

# State-owned and multinational enterprises partnership as an import substitution strategy: A narrative ARDL approach to the case of *oil contracts* in Argentina (1958-1962)

Manuel Máximo Cruz  
Korean Development Institute School  
manuelcruz@kdis.ac.kr

Santiago José Gahn  
University of Bari  
santiago.gahn@uniba.it

Guilherme Spinato Morlin  
University of Pisa  
guilherme.morlin@gmail.com

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## Abstract

To avoid balance of payments crises, two Argentinian presidents tried to make deals (*'oil contracts'*) with multinationals to transfer technology and know-how to *YPF*, which is a state-owned company in the oil sector. The aim was to substitute imports. The 'oil nationalism' doctrine opposed these agreements, arguing that multinational companies are a threat to the national security. In both cases, the story ended in a coup d'état, first in the period 1954/1955 (against President Juan Domingo Perón) and the second in 1962/1963 (against President Arturo Frondizi). Based on a demand-led growth model in small open economies, we show that the process of import substitution led by government agreements with multinational firms can result in an increase of national production. Using an *original* dataset, we corroborate this theoretical result by applying a narrative ARDL approach to the Argentinean experience (1958-1962), where a government policy to promote technological transfer, from multinational firms to *YPF*, to substitute imports was in place. We conclude that the *oil contracts* were successful.

*JEL classification:* E22, F21, F23, G31, H54, L16, L52, N46, O14

*Keywords:* Argentina, economic development, Foreign Direct Investment, MNEs, SOEs, import substitution policies, industrial policy, petroleum sector, structural change.

... We must achieve energy self-sufficiency, based on the exploitation of the oil and coal fields and the use of hydroelectric power. This will allow us to gradually substitute fuel imports ...

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*Fronidizi's inaugural message,  
Legislative Assembly, 1 May  
1958*

## 1. Introduction

Underdeveloped countries in general constantly try to avoid balance of payments crises, which are generally contractionary and recessionary (Diaz Alejandro, 1965; Krugman and Taylor, 1978). To this end, they carry out a series of measures ranging from exchange controls, international swaps, and loans to international lending agencies, among others. On the productive side, they try to carry out 'productive' policies. In the 1950s and 1960s, it was common for countries to carry out industrial policies, introduce import substitution plans of 5 or 10 years and promote exports (Irwin, 2021). These policies included the possibility of agreements between state-owned and multinational companies, with the aim of transferring technology and know-how. This has proven to have political constraints, above all because it changes the internal status-quo, especially due to the potential political changes derived from the change in the productive structure (Chang and Amsden, 1994; Whitfield and Buur, 2014), where some sectors can replace others as suppliers of foreign currency and the elites could be replaced with new ones.

To avoid balance of payments crises, two Argentinian presidents tried to make deals ('*oil contracts*') with multinationals to transfer technology and know-how to *YPF*, which is a state-owned company in the oil sector. President Juan Domingo Perón tried to carry out such agreements in 1954, but he failed due to the pushback of, even, the very same Peronist party he led. President Arturo Frondizi (1958-1962) was inspired by the policy designed by Perón and carried it out. It is clear that there were conflicting interests in the signing of these contracts. We group these opposing interests under the label 'oil nationalism'. Both experiences ended with a coup d'état. At least to our knowledge, no work has attempted

to analyse the effectiveness of *oil contracts* using long run datasets for oil production together with macroeconomic variables. Therefore, our research question is linked to whether these *oil contracts* with multinational companies had an effect on local production of oil. In particular, we analyse the period in which these contracts were actually carried out; that is, under Frondizi's government (1958-1962). It is important to understand this point, not only from a historical point of view but also to know if the *oil contracts* were effective or not; that is, to evaluate these attempts to know if it is a formula that could work in the future.

To determine the effectiveness of *oil contracts*, we first need to understand what the possible determinants of oil production are so that we can isolate the effects and not get spurious results. Consequently, a consistent theory of production is needed. With this goal in mind, we analyse what are the determinants of oil production. Unfortunately, most of the literature is focused on the supply-side, such as the studies researching the behavior of OPEC producers with regard to pricing strategies yet. Reiss (1990) concludes that the main determinants of oil production are the financial liquidity of the sector to invest, the maturity of long-term debt, the possibility of using oil as a collateral for loans and price changes, which can be influenced by deregulation, substitution and weather conditions. Kaufmann and Cleveland (2001) indicates that oil production shares stochastic trends with the decomposed price series, average costs, and prorating decisions. Henderson (2015) provides an analysis of the oil production determinants, such as the maturity of oil fields, the incorporation of Western technology, real prices for oil, exchange rate devaluation, the impact of sanctions on machinery imports, the access to capital markets by Russian oil companies and tax regime adjustments. According to Cologni and Manera (2014), there seems to be a cointegration relationship between oil production, world oil demand and oil prices. Few papers, if any, attempt to analyse oil production's determinants from a Keynesian perspective in peripheral economies. In part, this paper attempts to fill this gap with the help of a Keynesian model of growth in economies that are open to international trade.

Section 2 will briefly review the history of domestic oil production and the 'oil nationalism' doctrine, which opposes national State agreements with foreign oil companies. We then present a growth model for small economies that are open to international trade in Section 3, based on Morlin (2022), showing that there is a positive effect of a state-led import substitution policy on the level of domestic production. This contribution is enriched in Section 4 by econometric evidence using a novel database to analyse these *oil contracts*: we use the *oil contracts*' execution period, 1958-1962, to identify the policy in line with the literature on narrative approach (Romer and Romer, 2010; Mertens and Ravn, 2014; Alesina et al.,

2019; Alesina et al., 2020; Ryan, 2020; Metelli and Natoli, 2021) in an ARDL model. Our main results from the performed tests are that, even when controlling for autonomous demand (external demand and government’s expenditures), the *oil contracts* during Frondizi’s government were been profoundly effective to increase national oil-production in Argentina. In the final section, we will draw our conclusions.

## 2. Historical narrative of *oil contracts* in Argentina<sup>1</sup>

Argentina started developing its oil sector in an age when coal was still the dominant source of energy. From 1886 through to 1891, a private company, the ‘Compañía Mendocina Exploradora de Petr leo’, developed the first oil wells (Yacimientos Petrol feros Fiscales, 1958). In 1907, oil was found in great amounts (Gadano, 2006) and the President at that time issued a decree that created a national oil reserve (Solberg, 1986). Three years after the discovery of oil, the world’s first state-owned oil company was created (Solberg, 1982). Even so, for many years to come, the State did not commit the sufficient energy to develop this resource.

