

PETROBRAS-CHINA RELATIONS: TRADE, INVESTMENTS, INFRASTRUCTURE PROJECTS AND LOANS¹

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Petrobras' expansion over the last years is linked to one foreign country: China. After the discovery of the pre-salt oil, the company's relation with Chinese players has evolved rapidly in four directions: trade, investments, infrastructure projects, and loans. Chinese actors have become relevant crude importers, production partners, service providers, and funding options. China became Petrobras' main export destination and the origin of the majority of its external loans, which have helped it to expand production and honor its financial commitments. From China's perspective, Petrobras is a reliable crude supplier, besides being an increasingly relevant destination of investments and technical, operational, and financial services. In each of the four pillars, the progress of bilateral relations was based upon complementary circumstances, such as China's skyrocketing imports and Petrobras' burgeoning exports. However, beyond complementarity, Petrobras-China oil cooperation has significant challenges.

Keywords: China; Petrobras; oil; trade; FDI; infrastructure projects; loans.

AS RELAÇÕES PETROBRAS-CHINA: COMÉRCIO, INVESTIMENTOS, PROJETOS DE INFRAESTRUTURA E EMPRÉSTIMOS

A expansão da Petrobras nos últimos anos está ligada a um país estrangeiro: China. Após a descoberta do petróleo do pré-sal, a relação da empresa com os atores chineses evoluiu rapidamente em quatro direções: comércio, investimentos, projetos de infraestrutura e empréstimos. Empresas e bancos chineses tornaram-se importantes importadores de petróleo, parceiros em extração, provedores de serviços e opções de financiamento. A China passou a ser o principal destino das exportações da Petrobras e a origem da maioria dos seus empréstimos externos, o que a ajudou a expandir sua produção e equilibrar seus compromissos financeiros. Na perspectiva chinesa, a Petrobras é um fornecedor confiável de petróleo, além de ser um destino cada vez mais relevante de investimentos e de serviços técnicos, operacionais e financeiros. Em cada um dos quatro pilares, a evolução das relações bilaterais foi baseada em complementaridades, como a grande demanda chinesa por petróleo e as exportações crescentes da Petrobras. Porém, para além da complementaridade, a cooperação petrolífera Petrobras-China apresenta desafios significativos.

Palavras-chave: China; Petrobras; petróleo; comércio; IED; projetos de infraestrutura; empréstimos.

LA RELACIÓN PETROBRAS-CHINA: COMERCIO, INVERSIONES, PROYECTOS DE INFRAESTRUTURA Y PRÉSTAMOS

La expansión de Petrobras en los últimos años está ligada a un país extranjero: China. Después del descubrimiento del petróleo del pre-sal, la relación de la empresa con actores chinos ha evolucionado rápidamente en cuatro direcciones: comercio, inversiones, proyectos de infraestructura y préstamos.

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Los actores chinos se han convertido en importantes importadores de crudo, socios de producción, proveedores de servicios y opciones de financiación. China se convirtió en el principal destino de las exportaciones de Petrobras y en el origen de la mayoría de sus préstamos externos, que le han ayudado a expandir su producción y equilibrar sus compromisos financieros. Desde la perspectiva de China, Petrobras es un proveedor de crudo confiable, además de ser un destino cada vez más relevante de inversiones y servicios técnicos, operativos y financieros. En cada uno de los cuatro pilares, el progreso de las relaciones bilaterales se basó en circunstancias complementarias, como las crecientes importaciones de China y exportaciones de Petrobras. Sin embargo, más allá de la complementariedad, la cooperación petrolera Petrobras-China presenta desafíos importantes.

Palabras clave: China; Petrobras; petróleo; comércio; IED; proyectos de infraestructura; préstamos.

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1 INTRODUCTION

The history of Petrobras' internal and global expansion over the last two decades is intrinsically linked to one foreign country: China. This close relationship between the Brazilian company and Chinese oil traders, companies, service providers, and banks, either public or private, has deep roots in one discovery. In late 2006, the company announced the detection of huge oil reserves in an until then unexplored layer, the pre-salt. The formal announcement in 2007 has opened a new chapter in bilateral commerce, business, and financial relations, which, from then on, underwent fast developments in four pillars: trade, investments, infrastructure projects, and loans.

The existence of a new oil frontier has attracted Chinese companies and banks' attention. Over the last decades, Chinese oil demand has expanded at a fast speed, and national production did not match internal needs. Consequently, imports boomed as well as the presence of Chinese oil players in global markets, looking for commodity purchase and investment opportunities.

With great potential for growth of oil production and exports in the following years, Brazil and Petrobras' pre-salt activities opened up promising economic prospects: natural resources to import, strategic assets to explore, engineering services and equipment to provide, technologies to acquire and develop, and funding to be offered.

Petrobras saw in the cooperation with Chinese players three main benefits: a market to absorb its increasing crude exports, a partner in extraction, and a source of capital to invest in pre-salt production and to help fulfill its financial obligations in moments of economic crisis and international shortage of liquidity.

Based on this complementarian situation, the bilateral relationship has flourished. Petrobras' exports towards China between 2006 and 2019 were

multiplied by ten, and the Asian nation's share in the company's global crude exports has raised from 12% to 71%.

Three major Chinese oil companies, namely Sinopec, CNPC and CNOOC, have increasingly become important partners in production. The last two joined Petrobras in two landmarks of Brazil's pre-salt history: the auction of the Libra and Buzios oil fields, which are among the world's largest ones in terms of estimated barrels.

Engineering firms, equipment makers and service providers have also strengthened ties with Petrobras. The participation of Chinese shipyards in the Brazilian company's construction plans of drilling facilities – the largest ones in the world – is an important example. They were involved in the building of almost half of all Petrobras' vessels contracted abroad.

Chinese banks were also attentive to grasp opportunities in Petrobras' investment plans and became its main creditor in a relatively short time. Policy banks' China Development Bank (CDB) and Exim Bank (CHEXIM), commercial banks and multilateral financial institutions have provided loans which have helped to fund pre-salt exploration plans, foster exports and balance financial accounts. Moreover, economic statecraft tools, such as energy-backed loans and Chinese content purchase requirements, have been used to secure a steady flow of exports to China and to assist Chinese engineering firms expand their footprint in the Brazilian oil sector.

This article aims at analyzing the relationship between Petrobras and Chinese oil-related actors – traders, companies, service providers, and banks – over the last two decades, with a focus on trade, foreign direct investments (FDI), infrastructure projects, and loans. A complementarian situation between both sides have rendered tangible and mutual benefits. Yet, challenges are not negligible. Petrobras faces the challenge of maximizing the benefits of Chinese actors' participation in the company's business plans, but also minimizing the risks, such as over-dependence on one export destination partner.

