Thematic Area: International Politics, International Relations, Foreign Policy, Regional Integration

The Brazilian Ethanol Policy from 2003 to 2016: an Exploratory Study about the Interrelations Between Domestic and International Politics

Tiago Gabriel Tasca
Master Candidate in International and Comparative Politics – Institute of International Relations, University of Brasilia
Campus Darcy Ribeiro, Mailbox 04306, 70904-970, Brasilia – DF, Brazil
http://irel.unb.br

Paper prepared to be presented at 9th Latin-American Political Science Congress (ALACIP), Montevideo, from 26 to 28, July, 2017.
Abstract¹:

Brazilian ethanol policy was strongly developed from 2003 to 2010. However, after the announcement of the pre-salt oil reserves, in 2007, these policies have been weakened. In a nutshell, three phases (2003 – 2007, 2008 – 2013 and 2014 – 2016) show these contrasting movements: from supporting ethanol to supporting fossil fuel. This article seeks to present and explain these movements by using the Brazilian ethanol policy as a single-unit case through a simplified process-tracing methodology. Then, 12 in-depth semi-structured interviews were carried out. We seek to understand which domestic and systemic factors shaped Brazilian domestic and foreign policies for ethanol from 2003 to 2016, emphasizing the role played by conservative forces. The major goals of this article are: 1) to present the international system under conservative hegemony; 2) to present three analytical axis: foreign policy, domestic policy, and international prices; 3) to analyze domestic and systemic explanatory drivers for Brazilian ethanol retraction since 2008. As a conclusion, the rise and fall of oil international prices cannot completely explain the Brazilian ethanol retraction after 2008. Yet, moderate conservative domestic forces deeply rooted into Brazilian policy system can be an explanatory driver to these oscillations.

Keywords: Brazilian Ethanol Policy. Conservative Forces. Climate Change.

Introduction

Sugarcane ethanol was introduced into Brazilian energy matrix in the 1930s, but was only in the 1970s, due to the oil shocks and sugar prices crisis, that a public policy was effectively launched in Brazil through a program called Proálcool. This program faced success during the 1980s and the 1990s, but ended in 1999 due to the lack of state support and the lack of ethanol reliability in the consumers’ preferences. However, a new phase of expansion of Brazilian ethanol policy has started in 2003, with flex-fuel vehicles launched, enabling the consumer to choose between gasoline (mixed with anhydrous ethanol) and ethanol (hydrous). Notwithstanding, this expansive period ended in 2008, due to the financial crisis and the pre-salt oil discoveries. These movements from expansion to retraction can be seen through three lenses: foreign policy, domestic policy, and international relative prices.

Then, the central question to be addressed in this study is what factors explain these variations of Brazilian ethanol policy from 2003 to 2016. We understand that conservative forces related to the oil sector are the main driver that led to Brazilian ethanol policy setbacks. Among these forces, we focused on the role of Petrobras, State-owner Company with close ties with federal government and political parties. Thus, the main concern is to show Brazilian

¹ This study was funding by Federação de Amparo à Pesquisa do Distrito Federal (FAPDF).
ethanol policy changes under three analytical parameters (foreign policy, domestic policy, and international prices), unfolding the role played by conservative forces.

In order to analyze these changes, this study will present the interplay and the overlap between the international system under conservative hegemony and Brazilian ethanol policy. Firstly, this study sets for some theoretical guidelines about considering climate change as a civilizational driver, setting for the basis for an eclectic approach to cope with it within IR scope. Encompassing climate change into the core of international politics enables us to explore the main features of the international system under conservative hegemony (Viola et al. 2013) in order to establish a framework to analyze how Brazilian climate policy related to energy fits into this analytical category.

Hence, we find out that the lack of Brazilian long-term support for ethanol policy lies on the Brazilian policy features (e.g., short-term priorities, dysfunctional political system, close ties between oil industry and political parties). Hence, the Brazilian moderate conservative profile described by Viola et al. (2013) is a meaningful tool to understand ethanol policy changes from 2003 to 2016. However, we do not seek to provide an extensive discussion about the hegemony concept, rather we focus on the prominence of Brazilian conservative behavior according to climate policy concerning energy.

The paper is divided as follows. In section 1 we briefly present the interplay between domestic and international factors within the International Relations Theory, paving the way for eclectic approaches to cope with the climate change as international system civilizational driver. In section 2 we overlap the international system under conservative hegemony and its interplays with domestic politics. In section 3 we briefly present Brazilian ethanol policy from 2003 to 2016 according to three analytical parameters: foreign policy, domestic policies, and international relative prices. In section 4 we explain how conservative forces undermined Brazilian ethanol policy from 2003 to 2016. This paper is a preliminary version of a Master research in progress. Comments and criticism are welcome.

1. The “intermestic”: International Relations Theory (IRT) and Domestic Politics

Within IRT domestic factors were frequently driven out, especially in the traditional approaches like Realism. Among the IRT, several approaches addressed the great role of systemic factors (e.g., anarchy, sovereignty, unitary actor, etc.) to explain state’s behavior, and most of these approaches do not consider the impact of domestic factors on the
international relations outcomes (e.g., decision-making process, domestic groups, domestic policies, etc.).