The First World War (1914-1918) sunk Argentina into a severe energy crisis. Consequently, the development of a state-owned oil company became a top priority. For this purpose, President Marcelo Torcuato de Alvear<sup>2</sup> named nationalist colonel Mosconi<sup>3</sup> as the head of the company in 1922. Argentina became the first country outside the USSR to have a completely vertically integrated state-run oil company. Yacimientos Petrol feros Fiscales, which was also known by the acronym *YPF* (Solberg, 1982), launched a strategic plan of investments aiming to cover all areas of the oil industry: production, exploration, refinement and distribution at competitive prices, and making it fully autonomous from the central government, with the exception of its annual budget and major purchases that required credit. Nevertheless, oil exploration lagged behind because the company did not have enough financial resources to put forward a large exploratory drilling plan (therefore, limited scale of production). By a decree issued in 1924, President Alvear turned all parts of oil-rich Patagonia<sup>4</sup> into a reserve

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<sup>1</sup>For reasons of length, many details were excluded and are present in Cruz and Gahn (2021), where the reader can find an extensive analysis of the international and diplomatic relations of the period related to the oil sector.

<sup>2</sup>Marcelo T. de Alvear was a lawyer, descendant of one of Argentina’s founding fathers and a representative of Argentina’s *elite*.

<sup>3</sup>Enrique Mosconi, while in charge of the Argentine Army War Arsenals during the war, understood the threat to national security posed by dependence on imported equipment, thus concluding that the country needed to industrialise. He later served as the director of the Army Aeronautic Service, finding the same problem as the country relied on imported fuel for the military aviation (Solberg, 2001).

<sup>4</sup>A region located in the south of Argentina.

to be exploited only by the State, and therefore *limiting the reach of foreign direct investment in the area* (Solberg, 1982).

Mistrust of foreign direct investment in the oil sector had been growing since 1913<sup>5</sup>. The leading figure that would settle the idea that oil should be a State monopoly was none other than Mosconi. He thought that industrialisation and oil self-sufficiency were intertwined and foreign oil companies only aimed to import oil or establish reserves in Argentina for export, leaving no choice but to develop the industry by the State. As mentioned earlier, the Great War showed the need for self-sufficiency and reinforced this position. The military, worried about the implications for sovereignty, took a central role in pushing the State to lead the oil industry and other basic sectors (Solberg, 2001) with a nationalist position, that was also growing among civilians. The method that the head of *YPF* chose to spread support for the State monopoly was first to create a distribution network with gas stations, not only in the wealthy capital but also in the interior provinces where the private companies did not see enough profit; and second lower the prices of fuel below the international price, while maintaining a uniform national price (Gadano, 2006; Solberg, 1982, 2001).<sup>6</sup> This policy was extremely popular and, together with public speeches against oil multinationals, would become a part of nationalist thinking from then on.

President Yrigoyen (1916-1922, 1928-1930) sided with the oil nationalists, interpreting that he would get broad political support from the urban middle classes that saw employment opportunities at *YPF* and who benefited from the low fuel prices. In 1928, Yrigoyen was reelected, and went on to propose the nationalisation of private oil companies. As the composition of the Senate was the limit for the bill, Yrigoyen intervened many provinces to change the authorities. This led to a legitimacy crisis, the mobilisation of the opposition parties, which (combined with the effects of the Great Depression of 1929) would lead to the weakening of his political support and his ousted from the presidency in 1930 (Buchanan, 1973; Gadano, 2006; Solberg, 1982). To oil nationalists, this coup would become an indication of the power of the oil multinationals (Gadano, 2006; Buchanan, 1973).<sup>7</sup> It was expected that

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<sup>5</sup>In 1913, engineer Luis A. Huergo, a prestigious national figure who led the General Directorate for Oil Exploitation of Comodoro Rivadavia, published a manifesto denouncing the threat that the Standard Oil posed over the country, depicting it as a criminal organisation, which left a lasting impression on the public (Gadano, 2006). Scandals on its pricing policy and tax evasion would follow over the next few years (Solberg, 1986, 2001).

<sup>6</sup>While the low fuel prices might have helped spawn industrialisation, it also prevented *YPF* from having enough resources to invest in exploration (Solberg, 1982).

<sup>7</sup>In the long run, this ideology would permeate to all sides of the political spectrum depending on the economic condition, whether they were right or left (Berrios, Marak & Morgenstern, 2011).

the coup leaders would let foreign oil companies make deals with the provinces and limit YPF's operations. The former happened, and the foreign oil companies duplicated their oil production in the next two years, yet the latter was not the case (Solberg, 1986).

When the Second World War begun, Argentina had its machinery's supply heavily curtailed. When the war ended, the US' Economic Cooperation Administration (*ECA*) in charge of the "Marshall Plan" prevented countries receiving dollars from the programme to use these funds to import anything from Argentina (Escudé, 1980, 2006). Similar what happened during WWI, Argentina had to resort to burning corn and other substitutes of fuel due to the shortage in oil production (Kaplan, 1973; Perón & Santos, 1955). At the same time, the country had large amounts of foreign currency reserves and Europeans were in debt. The repayment of these debts in international currency barely happened because many European countries declared the inconvertibility of their national currencies and refused to pay in US dollars, which Argentina needed in order to proceed with its industrialisation plan<sup>8</sup> (Escudé, 1980).

The interests of the Great Powers in combination with huge mistakes in Argentina's foreign policy, the prosecution of the five-year plan aiming for industrialisation (which was forced to focus mainly on light industries), the increase in workers' incomes, and a shortage of supplies for oil extraction caused the systematic growth in the share of imported oil over total consumption (Instituto Argentino del Petróleo y el Gas - IAPG, 2007) between 1945 and 1950, turning almost half of all the oil consumed. Moreover, the share of fuel and lubricant imports ton the total share of imports and as a share of exports (Ferrerres, 2010) started to grow from 1945, and would keep on growing until 1957 (see Figure 1). Investment in the oil sector, where drilling is the main component, was dwindling until 1958 (see Figure 2).<sup>9</sup>

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<sup>8</sup>The guidelines on the bilateral trade with Argentina that the then Acting US Secretary of State, Edward L. Reed commanded to the Chargé in Argentina (1971) on 2 March 1945, stated that: 'Export Policy I. Export of capital goods should be kept at present minimums. It is essential not to permit the expansion of Argentine heavy industry'.

<sup>9</sup>US Ambassador Messersmith (1971, emphasis added in *italics*) noted in a secret message to the Secretary of State in 1947, that "In view of the importance of fuel, and particularly petroleum, in the Argentine economy, there were definite indications that the *Argentine Government was viewing the problems of the foreign oil companies with greater understanding*, and particularly in view of the fact that the Government was much dissatisfied with the operations of the Government company Yacimientos Petrolíferos Fiscales (YPF)."