2 REACHING HISTORICAL HEIGHTS: CHINA-PETROBRAS CRUDE OIL TRADE

The detection of huge untapped reserves in a hitherto unexplored area has changed the history of China and Petrobras relations. In August 2005, the first traces of pre-salt oil were found at the Santos Basin (ANP, 2015, p. 239) and, in October 2006, new and bigger detections were made (Petrobras, 2006a). In November 2007, the company formally announced the breakthrough: roughly 300 km off the coast, below the salt layer and from 5,000 to 7,000 meters deep in the Atlantic Ocean, the Tupi field – labelled Lula afterwards – was found

and regarded the world's biggest oil discovery since 2000 (Barbassa, 2007; Jia, 2009, p. 40).

Alongside with shale gas, pre-salt oil has become one of the two new and promising frontiers of oil and gas industry. Estimates about the totality of the new reserves differ substantially, but, in general, they range from 50 (Ribeiro, 2008) up to 176 billion barrels of a lighter and more commercially appreciated oil (Jones and Chaves, 2015).

In any of these scenarios, Brazil would enter soon in the small group of countries with big oil reserves. The International Energy Association (IEA) projected Brazil might become the fastest growing oil producer outside the Middle East. Oil production could reach 5.7 million barrels a day (mbd) by 2035, becoming the world's sixth major producer (Husar and Best, 2013, p. 14). Offshore production would correspond to 13% of the world's oil supply in the future and one third of it would come from Brazil (Cui, 2015, p. 47).

These prospects have promptly attracted attention from Chinese companies and policy-makers, which started to regard Brazil as a promising long-term oil source and a viable alternative in China's oil diplomacy (Xu, 2017a, p. 50). Since 1993, when the country became a net importer of oil,³ energy security was increasingly being considered a dangerous bottleneck for China's rapid economic growth (Cui, 2015, p. 46; Xu, 2017b, p. 34; Wu, Y., 2019, p. 4).

Indeed, China's imports dependency rate has soared over the last two decades, because of two concomitant phenomena: increasing demand and sluggish internal production. Between 2000 and 2019, Chinese oil demand has increased 195%, from 4.7 to 14.1 mbd, representing roughly 41% of global oil consumption growth. In 2003, China became the world's second largest consumer of oil, after the USA, and, in 2019, was responsible for roughly 14% of the world's consumption – it was 6% in 2000 (BP, 2020). During the same period, national production has grown slowly, from 3.3 to 3.8 mbd. It has even decreased since 2016, regaining force in 2019 (BP, 2020).

Because of this difference, imports have skyrocketed and their percentage of internal consumption have expanded from 30% (1.4 mbd of imports) to 72% (10.2 mbd) in the same period. In 2015, China became the world's largest crude oil importer (6.2 mbd). In 2019, it represented 22% of the global petroleum imports in value terms, a sharp increase comparing to 3.9% in 2000 (ITC, 2020). Under these circumstances, to increase imports and to diversify sources became the main mottos of China's energy diplomacy (Vasquez, 2018, p. 4; Hogenboom, 2017, p. 173).

3. Many years later, in 2007, China became a net importer of natural gas.

Brazil and Petrobras' newly found reserves and subsequent growing production and exports have fitted well in China's energy security strategy (Cui, 2015, p. 48; Becard and Macedo, 2014, p. 149; Xu, 2017b, p. 34; Liao, 2015, p. 90). Between 2006 and 2019, Brazil's crude oil production has grown from 1.8 mbd to 2.9 mbd (ANP, 2020b). Brazil became the tenth largest producer in the world in 2019, and Latin America's top oil producer since 2016. This is a completely different picture from 2000, when it was the 18th producer and second in its region.⁴

With internal consumption growing in a slower pace, more oil available meant more exports, which have increased from 0.4 mbd to 1.2 mbd in the same period. In 2019, Brazil was the world's 12th largest exporter and the first one in Latin America (ANP, 2020a), exporting 40% of its national production (ITC, 2020).

Over the years, Brazil's exceeding oil production went progressively to the Asian country. Brazilian exports to China have remarkably increased from 45 thousand barrels a day (tbd) in 2006 to 739 tbd in 2019. China's share of total exports also grew, from 12% to 63% in the same period (ITC, 2020).

TABLE 1
Brazil and Petrobras' crude exports to China (tbd)

Year	Brazil's world exports	Brazil's exports to China	China's share of total (%)	Petrobras' world exports	Petrobras' exports to China	China's share of total (%)
2006	368	45	12	335	40	12
2007	421	42	10	353	53	15
2008	433	56	13	439	66	15
2009	526	74	14	478	86	18
2010	632	161	25	497	144	29
2011	605	136	23	428	111	26
2012	549	125	23	364	120	33
2013	381	115	30	207	95	46
2014	519	107	21	232	95	41
2015	737	252	34	360	194	54
2016	798	296	37	387	217	56
2017	997	423	42	512	246	48
2018	1.123	624	56	428	297	70
2019	1.172	739	63	536	379	71

Source: Author's calculations based on data from Trade Map and Petrobras' annual reports.

Obs: There are inconsistencies between ANP and Petrobras' data for 2008 exports.

4. Available at: <<https://bit.ly/3s9V39u>>. Accessed on: July 7, 2020.

China became Brazil's main oil export market in 2010 and from 2013 on, beating the United States, which was the South American country's main export destination.⁵ Brazil's global exports have grown rapidly after 2013 – more than triple. This phenomenon was paralleled by a similar and faster export impetus towards the Asian country – expansion of more than six times since 2013 – and China's share has augmented steadily until 2019, when reached 63% (ITC, 2020).

This remarkable growth of Brazilian exports towards China would not be possible without Petrobras. Brazil's largest corporation is historically the country's main concessionaire, representing almost 74.1% of total production in 2019. As an operator, the company's production reached 93% of the total (ANP, 2020a).⁶ It is traditionally the chief exporter as well, although its percentage of national exports has been decreasing over time, from 91% in 2006 to 46% in 2019 (Petrobras, 2019a), essentially due to growing investments from other local and international firms in Brazil's upstream sector over the last few years.⁷ During this period, Petrobras' global exports have risen from 335 tbd to 536 tbd.

The growth of Petrobras' world exports was followed by a concomitant expansion of exports towards China, which have increased almost ten times, from 40 tbd to 379 tbd over the same period. From 2006 on, the Asian nation's part in the company's exports has raised from 12% to 71% in 2019, with the percentage increasing consistently after 2010 and substantially after 2015, when the country became Petrobras' chief destination market (Petrobras, 2019a). Intriguingly, the company's export dependency rate related to China was always higher than the Brazilian one, with the exception of 2006, when both were 12%. This suggests that other oil companies in Brazil might have a more diversified export market mix, depending less on the Asian country.