Realism seldom considers domestic factors and views the state as unitary actor. This assumption, for instance, was criticized by Allison and Zelikow’s argument in the Essence of Decision (1999), in which they articulated the conflict among various portions of the government over the policy outcome, setting for the main features of the bureaucratic politics. Gourevitch (1976), for example, suggests an analysis through what he calls “second-image reversed”, trying to include domestic elements as an important variable to determine state’s behavior in the international relations (Gourevitch, 1976:893).

The dismissal of the significance of decision-making influences and other state-level phenomena on policy-making is frequently apparent on structural realism. However, decision-makers’ responses often did not make sense in terms of international system imperatives since the power to make decision is spread over organizations, individuals, interests groups, and several other units (Hagan, 2001:10-11). In this regard, Hagan concludes that the decision-making process cannot be inferred directly from the international and domestic structure. Instead, “decision units appear to operate in a way that is often independent of the otherwise compelling constraints of both international and domestic politics” (Hagan, 2001:35).

While liberal institutionalism gives relevance but continues to focus on the international dynamics, some authors (Nye and Keohane, 2011) focused on the growing role of transnational, international and multinational actors, and non-conventional forces (e.g., technology and information) in shaping policy. Morse (1976) infers that the international and the domestic levels become more important while the national government as the unitary actor lost some importance *vis-à-vis* this new global configuration, specially in the Climate-Energy Era. Moreover, post-colonial approaches and constructivism, for instance, also sets for some elements about the interrelations between domestic politics (e.g., national economy) and international political economy, suggesting the dependency theory and world-system approach.

In summary, the reasoning by combining domestic and international factors to explain domestic phenomena is then mutual: they are mutually affected. Several comparative politics scholars treat the domestic structure as a simple independent variable in the IR studies, “underplaying the extent to which it and the international system are parts of an interactive system” (Gourevitch 1987:900). Yet, most of IR analyses still face some difficulties due to
the level-of-analysis problem, which lead to some difficulties to analyze the interplay between domestic and international politics.

To move beyond this point and to show how domestic and international factors are integrated, Milner and Keohane (1996:3) stressed: “we can no longer understand domestic politics without comprehending the nature of the linkages between national economies and the world economy, and changes in such linkages”. This way, several models were set out to link domestic and foreign affairs, usually by using a game theoretic perspective and by identifying the equilibrium between policy preferences and domestic institutional structures induced by domestic political concerns (Bueno de Mesquita and Smith 2012:163). Also, some authors also stressed that agency issues can be a focal point of analysis when linking domestic politics to international affairs (Bueno de Mesquita and Smith 2012:163; Liftin 2000:238).

Our focus here, however, is to integrate domestic and international politics through an eclectic approach, by using the interplay between the international system under the climate crisis and the domestic responses to this challenge, focusing on Brazilian energy policy. Eclectic approaches provide some sort of progressive research in IR, aiming to overcome the ‘isms’ flaws perceived in the Great Debates. Rather than assuming and defending any single set of assumptions or paradigms, these approaches try to build theories to address specific problems of world politics (Lake, 2013:573). In other words, “it is precisely this ‘mixing and matching’ of assumptions, issue areas, units, and interests that makes this sort of theorizing ‘eclectic’” (Lake, 2013:573).

Also called mid-level theory, eclectic approaches do not focus on general assumptions or paradigms, as the ‘isms’ do, but this approach deal with a more progressive basis. According to Lake (2013:572), this kind of theory “focus on parts of the political process, rather than the whole, and study the effects of one or more variables on policy and outcomes”. Issues like energy policy outcomes can be handled by these mid-level theories, which permit to match theories of foreign policy, public politics and international politics. Nevertheless, analytic eclecticism has some research questions that aim “to capture, not to bracket, the complexity of interesting political phenomena” (Sil and Katzenstein, 2011:483).

Indeed, an eclectic approach will be applied in this study in order to understand the interplay between domestic and international factors considering climate change as a civilizational driver. Furthermore, since climate change has migrated to the core of international politics, “[…] which means that the patterns of cooperation and conflict that
define this very sphere of social interactions will be more and more influenced by the characteristics of the responses to the climate challenge” (Viola et al., 2012:10), the response of major powers (e.g., Brazil) becomes a centerpiece to understand how countries are assimilating climate change as a civilizational driver. Finally, the eclectic framework proposed by Viola et al. (2013) enable us to understand Brazilian climate change commitments, its resources, and the policy outcomes derived from the great influence of conservative forces into ethanol policy.

2. International System under Conservative Hegemony: the Role of Energy Systems

The beginning of the 20th century brought a series of broad movements – in both technological and social terms – revealing a phenomenon called the acceleration of the history, which implies a new velocity of social processes in a pace never seen before (Viola and Franchini, 2012:472). One of these social processes is the consolidation of climate change as a key civilizational driver of our time, mainly after several extreme climate events since 2005. Civilizational drivers are the “deepest trends of the relation between mankind and the biosphere […] and, the imbalance of the climate system [has led it to] a position equivalent to other fundamental process of our current civilizational process: globalization and democracy” (Viola et al., 2012:9).

