Corporation and Mitsui Engineering & Shipbuilding Co., Ltd. to Petróleo Brasileiro S.A. (Petrobrás), a state-owned oil company in Brazil, for developing the Tupi oil field off the coast of the country, pointed out that Brazil was an important market for MODEC, that being the 10th FPSO vessel chartering service to be provided to Petrobrás by MODEC for which JBIC provided finance for all of them but one. Further, she aptly commented:

> "As part of its Investments for the Growth Strategy 2017, the Japanese government will advance public-private cooperation for development and commercialization concerning methane hydrate deposits expected to exist in waters around Japan. Against such a backdrop, I believe this project will speed up the advance of technology and know-how in FPSO operations required for exploiting ocean resources." (JBIC, 2018)

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[1] Such compacts regulated market share and molded the organizational structure and the incentive structure for the oil company in each market segment.

[2] In absolute terms, Japanese oil imports were then more than twice the French and Italian levels, and around 60 per cent higher than Germany's. Thorarinsson 2018.

[3] The major change in sources of imports has been the gradually increasing share of KSA, UAE, and Kuwait – at the expense of Iran, Indonesia, and Kuwait. Thorarinsson 2018.

[4] Defined as the share of the offtake amount of oil and natural gas under the control of Japanese entities (including domestic production), out of the total amount of imported and domestically produced oil and natural gas. From FY1973 to FY2008, the calculation for the Ratio was based exclusively on oil amounts. Natural gas was not factored into the calculation. Since FY2009, it has been calculating the combined amount of oil and natural gas. METI 2018.

[5] https://asia.nikkei.com/Opinion/Abe-s-corporate-reform-plan-faces-acid-test-at-government-run-companies

[6] The information presented in this section is extracted from JOGMEC's website: www.jogmec.com

[7] https://www.cao.go.jp/index-e.html

[8] https://www.isa.org.jm/

[9] In 2015, Brazil exported US$7.47 billion to Japan, compared to South Korea US$ 26.8 billion and Chile US$ 6.2 billion.

[10] A later version a broader roadmap between Japan and Mercosur, posted on Keidanren site in 2018, presents has a different wording of the proposal: "3.8. Energy and Mineral Resources. a. As well as being strategically important for both Japan and Mercosur, cooperation in the energy and mineral resource fields contributes to sustainable regional development, and such ties should be further strengthened through trade and investment activity. b. To this end, the EPA should avoid rules on restrictive trade measures such as export controls and export duties relating to energy and mineral resources. The EPA should provide rules on transparency of measures that could affect the investment environment, notification between countries when introducing new regulatory measures and steps to avoid disruption of existing contracts when adopting regulations, elimination/easing of local contents requirements and foreign capital ceilings, and enhancement of policy dialogue through the establishment of an Energy and Resources Sub-Committee." https://www.keidanren.or.jp/en/policy/2018/062.html

[11] Toyo Engineering established a 50/50 partnership with the Brazilian firm SOG Óleo e Gás (SETAL), the EBR – Estaleiros do Brasil Ltda., specialized in offshore naval construction. SOG, known as Setal Óleo e Gás, had a large experience in the onshore sector and since 1981 executed offshore construction projects. Toyo Engineering is a global company with over 1,600 projects in 50 countries in various sector. In the O&G offshore sector in Brazil, it executed 6 topside projects for the construction of FPSO built by MODEC for Petrobrás.

[12] https://www.mitsui.com/jp/en/topics/2017/1225091_10834.html

[13] FJPL is a Brazilian subsidiary of INPEX Offshore North Campos, Ltd., a joint venture company established by JOGMEC, INPEX CORPORATION and Sojitz Corporation.

[14] The Frade Field was discovered in 1986 and is situated in the Campos Basin in approximately 1,050 to 1,300m of water, approximately 370km northeast of Rio de Janeiro. Through the signing of a Participation Agreement with Petrobrás, FJPL participated in the project in 1999 when the field was in the exploration/evaluation stage. The field is estimated to contain approximately 200 million to 300 million barrels of recoverable reserves and peak production, estimated at 90,000 barrels per day of oil equivalent, is expected in 2011. https://www.offshore-technology.com/projects/fradefieldcamposbasi/

[15] In late October 2018, FJPL sold its 18.26 % stake to the private Brazilian oil company PetroRio for an undisclosed amount. In January 2019, PetroRio bought U.S. oil major's subsidiary Chevron Brasil Upstream Frade Ltda. which holds a 51.74 percent stake in the Frade field, Chevron's first oil development in Brazil. Bloomberg, which quoted a person familiar with the matter, says that PetroRio paid more than $500 million to

Chevron. The latter transaction made PetroRio the largest independent oil and gas player in Brazil. https://www.offshoreenergytoday.com/petrorio-buys-chevrons-stake-in-frade-field-off-brazil/

[16] www.offshoreenergytoday.com

[17] Ibid.

[18] www.epcengineer.com

[19] Indeed Hughes (2014: 208) presciently observed in regards to this issue: "Subsidies and other forms of support for national oil firms, for example, can lead to side payments from one government to another in the form of military arms, public infrastructure, or other support that functions as an inducement to gain preferential access to production…If history is a guide, such commercial and diplomatic maneuvering will continue to be a feature of the international oil market, and an important challenge facing governments will lie in managing its repercussions."

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