Due to China's overwhelming share in Brazil and Petrobras' crude exports, the bilateral trade complementarity in the oil sector receives different colors according to distinct authors. On the one hand, Chinese scholars tend to see it as a natural complementarity, which establishes a win-win scenario for both countries (Xu, 2017b, p. 34; Wu, Y., 2019, p. 1; Cui, 2017, p. 19). On the other hand, Brazilian researchers highlight the benefits of the partnership, but

5. The US growing internal shale gas production have helped the country to diminish its reliance on imports, which have decreased after 2012 (ITC, 2020), despite the fact that consumption kept rising (BP, 2020). With its chief crude destination importing less, Brazil – and Petrobras – needed to find alternative markets to swelling exports, a situation that fitted well in Beijing's desire to augment imports and diversify suppliers (Wu, W., 2019, p. 27; Xu, 2017a, p. 54; Rosito, 2017, p. 10; Hiratuka and Deos, 2019, p. 223).

6. These rates used to be higher in the past and have been progressively diminishing as other national and mostly foreign oil companies have started to desimbark in Brazil's upstream sector.

7. Accordingly, due to these growing investments from other local and international firms in Brazil's extraction and production sector, Petrobras' share in national production figures also diminished.

also stress the asymmetry of numbers and the overdependence of the country's exports to China (Becard and Macedo, 2014, p. 145; Cebri, 2018, p. 8).

The exponential growth of Petrobras's oil exports to China from 2015 on can also be partially explained by legal changes in China's oil and gas market. Until the end of 2014, only state-owned refineries were allowed to import petroleum. In an attempt to foster competition, the government started to allow private independent refiners – known as “teapots” – to directly access foreign markets through import quotas (Rosito, 2017, p. 10). In mid 2019, these refiners represented around 25% of the country's refining capacity, approximately 3 mbd. They comprise more than 50 medium and small refineries concentrated in the northeastern Shandong province. In June 2019, 41 plants were allowed to import oil with a quota of more than 2.5 mbd; 19 of these 41 refineries are partners of Petrobras (Petrobras, 2019b) and are increasingly buying from the company, such as the Hengli Group (China's Hengli..., 2018). These refineries have a special interest in Brazilian pre-salt oil, because it is low sulfur, such as the one from Angola, fitting these refineries requirements (Tan and Alper, 2018). Remarkably, after this new regulation entered into force, China's percentage in the firms' global exports has passed from 41% to 54% in 2014/15 and then to 76% in 2019.

With this new market opportunity, Petrobras inaugurated crude oil storage tanks at Qingdao Port, in Shandong province, aiming at improving negotiation margins in the local spot market (Egues, 2019). These teapots represented around one-third of the oil sold by Petrobras to Chinese clients by mid-2019 (Petrobras, 2019b).

3 JOINT-PRODUCTION: CHINA AND PETROBRAS INVESTMENT PROJECTS

Lured by the pre-salt discovery and the overall expansion of Brazil's oil sector, Chinese firms have directed increasing sums of FDI to the South American giant, opening a new chapter of China's “going out” policy in the bilateral oil cooperation. Besides natural resources to import, Brazil offered three more opportunities to Chinese firms: strategic assets to explore, economic opportunities to engineering and machinery companies and technologies to acquire and jointly develop. Because of Petrobras' dominant position in the national oil segment, it was the preferred target and partner in the majority of transactions, especially those related to pre-salt projects.

Firstly, Petrobras is worldwide known for its leading expertise in deepwater drilling, a gap that Chinese oil firms had and were willing to bridge (Husar and Best, 2013, p. 13; Xu, 2017b, p. 37; Cui, 2015, p. 48; Zhou, 2017, p. 31). In 2015, Brazil owned 172 registered patents of deep-sea exploration technology, and China, only 9 (Liu, 2015, p. 28). This knowledge could be used in China and

in other overseas extraction and production (E&P) projects, alluring Chinese oil firms to cooperate with Petrobras.

Moreover, Chinese oil firms saw in Brazil's potentialities an encouraging opportunity to expand overseas oil and gas acreage (IEA, 2014, p. 13); Jia, 2009, p. 40). Since they have started their international expansion in mid-2000s, later than their Western competitors, the best fields were already taken, left opportunities were in countries or projects politically, geologically, or economically riskier or demanding (Vasquez, 2019, p. 16; Hogenboom, 2017, p. 179; Wu, W., 2019, p. 25).⁸ In contrast, pre-salt was a new frontier, regulated under stable rules and open to international competition.

Other factors have helped to attract more Chinese investments to Brazil. The 2008 global financial crisis has given pocket-full Chinese firms a chance to increase investments when other international corporations were cutting down costs and selling assets (Hogenboom, 2017, p. 202). In Brazil, they benefitted mainly from Spanish, Portuguese and Danish companies' disinvestment plans. Furthermore, devaluation of Brazilian currency, domestic economic recession, and a corruption scandal that has affected all oil sector have opened a "window of opportunities" (Cui, 2017, p. 18), giving a chance to Chinese companies expand activities in Brazil (Leao and Puty, 2018, p. 3).

This situation has severely affected Petrobras, whose production has even decreased in some years, such as in 2012, 2013, 2017 and 2018. Some E&P expansion plans and financial recovery schemes were postponed (Petrobras, 2019a). Under these circumstances, Petrobras saw in technological, operational and financial partnerships a way to expand pre-salt projects. In this process, it has joined hands with Chinese firms, which kept investing in Brazil even in moments of economic and political uncertainty (Rosito, 2017, p. 10).

Petrobras-China partnership in FDI started in October 2010 through an indirect way. Sinopec bought 40% of Repsol Brasil in 2010, which already had several joint projects with Petrobras (Repsol..., 2010).⁹ Sinopec, indeed, had been trying to enter in Brazil's upstream segment long before. In March 2004, it signed a cooperation agreement with Petrobras to develop projects together (Ripardo, 2004).

8. Chinese oil companies have faced not few setbacks in their overseas investments, mostly in Middle East and Africa, such as kidnapping and murders of Chinese citizens in Nigeria, evacuation in South Sudan and reversal of contracts in Niger and Chad (IEA, 2014, p. 34).

9. The inaugural Chinese oil investment in Brazil was in May 2010, when Sinochem bought 40% of Peregrino field from Statoil (Pamplona, 2010). Differently from other three big Chinese firms – Sinopec, CNPC and CNOOC –, Sinochem is the only one that has not partnered with Petrobras yet.

TABLE 2
Petrobras and Sinopec companies' joint-projects
(In %)

Firms	Repsol-Sinopec	Sinopec	Petrogal	Petrobras
ES-M-414	11			88*
BM-POT-17			20	40*
BM-S-24 and BM-ES-31			20	80*
BM-PAMA-8		20		80*
C-M-539	35			30
AM-T-84			40	60*
POT-T-699			50	50*
BT-POT-29/36			50	50*
BM-PEPB-1, 2 e 3			20	80*
BM-POT-51			50*	50
Albacora Leste	10			90*
BM-S-50	20			60*
BM-S-51 and S-M-619/623	20			80*
BM-S-7	37			63*
Lapa	25			45*
Sapinhoá, Nordeste, Noroeste, Sudoeste	25			45*
Pre-salt Lula			10	65*
Uirapuru			14	30*
Atapu			10	42.5*

Source: Author's calculations based on the Brazilian National Agency of Petroleum, Natural Gas and Biofuels' (ANP) data.
Obs.: * Operator.