Climate Change is considered one of the planetary boundaries described by Rockström et al. (2009), emphasizing the increasingly anthropic pressure on the Earth system. Then, we are living in the Anthropocene Epoch (the anthropic factor as the leading driver of systemic climate change) and, regarding the new challenges to the sustainable development, Rockström et al. (2009) proposed nine planetary boundaries with which, under active stewardship, would allow modern society to have a safe operating space.

Accordingly, one of these planetary boundaries is the climate change, which had already been surpassed (Rockström et al., 2009). Thus, cooperative responses among countries should be addressed towards mitigation efforts, since these efforts are mandatory to avoid the planet average temperature increase in 2°C. However, if we take a look at the international system, we perceive a lack of an effective global governance to cope with these mitigation efforts due to the heterogeneous climate commitment2 of super (e.g., China and the US) and major

---

2 “Climate commitment is defined as the level of awareness that a specific society has of climate change as a
powers (e.g., Brazil). Consequently, “[…] the current structure of global governance is unable to tackle the most pressing civilizational challenges of our time – the climate crisis and the economic crisis -, which have been aggravated over the last five years” (Viola et al., 2012:13). Then, the international system regarding the climate crisis can be best described as the prominence (hegemony) of conservative powers (where conservative forces resist any major changes in the ways business is conducted) over reformist powers (those willing to take post-soberanist measures to tackle climate change) (Viola et al., 2012:13).

Yet, this international system under conservative hegemony is strongly marked by population growth, hyper materialism, consumerism, and powerlessness of current international and domestic institutions, which pose challenges to a low-carbon transition (Viola et al., 2013:117). This way, the building up of an effective global governance on climate change has a necessary condition: “the shifting from sovereignty to post-sovereignty in most societies, and particularly in the most powerful ones” (Viola et al., 2012:13). The Brazilian energy case, as will be illustrate in the next section, clarifies this example of a sovereignty profile, where the national interest linked to oil sector prevails.

Viola et al. (2013:213; 2012:11) also suggest the “climate power” concept, seizing two dimensions: power distribution over the international system and its relation to climate change, entailing the capacity of societies, the convergence of the state, the market and civil society. This concept combines three elements: volume and greenhouse gas (GHG) emissions, human and technological resources, and energy behavior (Paterson, 1996; Viola et al., 2013), enabling the authors to classify countries as superpower (US, China, and European Union – 55% of global GDP and 47% of global GHG emissions), major powers (Brazil, South Korea, India, Japan, Russia – 20% global GDP and 20% of global GHG emissions), and middle powers (South Africa, Argentina, Canada, Mexico, Venezuela, Colombia, Norway, among others – 15% of global GDP and 18% of global GHG emissions).

Despite of deforestation decline, voluntary commitment to reduce emission trajectory in 2009 and the sanctioning of a Climate Bill, to understand how the Brazilian climate policy moved from a conservative profile (1994-2005) towards a moderate conservative (2005 onwards) we focus on the idea of energy behavior (Stephenson et al, 2010; Paterson, 1996; Viola et al., 2013). This concept encompasses: 1) the composition of energy matrix; 2)
renewable energy development; 3) intervention programs; 4) energy consumption behavior; 5) energy behavior vis-à-vis material culture (values, needs, and the social context).

This way, in order to use energy behavior as a dimension to classify country’s climate policy under conservative or reformist categories, Viola et al. (2013:213) and Giddens (2009) stress the strong link between energy and climate policies. However, this link is complex. Accordingly, cheap oil, coal reserves, country’s big importance of fossil fuels into foreign trade suggest a conservative profile, yet cheap natural gas reserves, historical presence of renewable energy and nuclear energy into country’s energy matrix, and energy efficiency reveal a reformist profile (Viola et al., 2013:213). This elements “entrenched cognitive, social, economic, institutional and technological process lock us into trajectories and lock out sustainable alternatives” (Seyfang and Smith, 2007:588), pressing to a carbon lock-in system, deeply embedded into fossil fuels systems (Unruh, 2000).

Regarding the importance of energy behavior on domestic climate change policies, it is equally noteworthy to note that energy systems have a central role in the decarbonization process. According to Viola et al. (2013:28), decarbonization process lies on 1) the decline of GHG emissions over time; 2) a society that is aware of the climate change problem; 3) political leadership able to translate decarbonization demands into public policies, also willing to stimulate the creation of an international governance about this theme.

Empirical evidence shows that huge oil production and exports led States towards a more conservative profile (delaying decarbonization process and stimulating international conservative pathways) (Viola et al., 2013:325). Thus, we agreed that the State has a central role in ensuring energy security and the development of renewable energy, acting as an ensuring State (Giddens, 2009), not only stimulating and facilitating renewable energy development, but ensuring its development despite conservative forces of fossil fuels agents.