Fig. 1. Fuel and lubricant imports as a share of total imports and exports (1922-1972)

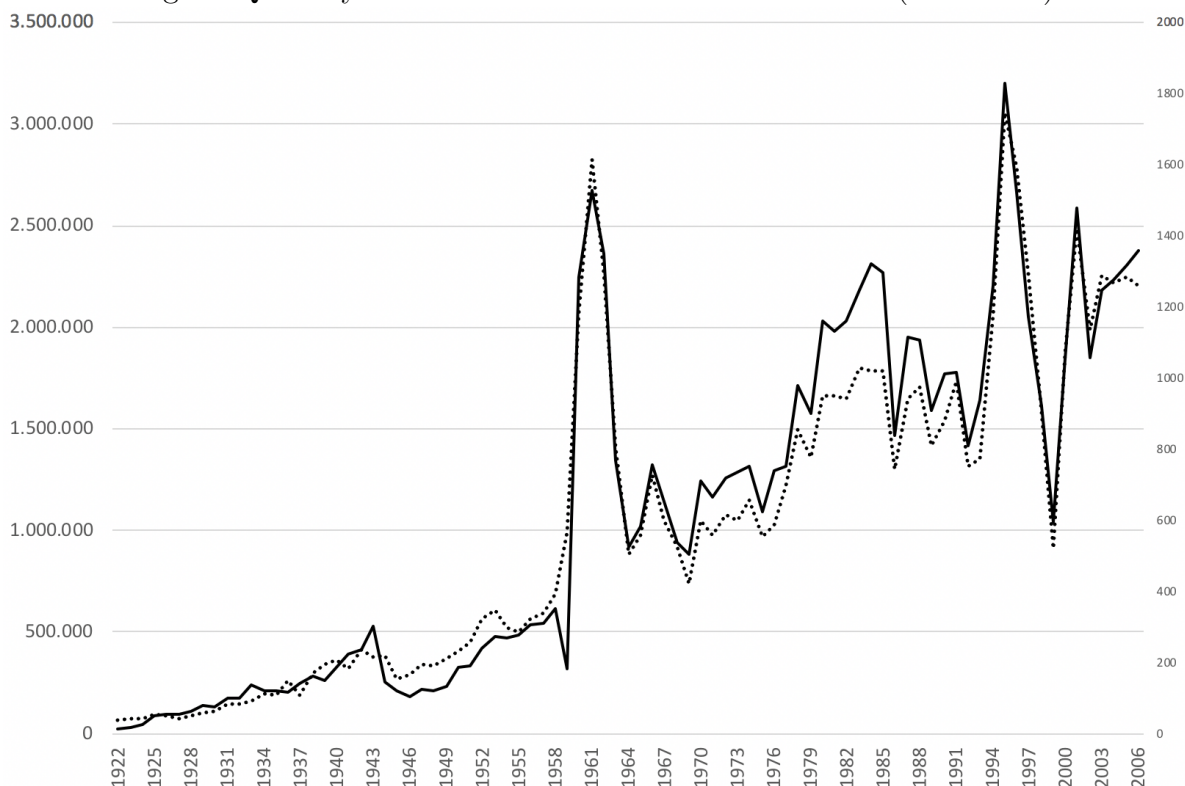


Note: Fuel and lubricants as a share of total imports (solid line) and as a share of exports (dashed line). Sources: Own elaboration based on Ferreres (2010, p. 723-725).

The harm done by the ECA was ‘irreparable’ and the economic situation could ‘lead to a catastrophe’ (Tewksbury, 1979). Consequently, a balance of payments crisis was close. The US granted a loan in 1950 (Escudé, 1980), yet the structural situation was unaltered and worsened by droughts in 1950 and 1952, and to a lesser extent floods in 1951 (Scarpati & Capriolo, 2013). This made the situation only more desperate because it produced a fall in exports of around 50%. By 1954, the country’s foreign currency reserves were exhausted from paying for the oil imports, which forced the government to review its nationalistic position for a realist perspective. As Buchanan harshly remarked (1973), ‘Petroleum is a high risk, capital intensive industry which demands sophisticated technical skills, and Argentina simply lacked the capital and the technological resources to attain fuel autonomy without foreign investment.’ In 1955 President Perón issued a decree (Perón, Borlenghi & Santos, 1955). This decree clearly states that because the Second Five-Year Plan aimed for national fuel self-sufficiency, which was regarded fundamental for the ‘economic growth, the country’s well-being and national security’, the Ministry of Industry was granted authorisation to start negotiations with the California Argentina de Petróleos S.A. (*CAPSA*), the Argentine subsidiary of the Standard Oil, over a contract for exploration, search and drilling in a location to be determined. An additional contract (Santos, 1955) obliged *YPF* to share the geological and geophysical information with *CAPSA*. Two weeks later, another decree

(Perón & Santos, 1955) approved the terms of the negotiation recognising that ‘in order to dispense with imports as quickly as circumstances require, the cooperation of capital and private technical resources is essential.’ It was then forwarded to Congress for its approval.

Fig. 2. Quantity of meters drilled and finished oil wells (1922-2006)



Note: Quantity of meters drilled (solid line left axis) and quantity of finished oil wells (dashed line right axis). Sources: Own elaboration based on: Dirección General de Minas, Geología e Hidrología (1927, 1929, 1931a), Velasco (2012), State’s oil statistical reports published between 1960 and 1999.

The opposition to the contract pointed out that it was a ‘typical unconscionable contract’, a ‘capitulation’ and accused the government of giving off the country’s sovereignty (Silenzi de Stagni, 1955). Perón’s fears<sup>10</sup> became reality and Congress, even part of the Peronist party, ended up rejecting the contract with the California Argentina S.A. This weakened Perón’s power as president and 4 months later he would suffer a military coup that maintained the

<sup>10</sup>Perón told the US Ambassador in 1947 that “conversations with congressional leaders had convinced him that it would be impossible for him to get the Argentine Congress to adopt a law which would permit foreign companies [i.e. American companies] to carry out exploration dealings and the development of Argentina’s petroleum resources.” (Perón et al., 1971).



industry's status quo.

After the 1955 coup, the Peronist party was banned and could not participate in elections until 1973. Hence, the democratic rival (the Radical Party led by Arturo Frondizi) became the dominant actor in elections.<sup>11</sup> In 1954, as a lawyer specialised in oil related issues, Frondizi published 'Oil and Politics' (1955), where he criticised the Peronist government's negotiations with foreign oil companies. Among other things, he wrote that

The main obstacle to the country's progress is its close dependence on the import of fuel and steel. That dependency weakens our capacity for self-determination and jeopardizes our sovereignty, especially in the event of a global war crisis. Argentina currently imports around 65% of the liquid fuels it consumes. On about 14 million cubic meters, consumed in 1957, approximately 10 million came from abroad.