In the following year, two more transactions. In April, Sinopec bought a 20% participation in the Northeastern exploration blocks BM-PAMA-3 and BM-PAMA-8 from Petrobras (Petrobras..., 2011a), as part of the General Agreement of Technological Cooperation, signed during former president Dilma Rousseff visit to China (Schutte and Debone, 2017, p. 100).¹⁰ In November, the Chinese firm acquired 30% of Petrogal in 2011 (China's Sinopec..., 2012), which was already Petrobras' partner in several fields.

After these initial transactions, Sinopec have mainly cooperated with Petrobras through these two companies and got involved in several greenfield projects, most of them in pos-salt area, but some in pre-salt fields, such as Lula, Lapa, Uirapuru, Atapu and Sapinhoa. In the majority of the cases, Petrobras is the operator.

10. Sinopec sold the first block back to Petrobras in 2016 (Bitencourt, 2016).

Sinopec has equally announced plans to enter Brazil's downstream sector. In 2013, it signed a letter of intent with Petrobras to discuss the Premium Refinery I project, which has not advanced so far (Petrobras..., 2011b).

TABLE 3
Petrobras, CNOOC and CNPC's joint-projects
(In %)

Companies	Pre-salt			
	PP1 Libra	PP3 Peroba	PP6 Aram	CO Buzios
CNODC	10	20	20	5
CNOOC	10	-	-	5
Petrobras	40*	40*	80*	90*

Source: Author's calculations based on ANP's data.

Obs.: 1. PP refers to production sharing regime pre-salt auctions; and CO, to onerous assignment regime pre-salt auctions.

2. * Operator.

Differently from Sinopec, CNPC – operating always through its local subsidiary CNODC – and CNOOC have been involved in less projects with Petrobras – and with other companies as well –, but have participated in the two biggest pre-salt fields' auctions: Libra and Buzios.

Remarkably, Sinopec alike, CNPC has been prospecting opportunities in Brazil as early as 2005, when it signed a memorandum of understanding (MOU) with Petrobras to foster joint cooperation projects (Acordo..., 2005), but only in 2013 made a big investment. CNPC and CNOOC's first investment in upstream was their participation in the winning consortium of the Libra field. They got a 10% stake each, in cooperation with Petrobras (40%), Total (20%) and Shell (20%). Their offer has overshadowed other bids, including those from Repsol-Sinopec and Petrogal. Libra was then considered the largest pre-salt field, with an estimation of 25 billion barrels of oil. Its auction was the first one of the pre-salt era (Brasil..., 2013). It was also the first time that Chinese firms engaged directly in a greenfield E&P project, participating in a bidding process.¹¹

CNPC and CNOOC's cooperation was extended and they participated in the pre-salt Buzios field auction in late 2019, which is regarded the world's biggest deep-water oil field (Petrobras, 2020a). In a bidding process that involved several billion dollars and in which other local and international oil corporations refrained from joining, they got a 5% share each, and Petrobras, 90% (ANP, 2019a).

11. Interestingly, it was equally the first time that CNPC and CNOOC cooperated in an overseas project, before they only have collaborated with Sinopec separately (Becard and Macedo, 2014, p. 151; Hogenboom, 2017, p. 199).

Because of the importance and enormous size of both fields, these Chinese investments were regarded as milestones in the history of Chinese investments in Brazil's oil sector. Pre-salt fields' productivity is higher than pos-salt ones, and their production is still in the initial phase. With these two deals, CNPC and CNOOC may probably become one of the main oil producers in Brazil in the near future.

CNPC has also participated in two other pre-salt projects with Petrobras. In 2017, Petrobras (40%), BP Energy (40%) and CNODC (20%) won the Peroba field auction (Petrobras, 2017a). In late 2019, one day after the Buzios' bidding, Petrobras (80%) and CNODC (20%) won the exploration rights of the Aram field (ANP, 2019b).

Another CNPC subsidiary, PetroChina, has taken advantage of Petrobras' disinvestment plans. In 2013, it bought the Brazilian company's assets in Peru and became this country's largest oil producer (Petrobras conclui..., 2014).

CNPC has shown interest in cooperating with Petrobras in other projects and subsectors, like downstream. In 2017, they established a comprehensive partnership and started plans to build a refinery at the Petrochemical Complex of Rio de Janeiro – Comperj (Petrobras, 2017b). In 2018, this partnership was extended and CNPC agreed to buy a 20% participation in oil fields at the Marlim cluster (Petrobras, 2018a). Nonetheless, in December 2019, the economic feasibility study of the refinery has discouraged the projects' continuation and the partnership was ended (Petrobras, 2019c).

Another institution that benefited from Petrobras' disinvestment policies was China Investment Corporation (CIC). It entered a consortium that bought 90% of Petrobras' Nova Transportadora do Sudeste (NTS), which is responsible for the management of more than two thousand kilometers of gas pipelines in Southeastern Brazil (Petrobras, 2016a).

An important consequence of Chinese firms' mounting investments in Brazil and of their partnership with Petrobras in E&P projects is their increasing participation in national oil production. Between 2011 and 2019, Chinese firms' "equity" production¹² has raised from 5.5 mby to 32.2 mby – respectively 0.7% to 3.2% of total figures – a growth of 486%. In comparison, the numbers of other oil companies in Brazil have expanded 29% in the same period. Taken as a group, Chinese production was the third largest in 2019, after Petrobras and Shell (ANP, 2020b; Barbosa, 2021a). These numbers are expected to grow in the

12. "Equity" production (Economy and Levi, 2014, p. 58) reflects the real ownership stake of Chinese companies in each specific project. It takes into consideration the Chinese companies' share in each concessionaire and specific project. For example, Sinopec has 30% of Petrogal, which has 10% of Atapu field. Thus, Sinopec's part in Atapu would be around 3%.

near future, considering that some of the recent pre-salt investments have not yet reached production phase.

4 CHINA IN PETROBRAS' INFRASTRUCTURE EXPANSION PLANS

Not only in terms of FDI that Petrobras' relations with China have flourished over the last years. Chinese engineering firms have been increasingly involved in Petrobras' infrastructure projects, in different subsectors.¹³

The first project was the Southeast-Northeast Interconnection Gas Pipeline (hereinafter Gasene), which was Sinopec's inaugural deal in Brazil. After the signature of a MOU in September 2004 (Wertheim, 2004), the EPC contract was signed in 2006. Sinopec was awarded the construction of the first section, known as Gascav, which stretches over 300 km from Cabiunas (Rio de Janeiro state) to Vitoria (Espírito Santo state, or ES). A year later, Sinopec was contracted to build another section, Gascac, which is between Cacimbas (ES) and Catu (Bahia state), with 946 km (Petrobras, 2007a).