Furthermore, to reach decarbonization many authors (Stern, 2006; Viola et al., 2013) explain that a transition towards a low-carbon economy implies to understand a new relation between society, state and the market, as far as the climate change becomes one of the greatest challenges in economic terms and one of the biggest markets failures ever seen. Moreover, the state has a pivotal role to guide and foster markets to innovate in low-carbon energy systems (Victor and Yanosek, 2011, Friedman, 2010; Giddens, 2009). The importance of energy systems on climate change mitigation is then clear: they answered for 47% of the increasing CO2 emissions (IPCC 2014:7).
Thus, mitigating climate change is closely related to a substantial transition in energy systems towards decarbonization. In addition, several reports assert that to tackle climate change is necessary to reduce CO₂ emissions from fossil fuels, because CO₂e from energy is responsible for 75% of greenhouse gas emissions (GHG) (Verbong & Loorbach 2012:23). Likewise, some researchers like David Mackay (2009:16) pointed out that “the climate change problem is principally an energy problem”.

To move beyond this point and to understand how the Brazilian climate policy regarding ethanol could fit into this framework of conservative/reformist profile, we should answer some questions: What are the main conservative forces in the Brazilian energy sector? How did they operate to foster or to hamper ethanol development from 2003 to 2016? How did conservative forces become stronger in the Brazilian energy policy since 2008? These answers can be found by analyzing the Brazilian energy policy concerning ethanol, where the conservative forces (fossil fuels) have been prominent during these thirteen years (2003-2016) and have led diminished ethanol competitiveness along these years. Next section will address these questions.

### 3. Brazilian Ethanol Policy from 2003 to 2016: Unfolding the Conservative Forces

This section sets for the main features of Brazilian ethanol policy between 2003 and 2016 considering three dimensions: foreign policy, domestic policy, and international prices. This way, our analytical axis is the idea of energy behavior – a component of climate commitment suggested by Viola et al. (2013) seeking to unfold the conservative forces – through: 1) the composition of energy matrix; 2) renewable energy development; 3) intervention programs; 4) energy consumption behavior; 5) energy behavior vis-à-vis material culture (values, needs, and the social context). This sub-section will focus on the composition of energy matrix and energy consumption behavior, and next three sub-sections unfold ethanol development, state programs and preferences, and energy behavior related to material culture (specially the democratic and political ones).

Firstly, in order to understand the role played by conservative forces in Brazilian energy policy, we should take a look at Brazilian energy matrix for the transport sector, which reveals some important insights about the increasing use of non-renewable fuels, such as gasoline and diesel. Together, ethanol, gasoline, and diesel represent almost 90% of Brazilian energy matrix for transport. So, our focus will be on these three fuels.
This way, in 2003, 85.3% of Brazilian transport sector was fuelled by non-renewable sources (diesel, fuel oil, gasoline, kerosene) and only 12% by renewable sources (ethanol, biodiesel). In 2016, for instance, these numbers evolved to 77.7% and 20.1% respectively. In accordance with energy behavior idea, Brazilian energy matrix for the transport sector is composed predominantly by non-renewable sources (diesel, fuel oil, gasoline, and kerosene).

Moreover, if we take a look in the evolution of Brazilian energy matrix for transport sector, we can see that diesel consumption grew from 25.189 (10^3toe) in 2003 to 36.246 (10^3toe) in 2016. Gasoline consumption, for instance, grew from 13.115 (10^3toe) in 2003 to 24.181 (10^3toe), almost duplicating its consumption. At the same time, ethanol grew from 5.794 (10^3toe) to 13.880 (10^3toe) (EPE, 2017). According to the second point of the energy behavior idea (energy consumption), we can see that non-renewable fuel consumption is increasing year-by-year, while ethanol consumption grow slowly. Chart 1 clearly shows these movements.


3.1 Foreign Policy Dimension

From 2006 to 2010 biofuels were considered a priority issue of Brazilian external action, developing a foreign strategy called ethanol diplomacy. Ethanol diplomacy was launched in a favorable moment, when energy security, climate change and international oil prices concerns were at stake in the global challenges faced by the global community. According to one
interviewed\(^3\), the decline of international oil prices was the greater incentive to expand Brazilian foreign action towards biofuels.

In relation to ethanol diplomacy, several analyses were made and suggested some multifaceted explanations about this initiative. Jesus (2011), for instance, stress that ethanol diplomacy was a Brazilian foreign strategy to reach autonomy and identity in the international system, combining with the Brazilian desire to reform the multilateral institutions. Other authors, such as Afionis et al. (2016:129) argue that Brazilian ethanol diplomacy was a “Brazil’s quest to exert global leadership within the biofuels arena”.

In 2008, at the FAO Conference opening discourse, the Brazilian president Lula da Silva’s speech mentioned the pivotal role played by biofuels as the centerpiece of a “Golden Revolution” (Jesus, 2011:78). Moreover, Lula da Silva’s closing speech at the International Biofuel Conference – with more than 90 participating delegations – reinforced the crucial role played by biofuels to tackle climate change based on the idea of sustainable development brought by the biofuels in the economic, societal, and environmental realms, mainly due to the job creation by the biofuel industry, according to one interview from Brazilian Ministry of Foreign Affairs.