Frondizi, 2011a, p. 106

Frondizi's oil nationalist stance and his view on the role of foreign investment was deemed to be changed mainly by Frigerio's<sup>12</sup> persuasive arguments in the years prior to his election as President of Argentina. The theory developed by Frigerio concluded that the modern world saw a process of concentration and centralisation, disregard of the system of political economy, be it socialist or capitalist, which transcended the Nation State. Because it caused the internationalisation of capital, it triggered a fundamental contradiction with it (Frigerio, 1981). Given that multinational corporations would try to dissolve the Nation State so as to create economies of scale that cover the whole of national territories, it would seem that there was a contradiction between a complete economic development of the nation (that would let it be independent of transnational strategies) and foreign investments (Frigerio, 1981). Nonetheless, Frigerio considered that foreign investment by multinational corporations was needed and unavoidable for the Nation to develop because they were the holders of the most advanced technique of production (Frigerio, 1981). The alternative to use it in a national strategy would lie in other contradictions that would leave room for this to happen. First, competition still exists and it is not intended that the Nation State should work for the monopoly but build a relationship with multinationals in line with the national interest (Frigerio, 1981). Second, competition among Great Powers in a setting of 'pacific

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<sup>11</sup>In 1957, the Radical Party was divided between the *Unión Cívica Radical del Pueblo*, which was led by Ricardo Balbín (and later by Arturo Illia), with a conservative and anti-Peronist orientation, and the *Unión Cívica Radical Intransigente*, which was led by Arturo Frondizi who in 1956 associated with Rogelio Frigerio (a charismatic businessman who elaborated an economic development theory, strongly influenced by Arghiri Emmanuel, that would be known as 'Developmentalism') and would become his chief economic adviser (Szusterman, 1993).

<sup>12</sup>See previous footnote.

co-existence' created favourable circumstances that, from the point of view of the Western world, imposed the promotion of economic development (Frigerio, 1981). As summed up by Arturo Sábato, an oil engineer who became the President's chargé at *YPF* in the years of his administration, the main turn made by the Developmentalist doctrine was the thesis that:

'Capital - national or foreign - is colonialist when it is dedicated to groups that strengthen dependency and, on the other hand, it is liberating when it is invested in the basic sectors of an economy.'

Sábato, 1963, pp. 17–18

As a result, Frigerio divided nationalism into two: 'nationalism of objectives' and 'nationalism of means', the latter rejecting any foreign investment as colonialist but having no issues with letting any amount of oil to be imported rather than to be extracted with non-State resources. Hence, with regard to oil, Frigerio took the failed Peronist contract with California Argentina de Petróleos S.A. as a model to work with foreign oil companies. The other issue that forced Frondizi to change his mind was the situation the country was in when he came to power.<sup>13</sup>

The political situation was unstable throughout the whole period because the government 'had to overcome multiple attempts at coups d'état, since there were 38 'situations' in 40 months' (Frigerio, 1981). As part of the developmental strategy, the government limited imports and encouraged the settlement of industries in the country through two laws that were passed before the end of 1958, in which investors were assured that they would be able to convert their profits into dollars and send them abroad, one relative to the establishment of foreign capital and the other for industrial promotion (Grenoville, 2002). It has to be noted that the oil self-sufficiency was only a part of the government's plans, which included steel mills, dams and electricity production, chemicals, vehicles, machinery for agriculture and also the building of roads and connectivity throughout the entire land, among others (Frigerio, 1960; Frondizi, 2011b).

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<sup>13</sup>In a speech titled 'The Battle for Oil' in 1958 he stated that (1) the Central Bank had foreign currency and gold valued U\$S 250 million and, between his inauguration 1 May and 31 December, the country needed U\$S 645 million to pay for its imports and obligations; (2) that the country needed oil self-sufficiency, which could be achieved thanks to its proved oil reserves and *YPF*'s know-how to do the technical analysis; (3) that this was of the utmost importance so that the country could use foreign currency to import machinery and equipment for industrialisation; and (4) that foreign oil companies were essential to extract as much oil as possible in the least time required and they would do business with *YPF* in the form of contracts (Frondizi, 2011a).

*Oil contracts* were real. After 60 days, the government had signed several different types of contracts: five were exploration contracts with the companies bearing the mining risk, and five other in exploitation or development to boost production. The companies started supplying oil only 6 months after the contracts were signed (Frigerio, 1979). It is worth mentioning that Frondizi also had negotiations with the USSR, who financed oil equipment (Walcher, 2013, p. 32). The growth in production and exploration had the effect of diminishing foreign oil from 32,62% of total imports in 1957 to 4,2% in 1963 (IAPG, 2007; see Figure 2). The companies had to provide everything that was required to advance an oil operation, from staff and equipment to the planning of work. While *YPF* maintained the ownership of the wells, its production and would bear the burden of most taxes. In all cases but one, contracts were subject to Argentine courts of law and listed force majeure situations that would suspend rights and obligation while the situation lasted (Müller & Stern, 1989). While in the period 1922-1957 the drilling count amounted 5930, during 1958-1963 the drilling count reached 5862. This means that in five years, almost as much as the previous 35 years of drilling took place. The oil production, which had been growing at an average rate of growth of 3,99% yearly, with ups and downs, dramatically changed in the period 1958-1962 and it grew at an average annual rate of growth of 23,82%. Crude oil production that took 19 years to duplicate in the period 1938-1957, took just 5 years to grow 247,75% (Bénichou, L., Ringenbach, C., & Kahraman, Z., 2020 and IAPG, 2007).

Similar to what happened when Perón tried making a contract with *CAPSA*, the oil nationalist rhetoric reached levels of mass hysteria led by the fraction that had opposed Frondizi. Prominent Argentines condemned the contracts as outrageous handouts to foreign companies and, once again, the opposition undertook a nationalist campaign accusing the government of ‘treason to the homeland’. Critics denounced, among other things, that the large remittances of companies’ profits nullified the dollar-savings that were made by the increase in production<sup>14</sup>, and that payments in dollars that *YPF* had to do for the contractors’ oil jeopardised the finances of the public company. In addition, because the President’s chargé had negotiated the contracts secretly and without the consent of Congress, this was made one of the main criticisms and an argument that increased the nationalist’s suspicion (Conesa, 1963; Illia, 1964; Solberg, 1986). It was counter-argued that this was legal according to the the Argentine administrative law. Furthermore, because *YPF* had the legal authority to do this sort of business, due to the situation the country was in 1958, there was no time to go through a bidding process. For reference, in 1960 when *YPF* used a public bidding process

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<sup>14</sup>The contracts forced the Central Bank of Argentina and the Industrial Credit Bank to ‘provide free access to their exchange reserves’ (Luce, 1966).

to build a lubricant's plant, it ended up not being built, even after three years (Sábato, 1963).

Finally, critics also pleaded that the price set for the oil extracted and delivered to *YPF* by the contractors was up to five times over *YPF*'s costs of production and that there was no limit to over-exploitation, which would lead to *YPF* paying for oil that it could not store nor transport, leading to it being lost by evaporation (Luce, 1966). However, according to Sábato (1963), the oil extracted was considerably cheaper than the cost of an imported equivalent, and also in relation to *YPF*'s cost.

Weakened and cornered, especially after allowing the Peronist party to run in an election they ended up winning, in March 1962 Frondizi finally lost the confidence of the military, which then carried out a coup (Walcher, 2013).

Even though Arturo Illia (challenging Presidential candidate) thought that *YPF* did not have what was needed to achieve and sustain oil self-sufficiency (Walcher, 2013), the presidential campaign centered around the invalidity of the *oil contracts*, making it almost impossible for him to depart from this electoral promise without having to confront mass opposition (Walcher, 2013). All of the arguments from the oil nationalists were written down in the considerations of the *annulment* decree 744/63 15 November 1963.