After the Gasene project, Sinopec was involved in other Petrobras' infrastructure projects. In 2011 and 2012, the Chinese firm was appointed to build a regasification terminal in Bahia state (TRBA) and the Fertilizer Unit III (UFN3) in Tres Lagoas (MS).¹⁴ In 2013, Sinopec was hired to perform pipeline services at Comperj (Petrobras, 2020b).

Other companies have followed Sinopec's path, such as BDG Brasil, Jiangsu Asian Star Anchor Chain (JASAC) and Shandong Kerui. JASAC has obtained six contracts from Petrobras since 2014, most of them related to anchoring services (Petrobras, 2020b). Shandong Kerui, in partnership with Potencial Engenharia, is finishing the construction of a natural gas processing unit (UPGN) at Comperj (Shandong..., 2017). Lastly, BDG has offered seismic data services in 2018 (Petrobras, 2020b).

Not only locally installed Chinese firms benefited from Petrobras' infrastructure projects. Chinese dockyards have played a relevant role in the company's floating, production, storage and offloading vessels' (FPSO) construction plans. Between 2000 and 2019, 20 out of 39 FPSO that were partially or entirely built abroad were done in Chinese harbors. Since 2014, almost all FPSO was in part or totality built or converted in Chinese yards (IHS Markit, 2019, p. 47). In 2019, four platforms were still under construction in the Asian country.

13. The definition of infrastructure project used here is: "a service between a customer and a supplier through a contract — usually the result of a bidding process, although the process may be by direct designation — and in which the ownership belongs to the customer" (Peters, 2020a, p. 2).

14. Both contracts have ended up in judicial litigation with Petrobras (Petrobras suspende..., 2014; Polito, 2018).

BOX 1

Petrobras' FPSO's built and under construction in China (2000-2019)

FPSO	Chinese shipyard	Status
Cidade de Ilhabela	CXG	Operational. Partially build abroad.
Cidade de Mangaratiba	COSCO and BOOMESC	Operational. Partially build abroad.
Cidade de Marica	CXG	Operational. Partially build abroad.
Cidade de Saquarema	CXG	Operational. Partially build abroad.
Cidade de Sao Paulo	COSCO and BOOMESC	Operational. Partially build abroad.
Cidade de Niteroi	COSCO	Operational. Entirely build abroad.
Cidade de Santos	COSCO	Operational. Entirely build abroad.
Angra dos Reis	COSCO	Operational. Entirely build abroad.
Itaguaí	COSCO and BOOMESC	Operational. Partially build abroad.
Caraguatatuba	DSIC	Operational. Entirely build abroad.
Campos de Goytacazes	COSCO, BOOMESC and Jutal	Operational. Partially build abroad.
P-63	COSCO	Operational. Partially build abroad.
P-67	COSCO Dalian and COOEC	Operational. Partially build abroad.
P-68 (Berbigao)	COSCO Dalian	Operational. Partially build abroad.
P-69	COSCO Dalian	Operational. Partially build abroad.
P-70 (Atapu 1)	COSCO Dalian and COOEC	Operational. Partially build abroad.
P-71	COSCO Dalian and YCRO	Operational. Partially build abroad.
P-75	COSCO Dalian and DSIC	Operational. Partially build abroad.
P-76	COSCO Dalian	Operational. Partially build abroad.
P-77	COSCO Dalian and DSIC	Operational. Partially build abroad.
Guanabara (Mero 1)	COSCO Dalian	Under construction.
Carioca (Sepia)	COSCO Dalian and BOOMESC	Under construction.
Sepetiba (Mero 2)	CMHI and BOOMESC	Under construction.
Almirante Barroso (Buzios 5)	COSCO Dalian	Under construction.

Source: Petrobras' annual reports.

In the wave of pre-salt discoveries, Petrobras announced in 2008 an ambitious plan to build several FPSO (Petrobras, 2008a). Mostly local Brazilian shipyards were hired and construction have started. Nevertheless, Brazil's subsequent economic crisis and a corruption scandal that affected all the country's oil sector have made Petrobras reassess its investment plans (Petrobras, 2014a, p. 25) and even incur in losses, such as the case of FPSO P-72 and P-73 (Petrobras, 2019d, p. 65).

In 2013, the Chinese dockyard COSCO – Petrobras' main Chinese constructor – assumed the construction of P-67's hull, after the Brazilian contractor Engevix was soaked into crisis (IHS Markit, 2019, p. 27). COSCO

was also involved in the manufacturing of other units, 19 in total, such as P-63, Cidade de Sao Paulo, Cidade de Mangaratiba, among others (Fitch, 2019, p. 33).

This situation was recurrent in the following years and more FPSO plans were transferred to Chinese docks. Engevix was also unable to deliver FPSO P-69 and P-71. It was not the only one that underwent financial problems and had to relinquish its contracts to Chinese counterparts. The consortium Integra, made by Mendes Junior and OSX, did not fulfill obligations related to FPSO P-67 and P-70 (Petrobras, 2017c; Chineses..., 2015). Inhauma yard, controlled by Queiroz Galvão, Iesa and Tecna, has experienced difficulties with units P-75, P-76 and P-77 (Petrobras, 2014b; Valle, 2014).

Due to the overall crisis in Brazilian shipyards, some FPSO were directly assigned to Chinese contractors, in order to keep Petrobras' schedule of pre-salt fields' production expansion. The flexibilization of local content requirements in Brazil has also prompted more transfers of construction projects to China (Leao and Puty, 2018, p. 27). For instance, minimal indigenous content for FPSO design, equipment and construction have decreased from 40% to 25% in 2015 (IHS Markit, 2019, p. 20).

Due to increasing participation in Petrobras' FPSO construction plans, Chinese shipbuilders have rapidly increased their learning curve and continued to expand globally. In the last several years, Brazil was the world's main buyer of FPSO and Petrobras, the largest FPSO purchaser (IHS Markit, 2019, p. 44). With all this huge demand, Chinese yards have gained experience, knowledge and reputation. They were almost exclusively dealing with Brazilian projects until 2014, but afterwards have started to operate in Central America and West Africa, for instance (IHS Markit, 2019, p. 48).

5 CHINA AS A WHITE KNIGHT? CHINESE LOANS TO PETROBRAS

Besides trade, investments and infrastructure projects, finance was another important pillar in Petrobras-China cooperation and was based upon a complementary situation. On the one hand, China has the financial might and appetite to secure increasing and regular flows of oil to its country. On the other hand, Brazil has the oil wealth and technical and operational means to explore it, but lacked capital to fund the new endeavor (Hogenboom, 2017, p. 173; Zhou, 2017, p. 29; Vasquez, 2019, p. 2).