During ethanol diplomacy golden years (2006-2008), President Lula’s foreign trips and meetings with foreign visitors to Brazil always emphasized the leading role played by biofuels and their importance on the sustainable development agenda (Simões, 2007:11). Some researches argue “biofuels topped Lula da Silva’s presidential foreign policy agenda, next to getting a permanent seat in the UN Security Council and agricultural cooperation with African countries” (Röehrkasten, 2015:174-5).

For his second term (2007 – 2010), Lula da Silva specified two aims for the Brazilian transboundary action for biofuels: 1) enhancing biofuels-related technology exports to Latin American and African countries and 2) promoting Brazilian ethanol exports and establishing ethanol as a commodity traded freely without barriers as a homogeneous good without qualitative differentiations across markets (Röehrkasten, 2015:175; Dalgaard, 2012:161). Moreover, Brazilian ethanol foreign policy tried to combine climate protection, environmental friendliness, and socioeconomic opportunities for developing countries in order to strengthen South-South cooperation, especially on the African continent.

However, since 2011 the number of international agreements signed by Brazil has

\(^3\) Interviewed #3, Ministry of Agriculture.
declined dramatically, and ethanol is no longer a driver of Brazilian diplomacy. This movement can be seen in Chart 2 below. Furthermore, a new phase of ethanol diplomacy seems to be opened with the Biofuture Platform launched in 2016 by Brazil at COP22, in Marrakech. Until now, the Biofuture Platform remains as a potential revitalization of ethanol diplomacy carried out in the 2010s, but without any current specific achievement to sugarcane-based ethanol.

Chart 2 – International agreements signed by Brazil about biofuels from 2005 to 2015

3.2 Domestic Policy Dimension

In order to understand how conservative forces shaped Brazilian ethanol policy from 2003 to 2016, we present four elements: 1) lack of national investments; 2) Pre-Salt oil reserves; 3) flex-fuel cars and blending mandates; 4) subsidies to fossil fuels. These elements shed light on the conservative behavior of Brazilian government towards the ethanol policy. Moreover, all these elements were mentioned by the 12 interviewed order to explain the oscillations of Brazilian ethanol policy for this period.

After the liberalization reforms carried out in the late 1990 and the deregulation process in first decade of the 2000s, ethanol policy faced a new wave of investments destined to build new mills and improving infrastructure. This liberalization paved the way for foreign companies to invest in Brazilian sugarcane complex. Several companies invested in Brazil until 2008, such as grain, food, and agricultural companies (Cargill, Louis Dreyfus, Bunge), oil companies (Shell), among others.

Nevertheless, the financial crisis after 2008 negatively impacted the traditional

---

4 Available at: http://dai-mre.serpro.gov.br/pesquisa_ato_todos
5 Interviews #1 and #6 (Sugarcane Industry Union)
entrepreneurs of the ethanol sector that used to finance ethanol activity with short-term loans, as a consequence of fewer investment sugarcane yields declined. Indeed, the adverse weather conditions have required more investments since 2009, but these investments are responding slowly to industry’s demand. According to the Brazilian Development Bank (BNDES, in Portuguese) and one interview from BNDES, sugar and ethanol sectors are leading the BNDES losses. These losses are estimated in BRL 568,5 million from 2006 to 2016 (Alerigi Jr., 2016).

However, the indebtedness scenario has accentuated the sector's crisis: from 2008 to 2016 more than 80 mills were closed, 67 mills are waiting receivership and generated more than 100,000 jobs (UNICA, 2017). Last year (2016), the Brazilian oil company (Petrobras) sold all its biofuels (ethanol and biodiesel) industries (Nova Fronteira and Guarani) and announced its integral withdrawal from the ethanol sector as a part of Petrobras’ Business Plan (2017 – 2021), which seeks to recover Petrobras’ ‘financial health’ (Oliveira, 2016). Once again, the lack of investments in new mills or to recover some of them reflects the Brazilian government preferences on oil, regarding short-term policies over long-term ones. However, decarbonization policies are long-term ones and need strong State support.

In summary, domestic and foreign investments for ethanol production declined severely since the financial crisis and the Brazilian State (through BNDES) was unable to invest in the sector due to the indebtedness scenario and due to the lack of interest in the ethanol sector, which reinforces the Brazilian State preferences on fossil fuels (Petrobras, the big national oil company) over ethanol. However, since 2008, Brazilian investments towards oil sector have been increased, reaching USD 120 billion in 2016. Hence, state preference on oil over ethanol unfolds the first sight for the conservative forces, and the desire to become a major oil exporter overshadow ethanol policy, which has been undermined since the beginning of the 2010s, stress Ming (2017).