To list some possible interest groups that would benefit from reverting the situation to the previous status-quo, aside from *YPF*, a company that saw its traditional place threatened by the foreign oil companies, one of the parties who were most interested in the contract's annulment fell on part of the contractors themselves because this would let them resort to a court of law and demand the compensation, which was set in the contracts due to the government's interference. Another possibility is elaborated by Mairal (2019), who argues that traditional trade relations with the UK would have been at risk due to the oil self-sufficiency because the trade agreements signed between the two countries in 1949 were of barter between beef, on the one hand, and fuel, on the other hand. Given that the beef industry held an important political leverage in the People's Radical Party (opposition party of Frondizi), and given the fact that almost half of exports during the 1955-1960 period were beef, of which 63%-88% went to the UK, it would make sense to think of it as one interest group lobbying against the contracts; however, it might be too far-fetched to put it as the key element. Finally, the key player whose interest had been harmed by the country's oil self-sufficiency were the oil importers.

The historical context plays a decisive role in the analysis of public policies. After understanding which sectors were in favour and against oil contracts and why, we are now in a position to verify the effectiveness of these contracts with the help of this narrative. To do this, in Section 3 we extend a model of a small open economy based on Morlin (2022), which will provide a theoretical framework for the econometric exercise performed in Section 4.

### 3. Import substitution policies in a small open economy growth model

Growth in Latin America from the post-war to the 1970s is often considered to have relied exclusively on import substitution policies. However, these policies were an integrated part of broader industrialisation strategies, which called for an important role of the state in economic development. Import substitution was crucial to allow for the growth of domestic demand in periods of a binding external constraint. In Latin America as a whole, ‘periods in which foreign exchange was in greater supply were invariably also times when domestic demand grew more rapidly (1945-57 and 1967-74)’ (Bértola and Ocampo, 2012). Still, ‘Balance-of-payments policies also played an important role in buoying the growth of domestic demand in 1957-67. [...] Thus, within the balance-of-payments constraints existing at that time, the industrialization process can be said to have galvanized domestic demand.’ (Bértola and Ocampo, 2012).

Domestic demand plays a fundamental role in growth, even in small open economies (Morlin, 2022). However, the growth of domestic demand may be prevented by the Balance of Payments constraint (Thirlwall, 1979).<sup>15</sup> Oil is a basic commodity in the sense proposed by Sraffa (1960). Therefore, any increase in final demand will increase the demand for oil, which meets the supply by imports and domestic production. If domestic production cannot meet demand due to the lack of a competitive technique, then imports grow in tandem with final demand. Oil contracts filled this gap by supporting the growth of oil production with advanced techniques. By reducing the dependence for imported oil, the contracts also allowed for a faster growth of demand.

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<sup>15</sup>Balance of Payments constrained growth models often provide the policy recommendation of industrial and innovation policies. These policies tend to increase the income elasticity of exports, thus relaxing the external constraint and allowing for faster economic growth (Araujo and Teixeira 2021; Bottega and Romero 2021). In this section, we focus on import substitution policies, which are relevant for the analysis of the *oil contracts* in Argentina.

We will show how import substitution policies may boost economic growth in a small open economy. Growth models following Thirlwall’s (1979) tradition consider exports as the driver of demand in the long run. The Sraffian supermultiplier (Serrano, 1995; Freitas and Serrano, 2015) allows us to account for the effect of domestic autonomous expenditures on the long run growth of demand and output (Morlin, 2022). Hence, we introduce a supermultiplier model, in which growth is led by exports ( $X$ ) and an autonomous domestic expenditure ( $D$ ). Autonomous domestic demand is the sum of government expenditures and autonomous consumption. The model shows that, in a period in which the external constraint is binding, import substitution policies temporarily allow domestic demand to further push growth.

Output is determined by the level of autonomous demand and the supermultiplier, as in equation 1.  $Z$  stands for the total autonomous demand, being given by the sum of exports and the domestic autonomous expenditure.  $c$  is a constant propensity to consume;  $\tau$  is a constant fix tax rate.  $h_t$  is the propensity to invest, which evolves in time according to a flexible accelerator process (Freitas and Serrano, 2015).  $m$  stands for the propensity to import, and is affected by import substitution policies.

$$Y = \frac{Z}{1 - c(1 - \tau) - h_t + m_t} \quad (1)$$

Output growth is driven by autonomous demand in the long run. However, in the short run, growth is also affected by temporary changes in the propensity to invest and in the propensity to import, which reduce the leakage of domestic demand to imported inputs and final goods.

We introduce the external constraint as a maximum trade deficit-to-exports ratio. Moreno-Brid (1998) introduced a constant trade account deficit to income ratio as a way to model the Balance of Payments constraint. We follow a similar strategy, although we normalise the trade deficit with exports because exports are a proper measure of a country’s ability to repay liabilities invoiced in foreign currency (Bhering et al., 2019). We introduce the trade deficit-to-exports ratio as a threshold ( $k$ ), representing the maximum trade deficit that the international capital market is willing to finance. The economy can persistently remain below this threshold if domestic demand grows less than exports. Therefore,  $k$  also defines the level of output compatible with the Balance of Payments constraint ( $Y^b$ ). We note, however, that the Argentinian economy remained persistently close to this upper constraint in the historical period discussed in Section 2.

Therefore, for two periods  $i = 0, T$ , we have that:

$$\frac{m_i Y_i^b - X_i}{X_i} = k \quad (2)$$

And thus,

$$\frac{m_i Y_i^b}{X_i} = 1 + k \quad (3)$$

By evaluating equation 3 in periods 0 and  $T$ , and equalising the two trade deficit ratios, we get:

$$\left( \frac{m_T}{m_0} \right) \frac{Y_T^b}{Y_0^b} = \frac{X_T}{X_0} \quad (4)$$

Considering the outcome of import substitution policies means that the propensity to import of the economy falls from period 0 to  $T$  ( $m_0 > m_T$ ). Therefore the term within parenthesis is smaller than one. Hence, the equality in 4 implies that the average growth rate from period 0 to  $T$  can exceed the average growth rate of exports.<sup>16</sup>

In other words, import substitution (the fall in  $m$ ) due to the oil contracts allows for the acceleration of growth, until the economy reaches the external constraint. Hence, the average growth rate of output can exceed the growth rate of exports ( $g^\mu > g_X^\mu$ ) as the import substitution occurs. The relaxation of the external constraint allows for a (temporarily) faster

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<sup>16</sup>With more details, from equation 4, we get:

$$\left( \frac{m_T}{m_0} \right) \frac{Y_0^b e^{\int_0^T g_t dt}}{Y_0^b} = \frac{X_0 e^{\int_0^T g_{Xt} dt}}{X_0}$$

By canceling  $Y_0^b$  and  $X_0$  in the fractions, and taking logs, we get:

$$\ln \left( \frac{m_T}{m_0} \right) + \int_0^T g_t dt = \int_0^T g_{Xt} dt$$

The average growth rate of  $Y^b$  over the period 0- $T$  is given by  $g^\mu = \frac{\int_0^T g_t dt}{T}$  and an analogous expressions hold for exports.  $g_X^\mu$  denotes the average growth of exports. Therefore, we can show that the average growth rate of income *can* exceed the average growth of exports after a fall in the propensity to import, as follows:

$$\frac{1}{T} \ln \left( \frac{m_T}{m_0} \right) + g^\mu = g_X^\mu$$

Hence, if  $m_0 > m_T$ , then it follows that  $g^\mu > g_X^\mu$ .