Between 2007 and 2019, Chinese policy, commercial and multilateral banks have provided a total of 15 oil loans to Brazil, of which 14 had Petrobras as the direct borrower institution. They totaled USD 36.8 billion, of which only USD 31.7 billion was disbursed. USD 17 billion was related to energy-backed loans, and USD 6.75 billion had proven Chinese content purchase requirements.

TABLE 4
Chinese oil financing in Brazil (2007-2019)

Year	Lender	Borrower	US\$ million approved	US\$ million disbursed	EBL?	Chinese content?	Duration
2007	CDB	BNDES	750	750	No	Yes	-
2009	CDB	Petrobras	10000	7000	Yes	Yes	10
2013	BOC	Petrobras	1000	1000	-	-	-
2014	CDB	Petrobras	3000	3000	No	-	10
	BOC	Petrobras	500	500	-	-	-
2015	CDB	Petrobras	3500	3500	No	Yes	10
	CDB	Petrobras	1500	1500	No	Yes	10
	ICBC Leasing	Petrobras	2000	1000	No	-	10
2016	CHEXIM	Petrobras	1000	1000	-	Yes	3
	CDB	Petrobras	5000	5000	Yes	-	10
	Hai Feng	Petrobras	1000	1000	-	-	-
2017	CDB	Petrobras	5000	5000	Yes	-	10
2018	NDB	Petrobras	200	200	No	No	4
	BOC	Petrobras	500	500	-	-	5
2019	CHEXIM	Petrobras	750	714	-	-	2

Source: Author's calculations based on data from Petrobras' annual reports.

The first loan was the only one that Petrobras was not directly involved, but it was aimed at partially financing the construction of its Gasene pipeline, for which Sinopec was hired. It was agreed in 2007. The USD 750 million went to the Brazilian Development Bank (BNDES, initials in Portuguese), which was responsible for funding the rest of the project.

Policy banks' CDB and CHEXIM have provided the majority of the loans, respectively USD 28.7 billion and USD 1.75 billion. Apart from the Gasene one, CDB has offered funding in 2009 (USD 10 billion), 2014 (USD 3 billion), 2015 (USD 5 billion), 2016 (USD 5 billion) and 2017 (USD 5 billion). CHEXIM had only two loans with Petrobras, one in 2016 and another in late 2019.

Petrobras has also resorted to Chinese commercial banks, mainly Bank of China (BOC) and ICBC. The former has offered three loans of USD 2 billion in total. Through its subsidiary ICBC Leasing, the latter has provided one credit of USD 2 billion, aimed at leasing two of Petrobras' FPSO – P-52 and P-57 –, but only one ended being negotiated (Petrobras, 2015).

Lastly, the BRICS' New Development Bank (NDB) lent USD 200 million to Petrobras in 2018, which was used to adapt two of the company's refineries to environmental regulations (NDB, 2018).

Remarkably, looking at Petrobras-China finance cooperation from a broader perspective and, thus, comparing it to all oil-related Chinese loans since 2009 – the year of the first loan to the Brazilian company –, one sees that Petrobras plays an important role in China's global oil finance. According to the China's Global Energy Finance, a database developed by Boston University's Global Development Policy Center, between 2009 and 2019, CDB and CHEXIM have provided no less than USD 122.5 billion in credit to oil and gas projects around the world. Latin America has received USD 47.6 billion in the same period (Gallagher, 2020). Paralleling these numbers with those delivered from CDB and CHEXIM directly to Petrobras – USD 30.5 billion –, the Brazilian company would represent roughly 25% of the total and 64% of Latin American figures. In the world, Petrobras is second only to Russian oil companies, which have received more funds.

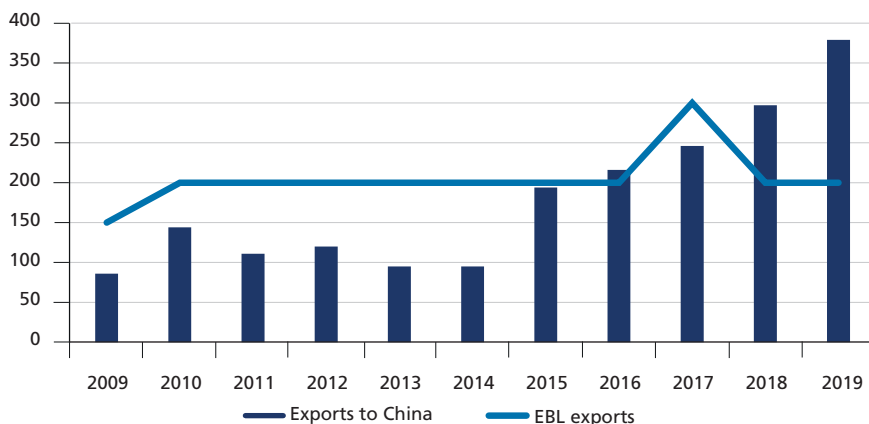
Petrobras-China finance cooperation has three main characteristics: energy-backed loans (EBL), Chinese content requirements, and countercyclical pattern.

In part of the loans, China has resorted to economic statecraft tools, to induce Petrobras to behave in a way beneficial to the country's energy security objectives and development targets. Energy-backed clauses have helped China to increase oil supplies and diversify import sources. Chinese content requirements are key to foster the internationalization of Chinese corporations, one of the main purposes of the “going out” policy (Barbosa, 2021b).

Loan-for-oil mechanisms have become recurrent instruments in China's oil diplomacy over the last years. They are normally a trilateral loan agreement between a bank, an oil company, and a trading firm in which repayment is not in cash; instead, this is done through oil sales. Under the contract, the oil company must sell a certain amount of barrels during a specific period, payment is sent directly to the bank (Alves, 2013, p. 101; Wu, W., 2019, p. 27). After the 2008 global crisis, China has extended this modality of credit to several oil-rich countries (IEA, 2017, p. 14). Estimates have shown that around 40% of all China's loans are guaranteed in oil sales (Gallagher et al., 2018, p. 317).

CDB and Petrobras have signed three energy-backed loans. The 2009 loan established an obligation to sell 150 tbd in 2009 and 200 tbd between 2010 and 2019 to Unipecc Asia, a Sinopec's subsidiary (Fitch, 2019, p. 86). The 2016 one was signed under similar conditions: preferential supply of 100 tbd for ten years to China National United Oil Corporation – subsidiary of CNPC –, China Zhenhua Oil and Chemchina Petrochemical – subsidiaries of ChemChina (Petrobras, 2016b). The 2017 loan replicated the previous one, but the buyer is Unipecc Asia (Samora, 2017).

GRAPH 1
Petrobras' exports to China (tbd)



Source: Author's calculations based on data from Petrobras' annual reports.