The lack of governmental interest on ethanol since 2008 was also a result of huge oil discoveries in the pre-salt layers\(^6\). Initial findings were made in 2005 and in 2006, when Petrobras invested USD 254 million to drill the pre-salt layer. Then, in the same year the company announced the discoveries of oil in Santos basin. Some projections show that pre-salt's capacity is nearly 119 billion of barrels (Sauer and Rodrigues, 2016:196). However, Petrobras' financial situation has deteriorated since the beginning of the 2010s due to several

\(^6\) Interviews #2 (Campinas State University), #9 (Federal University of Rio de Janeiro), #11 (Federal University of Itajuba), and # 12 (University of Sao Paulo)
reasons (e.g., corruption scandals, price control policy, huge investments made in the first decade of the 2000s, etc.) and led the company to decelerate its investment plan. During 2015 and 2016, Petrobras cut investments that impacted oil production from pre-salt layer. Bistafa, Gurgel and Paltsev (2016:4) stressed that Brazilian production target was reduced from 4.2 million to 2.8 million equivalents barrels per day. Nevertheless, this did not diminish the governmental preferences on oil over ethanol, since oil byproducts consumption has been increased year after year, as a consequence of both production and imports.

Notwithstanding, pre-salt could be described as a myth, since its costs do not reflect the opportunities initially launched. In this regard, Bistafa, Gurgel and Paltsev (2016:17) argue that in the long term pre-salt oil will bring more expenses than profits since the investment required to achieve the production target will force huge investments towards a sector that has been in constant crisis. This way, despite the future of pre-salt, it is important to keep in mind that these oil discoveries were released when ethanol was facing its “golden years”, then, the price control policy (2011 - 2014) and subsidies applied to gasoline prices (2008 - 2014) strongly affected ethanol policy outcomes, unveiling the strong governmental commitment towards oil.

The second element is the flex-fuel vehicles (FFV), which were articulated by BNDES and the Brazilian Ministry of Foreign Affairs. Despite of FFV success, they were not immediately accepted by the sugarcane and automotive sectors. In the year of launching (2003), 7,5% of vehicles sales were flex-fuel. This number evolved to 24% in 2004, 55% in 2005 and 91% in 2008 (Pinto, 2011:78; ANFAVEA, 2017:140). In parallel with the sales growth, ethanol consumption also increased from 3.2 billion liters (2003) to 13.3 billion liters (2008).

Regarding flex-fuel vehicles, one of the most remarkable examples is the Brazilian policy to foster FFV sales. From 2004 to 2008, the IPI tax was 6-7 per cent lower on flex-fuel vehicles than on pure gasoline cars, which encouraged flex-fuel sales. In 2008, the IPI tax was 5,5% (vehicles with more than 1000cm$^3$ to 2000cm$^3$). From 2008 to 2012, the IPI oscillated from 7,5% in 2009, 11% in 2010 to 5,5% in 2012. From 2013 to 2015, the tax was higher: 7% in 2013 to 11% in 2015 (ANFAVEA 2017). In this regard, the policies carried out by the federal government from 2004 to 2008 (e.g., reduced IPI tax) led to an increasing of more than 600% in flex-fuel cars produced (from 332.507 flex-fuel cars produced in 2004 to 2.243.648 cars produced in 2008). From 2008 to 2013, the production of flex-fuel cars
increased 31% (from 2,243,648 cars produced in 2008 to 2,950,611 in 2013). However, since 2013 flex-fuel cars production is declining in about 60% (from 2,950,611 in 2013 to 1,765,153 in 2016) (ANFAVEA, 2017:59).

Blending mandates also impacted FFV sales, and they are keeping in low rates in the last 13 years. In a nutshell, blending mandates are related to the percentage of ethanol mixed with gasoline C. In 1977, gasoline C had 4.5% of ethanol, some years later, in 1990, 25% of ethanol was mixed into gasoline. In 2006, the blending mandate fell to 20%, but was reestablished to 25% in 2007. Another change happened in 2011, when the blending mandate fell to 18%. Until 2014, Brazil was the country that had the biggest blending mandate (25%); Paraguay was the second (24%), while the US had 10% of ethanol mixed into gasoline (UNICA, 2014).

Since 2015, the blending mandate has been fixed at 27%, which reveals new challenges and opportunities to Brazil’s ethanol policy (Brasil, 2015). Besides this increasing in the blending mandate, FFV sales have declined since 2013. Notwithstanding of having one of the biggest blending mandates around the world, a vehicle fuelled only by alcohol was not included into political discussions, revealing 1) lack of automotive interest; 2) lack of predictability of ethanol sector to produce all ethanol required; 3) lack of governmental support for this proposal.

Subsidies applied to gasoline by the federal government are also an important source to understand how ethanol competitiveness has been undermined since the late of 2000s. In this way, “Brazil’s ethanol roller coaster is a sobering example of what can happen when climate and energy planning clash with economic decision-making” (Angelo, 2012:646). In addition, gasoline prices are a “pocketbook issue for voters, making high prices potentially costly for political representatives” (Hughes and Lipsy, 2013:456), which can be easily seen from 2008 to 2014, when the government applied subsidies to gasoline aiming to sustain the Brazilian economic growth and avoiding higher inflation rates. Consequently, gasoline prices were adopted as a short-term measure to control high inflation rates, with strong state control from 2008 to 2014, reinforcing the role played by conservative forces related to oil sector.