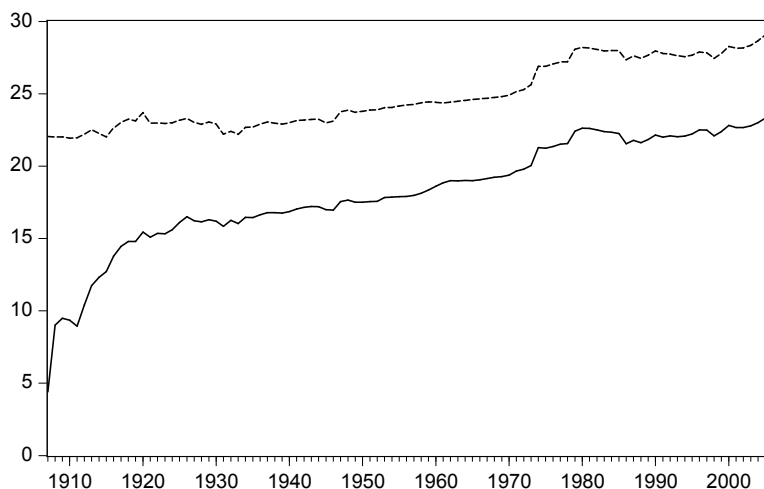
growth rate of domestic autonomous demand until the economy reaches the upper level of output that is associated with the constraint to the trade deficit-to-exports ratio. When this happens, additional import substitution policies may take place to sustain the growth pace. The same logic applies to production levels.

## 4. A narrative ARDL approach to the case of *oil contracts* in Argentina (1958-1962)

### 4.1. Data and estimation strategy

Based on the demand-led model presented in the previous section, we assess empirically the effectiveness of *oil contracts*. Therefore, we decided to build a novel dataset for the period 1907-2006. Figure 3 shows oil production over time for Argentina (*AROIL*), as well as world energy production (*WE*). With a simple visual analysis, a strong long-term relationship between these variables can be observed. Meanwhile, Figure 4 shows the behaviour through time of public expenditure of the Argentine national administration (*GOV*).

Fig. 3. Argentina's oil production and world's energy production (1907-2006)

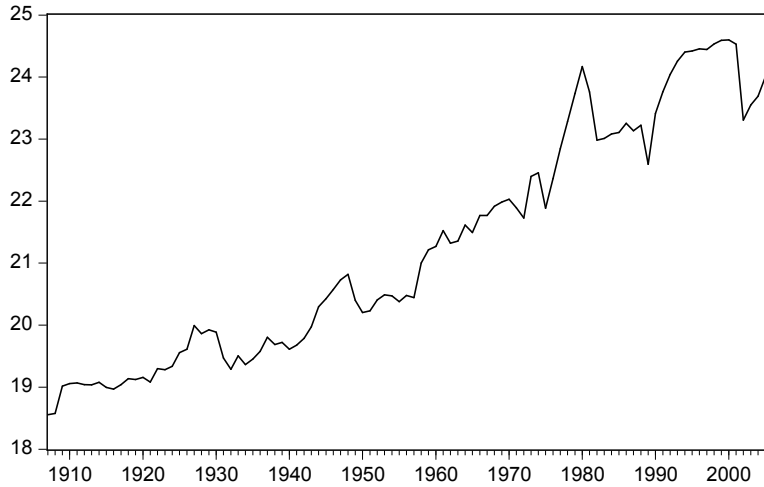


Note: Argentina's oil production *AROIL* (solid line) and world's energy production *WE* (dashed line) expressed in log of u\$s 2015 constant prices.

Source: see Appendix B for further details.



Fig. 4. Real Expenditures of Argentina’s National Administration (1907-2006)



Argentina’s government expenditures  $GOV$  expressed in log of u\$s 2015 constant prices. Source: see Appendix B for further details.

Given that we aim to analyse the effectiveness of oil contracts with a special emphasis on the ‘Developmentalist’ state of Frondizi (1958-1962), we create an econometric model that allows us to incorporate the narrative developed in Section 2. The idea is that by controlling for external (proxied by  $WE$ ) and internal demand for oil (proxied by  $GOV$ ), any increase in production that we can verify in the period 1958-1962 that is independent of these factors will allow us to know whether or not the contracts were effective. See data sources in Appendix A.

From a technical standpoint, to understand what the best time series methodology might be, we must first analyse whether or not the variables have unit roots.  $AROIL$  is  $I(0)$  while  $GOV$  and  $WE$  are  $I(1)$  (see the detailed results in Appendix B on unit root tests). It is well-known that ARDL cointegration technique is preferable when dealing with variables that are integrated of different order, particularly in a small sample size (Pesaran et al., 2001). Therefore, an Autoregressive Distributive Lag (ARDL) long-run model is applied with the following form:

$$\begin{aligned}
 AROIL_t = C + \alpha_1 AROIL_{t-1} + \dots + \alpha_n AROIL_{t-n} + \beta_1 GOV_t + \dots + \beta_n GOV_{t-n} \\
 + \gamma_1 WE_t + \dots + \gamma_n WE_{t-n} + \delta_1 D5862 + \epsilon_t
 \end{aligned} \tag{5}$$

where  $C$  is the constant and  $\epsilon_t$  is a random disturbance term; the total Argentine oil production ( $AROIL$ ) and the rest of the world’s energy production ( $WE$ ) (as a *proxy* of foreign demand/exports) and the Argentine central government’s spending ( $GOV$ ).  $WE$  and  $GOV$

represent the factors that explain the long-term trend of oil production growth that we discussed in Section 3: autonomous demand.  $D5862$  is a dummy. This dummy allows us to incorporate the historical narrative of *oil contracts* that we described in Section 2.

The model has a maximum of four lags on the dependent variable and three on the regressors to better the fit, selected with the Akaike selection method. One *dummy* is set in order to test for any significant changes in oil production during the period *1958-1962*; that is, the years in which the first risk service contracts were signed between *YPF* and foreign oil companies. To determine the long run relationship, we use a Long Run Form and Bounds test. For robustness, because heteroscedasticity is present, we use a HAC (Newey West) coefficient covariance matrix. Furthermore, a Granger causality test is run for the three variables. Finally, to check for robustness, we run post-estimation tests such as a residuals normality test, specifically, the Jarque-Bera test. For auto-correlation, we run the Breusch Godfrey test. Finally, to check for the correct specification, we run the Ramsey RESET test. As for dynamic stability, we run the CUSUM and CUSUM of Squares test. Granger causality test and post-estimation tests are shown directly in Appendix C.