These three loans have given to China a continuous flow of Petrobras' oil over the years, but probably not according to contractual terms. Considering the contracts' conditions and pre-payments, the Brazilian company should have supplied 150 tbd in 2009, 200 tbd between 2010 and 2016, 300 tbd in 2017 and 200 tbd in 2018 and 2019. However, actual exports figures demonstrate that Petrobras probably have achieved the targets only in three occasions, in 2016, 2018 and 2019. In some years, such as in 2013 and 2014, yearly numbers were considerably below the predetermined ceiling of 200 tbd (Petrobras, 2019a). This situation was reported in media investigations (Trevisan, 2017) and confirmed in interviews with Petrobras' employees (Anonymous1, 2019).

Another common feature in Chinese loans to Petrobras is the presence of content requirements. These are another economic statecraft instrument that China makes use, in order to maneuver financial cooperation in a direction that fulfills its strategic goals. Under these terms, borrowing companies must spend part of the received credit in equipment or services provided by Chinese manufacturers, therefore fostering Chinese companies' global expansion and increasing their footprint in other countries. Most, if not all CDB's and CHEXIM's deals possess this kind of provision (Brito, Nunes and Pita, 2016). Usually, they are not disclosed, being difficult to track their existence and implementation through official channels. Nevertheless, the growing participation of Chinese service providers in Petrobras' infrastructure projects in the last few years might be a symptomatic consequence of this kind of clauses. Media reports have stated that the transfer of some FPSO plan to Chinese dockyards was partially due to loans' minimum content clauses (Rosa, 2017).

There were five loans with proven minimum content clauses. The first one was in 2007. Its percentage of 25% in Chinese goods and services was decided after long negotiations of BNDES first with CHEXIM and then with CDB, which replaced the former (Alves, 2013, p. 115). Part of the 2009 loan – USD 3 billion – should be used in purchasing Chinese equipment. This amount should be bigger, but it was reduced to comply with Brazilian stringent local content regulations (Alves, 2013, p. 121). However, Petrobras has decided not to withdraw this part of the deal.

Leaked information published by a Brazilian newspaper has shown that the two 2015 CDB loans required a minimum 60% of Chinese content. This clause has sparked disagreements between Petrobras and ANP, the organ that oversees the whole oil sector (Brito, Nunes and Pita, 2016; Alves, 2013, p. 108). Complying with a request from the Securities and Exchange Commission of Brazil, Petrobras made a public statement about the issue (Petrobras, 2016c). Lastly, CHEXIM's 2016 loan was related to contracts of purchase of equipment and goods that Petrobras has already signed with Chinese companies (Petrobras, 2016d).

Besides the abovementioned two characteristics, Chinese loans have another distinct feature. They were offered when Petrobras needed additional funding or was facing severe economic crisis, due to domestic and global factors. Other international financial institutions were reluctant to finance the company (Barbosa, 2021b).

After the discovery of pre-salt oil, Petrobras has developed ambitious plans. The geographical location of the new reserves demanded supplementary funds. The company's 2008-2012 Strategic Investment Plan foresaw USD 65 billion in E&P investments over the period, 32% more than the previous one (Petrobras, 2007b). The following planning document predicted higher disbursements: USD 105 billion between 2009-2013 (Petrobras, 2009).

However, the moment Petrobras started looking for financial support was not the best. The outburst of the 2008 global crisis led to a shrinkage of liquidity, world lending has declined. Alves says that, after an unsuccessful trip to USA and Japan in November 2008, Petrobras' CEO, Jose Sergio Gabrielli, went to Beijing, visited CDB and received a positive answer: a USD 10 billion loan (Alves, 2013, p. 116; Fitch, 2019, p. 87). From then on, at the same time that the company's financial solidity has progressively deteriorated, Chinese financial institutions have gradually strengthened ties with it.

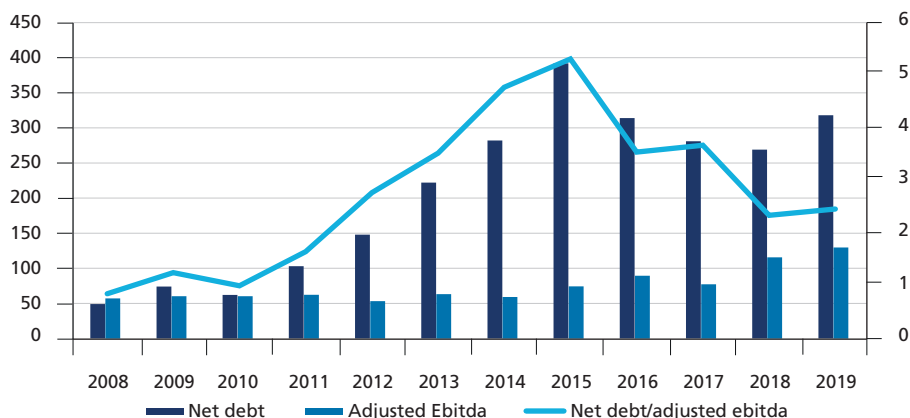
Since 2013, Brazil's turbulent political scenario and worsening economic situation were severely impacting Petrobras' activities and prospects. As part of the corruption investigation Car Wash Operation, criminal investigators have found an enormous scheme of money laundering and illegal payments involving

the company and some political circles, which became the largest corruption scandal in Latin American history (Petrobras, 2019d, p. 16). After this, Petrobras started to face an endless stream of challenges.

Several domestic and external lawsuits were filed against Petrobras, causing significant economic losses. An oil sector in tatters, due to economic recession and several companies' involvement in corruption investigations, has forced Petrobras to cancel and postpone plans. Suppliers had difficulties or were unable to deliver services and equipment, negatively affecting pre-salt investment plans and overall production, which decreased in 2011/2012 and in 2017/2018. Stock prices have melted down, decreasing from an annual average price of USD 24.9 in 2009 to USD 9.2 in 2015, when it started to recover slowly. In 2019, the average was of USD 27.2.¹⁵

Brazilian currency's depreciation over time – from an annual average of BRL 1.83 per dollar in 2008 to BRL 3.93 in 2019¹⁶ – has posed an additional challenge to Petrobras since it had a considerable part of its escalating debt in dollar terms. In 2015, it was 74% (Petrobras, 2014a, p. 75). Moreover, the cost of importing gasoline, other derivatives, equipment, and services have increased accordingly. To worsen the situation, oil prices were in downfall. After a peak of USD 112 per barrel in 2011/12, Brent oil rates reached USD 52, USD 43 and USD 54 between 2015 and 2017 respectively (BP, 2020).

GRAPH 2
Petrobras' debt evolution (BRL billion, 2008-2019)



Source: Author's calculation based on Petrobras' annual reports.