In accordance with Giddens (2009:44), energy policies around the world have become more and more politicized and “political considerations have come to intrude deeply into energy markets because of their concentration in the hands of state which use them as instruments of domestic and foreign policy”. These political considerations can be translated
into the idea of “petrolization” of politics, in which oil sector has had a great impact in the public policy outcomes in Brazil, this is specially true when we take the example of ethanol policy. Bearing this in mind, recent corruption scandals involving Petrobras – as funding company of political campaigns – and three political parties (PT, PMDB, and PP) show the big influence of the oil sector into political decisions.

According to Pires (2016:online), due to the domestic gasoline subsidies that have been practiced since 2008 by the federal government, Brazil has not followed the global trend of gasoline price: when the oil prices were high, the government forced Petrobras to sell gasoline and diesel cheaper than global prices; when the oil prices plummeted (since 2013), domestic gasoline prices had boosted (see Chart 3). Consequently, these heterodox policies have increased macroeconomic imbalance and have also undermined ethanol competitiveness (Viola and Basso 2016:12).

Chart 3 - International Oil Prices related to Brazilian Gasoline Prices (2001 - 2016)

![Chart 3 - International Oil Prices related to Brazilian Gasoline Prices (2001 - 2016)](source: elaborated by author (2017) based on OECD (2016) and ANP (2017) data)

Moreover, Petrobras also suffered from the federal subsidies applied to gasoline. According to Almeida, Oliveira e Losekann (2015), from 2011 to 2014 Petrobras’ lost BRL 119 billion due to the price control policy adopted and to the huge amount invested in pre-salt exploration. As we can see in Chart 3, from 2001 to 2005, Brazilian gasoline price was higher than international oil prices. In 2008, the government started to subsidize gasoline, leading to lower domestic prices, in comparison to international oil prices. This movement (strong federal subsidies to gasoline), which ended in 2014, undermined ethanol competitiveness, even after the decline of international oil prices. Moreover, despite of gasoline high prices, ethanol production costs increased 70% from 2007 to 2011 with slow productivity improvements and lack of investments in new mills and infrastructure (logistic), which also
undermined its competitiveness.

Another great example to the governmental preferential tax treatment on gasoline prices can be seen in the decline of CIDE\textsuperscript{7} - applied only for gasoline –, which remained very low in the last five years and, as a consequence, had contributed to undermine ethanol competitiveness in Brazil. Nowadays, CIDE is BRL 0,10/liter, however, it is necessary to achieve BRL 0,60/liter in order to give ethanol competitiveness over gasoline\textsuperscript{8}. Not surprisingly, Brazil’s support for ethanol has changed from strong support between 2003 and 2008 to weak ethanol support and strong oil support since 2008. Thereby, Brazilian fuel price policy (mainly due to subsidies to gasoline and the decline of CIDE) also plays a crucial role in explaining governmental decisions and policy outcomes in the ethanol sector.

Besides some authors argued that the increasing in State intervention was a good deal for ethanol sector regulation in order to give more competitiveness to this industry, what we see in the Brazilian case is the opposite: ethanol has lost competitiveness since 2008 due to policy mistakenly adopted by State, which stimulates oil rather than ethanol. Indeed, the Brazilian State is strongly committed to the oil sector rather than ethanol, especially after 2011, when the ties between domestic political parties have became stronger.

In short, since 2011 the state has reinforced oil consumption and production – through subsidies – that had undermined ethanol competitiveness. One of the main reasons lies on the fact that Brazilian major oil company belongs to the state (Petrobras) and the pre-salt discoveries shifted the government discourse from ethanol support to oil support, as we can see in the second administration of Lula da Silva, when the president suggested the interest of becoming an OPEC member, at the end of 2007, when the pre-salt discoveries were published.

### 3.3 International Prices Dimension

Brazilian ethanol policy outcomes have been influenced by two international variables: oil and sugar international prices. The interviews carried out for this paper suggest that oil prices have impacted more directly than sugar prices, since several domestic legislation have guaranteed the amount of allocated sugar to ethanol sector. This amount varies from 45% to 55% and can be negotiate around 10% during the harvest. However, despite of domestic

\textsuperscript{7} Law number 10.336 of December 19, 2001 created the CIDE in replacing the Specific Price Parcel (PPE, in Portuguese).

\textsuperscript{8} Interview #6 (Sugarcane Industry Union)
policy preferences, international oil prices have influenced federal policies towards oil over ethanol directly. This way, our focus will be on international oil prices.