## 4.2. Results

In this section, we present the econometric results for the proposed theoretical model and also the estimated determinants of the Argentine oil production (*AROIL*). We specify the model with 96 observations as an ARDL(4,0,2) in which the dependent variable (*AROIL*) presents four lags; the first regressor (*GOV*) has no lag, and the last regressor (*WE*) has two lags, with all the variables expressed in logarithms.

Table 1 presents short-run results of our estimation. The constant and the first lag of every regressor and variable are statistically significant at the 1% level.  $AROIL(-1)$ 's negative coefficient is in line with the error correction model's results. The coefficient for *GOV* implies that a 1% increase (decrease) of the central government's spending tends to increase (decrease) *AROIL* in time  $t$  by 0.04%. The same happens with the foreign demand ( $WE(-1)$ ) in  $t-1$  because it influences *AROIL* in  $t$  in 0.12%.  $D(AROIL)$  and  $D(WE)$ , with different time lags, are included to solve potential auto-correlation problems. The decisions made by the Argentine government during the *oil contracts*' period is reflected with the  $D5862$  dummy.  $D5862$  rejects the null hypothesis of its coefficient being zero at the 5% significance level, showing a differential intercept coefficient of 0.12. In other words, this means a rise of the intercept of 8%. One might claim that this result supports the idea that the *oil contracts*

Table 1: Short-run results

Variable	Coefficient
C	-1.32***
AROIL(-1)	-0.14***
GOV	0.04*
WE(-1)	0.12***
D(AROIL(-1))	0.19***
D(AROIL(-2))	-0.01
D(AROIL(-3))	-0.21***
D(WE)	0.94***
D(WE(-1))	-0.21***
D5862	0.12**

Note: \*=pval<0.1, \*\*=pval<0.05, \*\*\*=pval<0.01.

**Source:** Own computations.

were effective in increasing oil production during the period 1958-1962.

Table 2: Long-run results

Variable	Coefficient
GOV	0.30*
WE	0.87***
EC = AROIL - (0.3033*GOV + 0.8630*WE )	

Note: \*=pval<0.1, \*\*=pval<0.05, \*\*\*=pval<0.01.

**Source:** Own computations based on data provided.

The long-run results are presented in Table 2. The F-Bounds test provides an F-statistic of 50.22 with k=2, largely exceeding the upper limit marked by Pesaran et al. (2001). The t-Bounds Test shows a value of -11.63, which exceeds the lower limit marked by Pesaran et al. (2001). This suggests that there is evidence of a long-run relationship between the time-series present in the model, hence preventing the possibility of a spurious relationship. As can be seen, the central government's spending and the world's demand are statistically significant in explaining changes in Argentine oil production. Autonomous demand is clearly an explanation for the long-run trend of oil production in Argentina. In addition, the external market is very important. As the error correction equation shows, for every 1% of increase (decrease) in the world's output, the domestic oil production tends to increase (decrease) by 0.87%; and for every rise (fall) of 1% in the central government's spending, national oil production tends to increase (decrease) by 0.30%. The long-run adjustment happens at 0.14 each year. Finally, a Granger causality-test following Toda & Yamamoto

(1995) was performed. We cannot reject the view that the central government's spending does not cause the Argentine oil production because the null hypothesis is rejected with a 1% confidence level. In addition, we cannot reject the view that the world's energy output does not cause the Argentine oil production because the null hypothesis is rejected with a 5% confidence level. These results and post-estimation tests are shown in Appendix C.

From a theoretical viewpoint, the principle of effective demand, through autonomous components, is what ultimately determines domestic output levels. In our case, taking international energy demand and public expenditure of the national administration as determinants for the level of domestic oil production, we find a strong and positive relationship between these components in the long-run. In our case, we can conclude that both external demand and public expenditure have been determinant in defining local oil production levels. In particular, levels of oil production between 1958-1962 cannot be explained by autonomous components alone. As we have shown throughout this article, this was the period in which the *oil contracts* were executed. Therefore, *oil contracts* are the main cause of the growth of oil exploration and production in Argentina, which we confirm with our econometric ARDL model.

## 5. Conclusion

This article treated many different aspects of oil production in Argentina since it started to be developed in 1907. Our main focus was on understanding the effectiveness of *oil contracts* in the period 1958-1962. These contracts were a form of import substitution policy in the oil sector and sparked disagreements between different groups defending different interests in Argentina. In fact, the first attempt to sign an agreement between the State-owned oil company *YPF* and multinationals was rejected by Congress during the presidency of Juan Domingo Perón. A few months later, a coup d'état was staged in 1955. By 1958, even before President Frondizi's inauguration, the oil importation situation was unsustainable, forcing the newly elected government to start negotiations over a set of bold *oil contracts* of production and exploration with multinational companies. In the next five years, the positive impacts on oil investment and production were made clear—the number of drillings compounded to levels that added up to the 35 previous years of exploration and oil production would grow by 247% in the period 1958-1962. President Frondizi (1958-1962) went on to execute the contracts but also suffered a coup d'état because of it. However, a detailed analysis of the effectiveness of these contracts has never been carried out. Thanks to the archival and compilation work that we realised, we are confident to have brought light onto

the matter.

After rediscovering the historical narrative behind *oil contracts*, we constructed a theoretical model of demand-led growth to explain the determinants of domestic oil production. With this theoretical model in mind, we put this theory into practice, constructing a new dataset that would allow us to analyse the effectiveness of *oil contracts* in the period 1958-1962. Controlling for autonomous demand (with variables that capture the effect of exports and public spending), we find that part of the national production during the period 1958-1962 cannot be explained by these factors. Performing a narrative ARDL approach, we attribute an important role to *oil contracts* in explaining this phenomenon. On the strength of narrative explanation, a dummy for the period 1958-1962 that is positive and significant in explaining the level of domestic oil production is an indication of the effectiveness of oil contracts, while controlling for other determinants of production.

A more in-depth study is pending to understand whether the oil case can be extended to other industries; and if so, whether partnerships between SOEs and multinational companies can be an alternative for underdeveloped countries on the road towards development.

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## Appendix A. Data Sources

- *AROIL* Oil Production in Argentina in real terms updated at u\$s 2015 constant prices. Source: compiled based on Bénichou, L., Ringenbach, C., & Kahraman, Z. (2020). Variable in logarithms.
- *WE* Energy production rest of the World in real terms updated at u\$s 2015 constant prices. Source: compiled based on Bénichou, L., Ringenbach, C., & Kahraman, Z. (2020). Variable in logarithms.
- *GOV* Argentina’s National Public Administration Expenditures in real terms updated at u\$s 2015 constant prices. Source: Ferreres (2010). Variable in logarithms.

## Appendix B. Unit Root Tests

Table 3: Unit Root Tests

Variable	ADF
AROIL	-5.325***
GOV	-0.655
WE	0.344

Note: \*=pval<0.1, \*\*=pval<0.05, \*\*\*=pval<0.01.