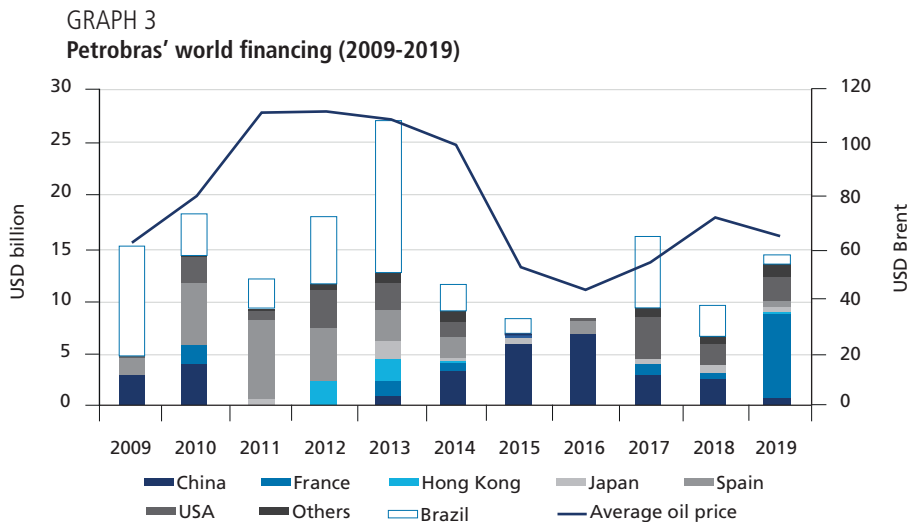
Obs.: There are inconsistencies between ANP and Petrobras' data for 2008 exports.

15. Available at: <<https://bit.ly/3pB8RrE>>. Accessed on: July 7, 2020.

16. Available at: <<https://bit.ly/3ax9Njv>>. Accessed on: July 7, 2020.

This succession of negative events has impacted Petrobras' indebtedness. Between 2008 and 2019, net debt has augmented from BRL 49 billion to BRL 318 billion (or USD 27 billion and USD 81 billion, according to yearly average exchange rates), reaching a peak of BRL 392 billion in 2015 (USD 118 billion at that year). At the same time, profitability was stable and has even decreased in some years. Ebitda has varied from from BRL 57 billion to BRL 129 billion (or USD 31 billion and USD 33 billion at those years). Therefore, coefficient net debt/ebitda has increased from 0.85 in 2008 to 5.31 in 2015 (Petrobras, 2019a). This situation of mounting debts coupled with sluggish incomes has raised concerns about the financial sustainability of the company. There were delays in the payments of wages at the end of 2014 and 2015, and worker strikes broke out in different parts of the country (Almeida, Ilha and Scrivano, 2015).

Of extreme importance was Moody's, Standard and Poor's and Fitch's choice to downgrade Petrobras' rating to non-investment grade in February 2015, September 2015 and May 2016 respectively (Petrobras, 2016e, p. 27). These decisions have nearly closed the company's access to financial markets when it needed the most.



Source: Author's calculation based upon data from Petrobras.

Obs.: Numbers include only banking finance, therefore do not involve capital market-related bond emissions (debentures etc.), stocks and others. It encompasses loans, financing, export credit notes, export prepayments, bank credit notes, transactions with export credit agencies (ECAs), leases, and others. Values shown are according to the date of disbursement. Only disbursed values are considered.

In addition, recipient companies were Petrobras S.A. and its subsidiaries PNBV, Petrobras International Finance Company, PIBV, Citepe, Petrobras Global Trading BV and Petrobras Logística de Exploração e Produção S.A. (PBLog). However, the following subsidiaries are not included: Transpetro, Ibritermo S.A., Arembepe Energia S.A., Innova S.A., Liquigas Distribuidora S.A., Energetica Camaçari Muricy S.A., Companhia Petroquímica de Pernambuco and TAG.

Loans from international banks include those offered by their Brazilian branches. For loans in currencies other than USD, the exchange rate used is that of the day of the transaction. Values are shown according to disbursement dates.

Like in 2009, Chinese financial institutions have acted as Petrobras' white knight. Since 2013, they started to direct increasingly sums of capital to the company. When national and international banks were refraining to assist, China has stepped in again, operating in a countercyclical pattern.¹⁷ Two examples depict this situation.

Firstly, from 2013 on, exactly when oil prices have started to slump, aggravating Petrobras' financial instability and driving traditional lenders away, Chinese banks have begun to inject money. Secondly, with the worsening of the company's indebtedness and capability to pay its debts, as reflected in the coefficient net debt/ebitda peak in 2015, Chinese financial institutions have provided more credit. Some authors affirm that these CDB's loans might have saved Petrobras from defaulting in the short run (Hogenboom, 2017, p. 201).¹⁸

Thanks to all these successive loans after 2009, Chinese banks have become Petrobras' main creditor in 2019, representing almost 20% of the total USD 160 billion that the company has borrowed over the period and surpassing traditional lenders, such as Spanish and North American financial institutions. Comparing only with international loans – USD 107 billion –, the USD 32 billion of Chinese disbursed loans would account for 30%.

6 CONCLUSION

An analysis of Petrobras' performance over the last two decades shows that it was influenced by one foreign country: China. Chinese oil traders, companies and banks have become relevant crude importers, production partners, service providers, and funding options. Besides being regarded a promising long-term oil source by them, the company's dominant position in Brazil's oil segment has made it the preferred partner of these Chinese actors in investments, infrastructure projects and oil-related loans in the country.

An important reason behind this deepening of bilateral relations is the revolution brought about the discovery of gigantic oil reserves in the pre-salt layer. After the announcement of the new frontier, Brazil and Petrobras have risen in the world's ranking of major oil producers and exporters. This progress was partially possible due to the cooperation with Chinese actors. Over time, China became Petrobras' main export market and the origin of the majority of its external loans, which helped the company to expand production activities.

17. Interestingly, Chinese banks have behaved in a different way than Chinese oil companies in Brazil. These have speeded up investments when oil prices were up or going up. Accordingly, they have invested less when oil rates fell (Barbosa, 2021a).

18. As a consequence of increasing loans from China, Petrobras' office in Beijing, which was inaugurated in 2004, started to focus its activities only on financial issues (Rosito, 2017, p. 11).

The progress of bilateral relations was based upon complementary circumstances, such as China's skyrocketing demand and imports and Petrobras' burgeoning production and exports. Chinese oil firms' internationalization push, Petrobras' deteriorating financial stability, and Brazil's oil sector overall crisis are other important factors.

However, beyond complementarity, Petrobras-China oil cooperation has significant challenges, the biggest being an asymmetric interdependence. China's share of Petrobras' crude exports was 71% in 2019. Moreover, the obligation of exporting specific quantities of oil under energy-backed loans might have limited the company's flexibility to find better deals elsewhere or even inside China, with independent refiners for example.

Petrobras and China have played key roles in each other's strategic interests over the last years. Based upon the bilateral long-term commitments made and the current mutual complementarities, relations are poised to keep growing in all four pillars in the future.

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