**Source:** own computations based on data provided.

## Appendix C. Granger-causality and post-estimation tests

Granger (1969) proposes a method to test for causality in a statistical manner between two variables and their feedback mechanism; in other words, by measuring temporal precedence. This is not a substitute for causality in a theoretical sense. Because series are nonstationary, in order to apply a Granger causality test, we applied the Toda and Yamamoto (1995) procedure, hence with five lags.

Table 4 shows causation in a Granger sense. In the model, we cannot reject the view that the central government’s spending does not cause the Argentine oil production because the null hypothesis is rejected with a 1% confidence level. In addition, we cannot reject the world’s energy output does not cause the Argentine oil production as the null hypothesis is rejected

Table 4: Granger Causality Test

Granger Causality Test	ADF
GOV does not Granger Cause AROIL	3.83***
AROIL does not Granger Cause GOV	1.45
WE does not Granger Cause AROIL	3.17**
AROIL does not Granger Cause WE	1.07
WE does not Granger Cause GOV	1.51
GOV does not Granger Cause WE	1.08

Note: \*=pval<0.1, \*\*=pval<0.05, \*\*\*=pval<0.01.

**Source:** own computations based on data provided.

with a 5% confidence level.

Table 5: Post-estimation tests

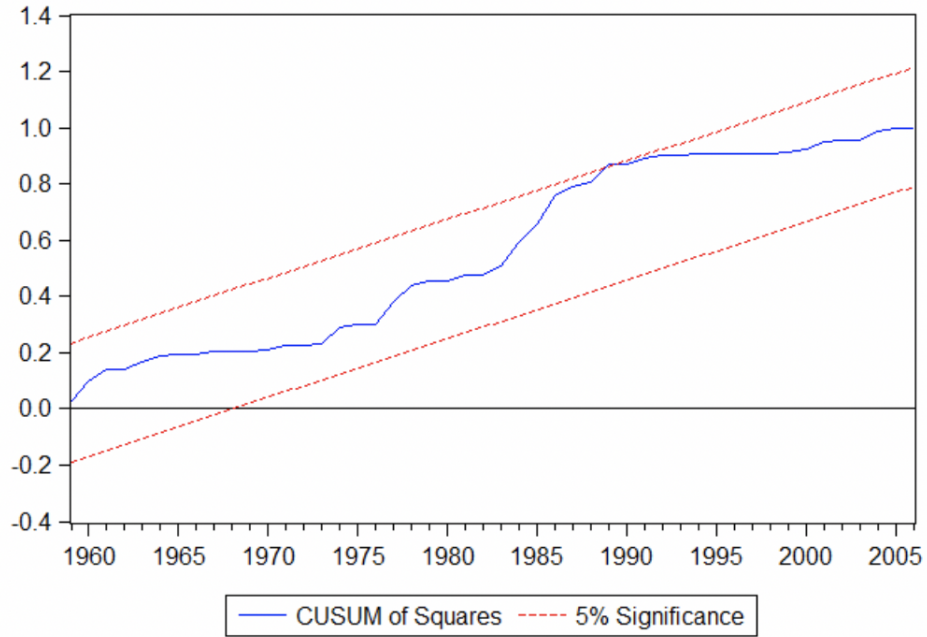
Post-estimation tests	
Durbin-Watson statistic	1.98
Breusch-Godley LM	1.07
Breusch-Pagan-Godfrey	22.21***
Ramsey Specification test	0.65
Jarque-Bera test	30.74***

Note: \*=pval<0.1, \*\*=pval<0.05, \*\*\*=pval<0.01.

**Source:** own computations based on data provided.

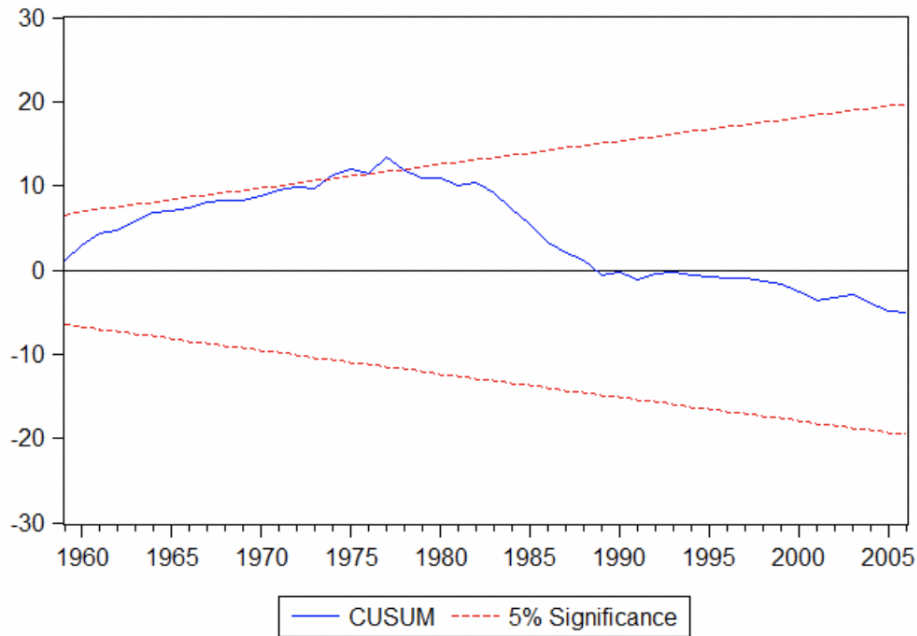
Following Savin & White (1977) at a 1% significance level, the Durbin-Watson statistic should be, at least, over 1.573 in order not to reject the null hypothesis of non-serial correlation. The calculated DW (96,2) is 1.98. Breusch-Godley LM cannot reject the null hypothesis of non-serial correlation. The Breusch-Pagan-Godfrey test shows a low p-value, hence rejecting the null hypothesis that there is a presence of heteroskedasticity. The Ramsey Specification test rejects the null hypothesis of omitted, non-linear, variables in both, the t-statistic and the F-statistic. This suggests that the model is correctly specified. As for normality, the Jarque-Bera test is statistically significant, meaning that the residuals are not distributed normally. This can pose a problem for forecasting because it might make estimations less efficient (Gabrisch, 2019), yet it is not a problem for statistical inference.

Fig. 5. CUSUM of squares



Source: Own elaboration.

Fig. 6. CUSUM



Sources: Own elaboration.

To check for the stability of the short-run dynamics and the long-run coefficients together,



we apply the recursive estimation proposed by Brown, Durbin and Evans (1975); that is, the CUSUM of Squares and CUSUM tests. These show that, at a 5% significance level, the model is somewhat stable because it barely crosses the corridor. The exception in Figure 5 is the year 1989, which was marked by a hyperinflation of 3079.5% (Ferrerres, 2010, p. 565) and previous to the ‘mini-oil shock’ of 1990 that followed the Iraqi invasion of Kuwait. In Figure 6, the CUSUM crosses the 5% significance boundary starting the year 1974 after the first oil shock in 1973 until 1978 (the year before the second oil shock), when it converges back to 0.