In a nutshell, oil prices can be considered a barometer of Brazilian ethanol policy: when oil prices increase, federal policy measures stimulate ethanol production and exports (more investment and construction of ethanol plants); when oil prices decline, Brazilian government tends to encourage oil rather than ethanol because ethanol demand weakens. Nevertheless, this trend had changed since the pre-salt discoveries and the federal subsidies applied to gasoline undermined ethanol competitiveness. Thus, international oil prices can be an important element to analyze the Brazilian ethanol policy changes towards a more conservative profile related to the energy behavior.

Several authors have also demonstrated the relation between ethanol production and oil prices (Zhang et al., 2010; Pokrivcak and Rajcaniova, 2011), which also impacted on ethanol policy outcomes. Many of them agreed that oil prices affect ethanol prices indirectly through gasoline prices (Zhang et al., 2010). Then, “as the global economy expands or contracts, oil prices are affected, placing pressure on gasoline prices which then influence ethanol prices” (Pokrivcak and Rajcaniova, 2011:396). Furthermore, the price linkage between ethanol and oil is more complex because they are both complements and substitutes in Brazilian market: on the one hand, ethanol is mixed into gasoline; on the other hand, ethanol was introduced as a substitute for oil (FFV fuelled by hydrous ethanol).

To illustrate oil prices’ importance on the Brazilian ethanol policy, three moments need to be clarified: the 1970s oil shocks, oil prices in 2008 during the financial crisis, and oil prices since 2013. Accordingly, international oil prices varied along the time, but the oil shocks of 1970s presented a great challenge to the world economy as a whole. As a consequence of the 1970s oil shocks, the OPEC raised the price from USD 3 per barrel to USD 12, and this price has remained until 1979 (Yan, 2012:40). This movement caused drastic economic changes all over the world, and those economies heavily dependent on imported oil suffered the deterioration of their balance of payment, as the Brazilian case. At that time, the Brazilian government launched the Proálcool.

The second moment that has a strong impact on Brazilian ethanol policy is the 2008’s oil prices. In the middle of 2008, oil prices were nearly USD 150/barrel, but the outbreak of financial crisis, in the second half of the year, dropped oil prices at the lowest level in recent years, to USD 40/barrel (Yan, 2012:41; OECD, 2016).
In a broader way, international oil prices’ fluctuations have been faced in all stages of the global economy. Yan (2012:41), for instance, argues that these fluctuations are not only caused by the basic economic rule of supply and demand, but by a sort of factors, like influence of dollar exchange rate, the opportunistic practices in the futures market, geopolitical instability, emergencies (e.g., extreme climate events), the security of the oil traffic path. Moreover, new discoveries, increasing demand in developing countries (India and China, for example), shale gas revolution, natural liquefied gas impacted directly on oil politics. These factors unfold the third moment: fell in oil prices after 2013.

Finally, Chart 3 sheds light to a mismatch when we overlap international oil prices – which have traditionally influenced ethanol policy – with Brazilian ethanol production. To understand this mismatch, we should take a look at four moments: 1) 1990 – 2003: ethanol domestic production was following the global oil prices; 2) 2003 – 2007: increase in oil prices stimulated ethanol production, since they are both complementary and substitute fuels. However, the third (2008 – 2013) and fourth (2014 – 2015) moment shows that, despite the growth and decline of oil prices, ethanol production in Brazil was reduced (2011 – 2012) and remained stagnated (2013 – 2015), suggesting that other elements beyond international dimension can be the reason for this mismatch of oil prices and ethanol production. Next section provides some insights about these other elements (domestic ones) that can be explanatory drivers for Brazilian ethanol policy setbacks.


Regarding these three analytical dimensions proposed previously (foreign policy,
domestic policy, and international prices), we could observe that conservative forces are deep-rooted into Brazilian political system. Hence, Viola et al. (2013) put on evidence the singularity of Brazilian politics as a country dominated by short-term policies in order to keep the particularism ties of national oligopolies, mainly those surrounded by fossil fuels. Nevertheless, climate change mitigation and energy decarbonization process require long-term policies rather than short-term. This excessive concern about short-term and electoral logic – linked with crisis in the democratic system (Viola et al., 2013:109) – does not provide effective solutions to the climate change problem concerning energy.

Bearing in mind the climate commitment in order to classify a country into conservative or reformist, the Brazilian energy behavior concerning ethanol clearly shows low-commitment. This low-commitment can be seen through Brazilian democracy, which is classified as a medium-quality democracy based on: lack of transparency, low degree of accountability, party system that aggregates preferences, education, civic formation, equilibrium between individual and collective interests, limit of economic groups (e.g., big oil companies) over political parties (e.g., high corruption rates in Brazil) (Viola et al., 2013:54). Furthermore, the lack of institutional and civic culture to cope with climate change mitigation, short-term concerns, and the lack of consistent public policy towards decarbonization locked Brazil into a moderate conservative profile, despite of the non-linearity of democracy-climate change commitment (Viola et al., 2013:55; Unruh, 2000).

One of the main drivers of this energy behavior is the close ties between political parties and the oil sector as campaign funding, especially since 2011. In this power play between gasoline, oil, diesel, and ethanol industries, the latter has a limited influence over political parties whereas the other three has privileged channels of action, noted two interviews from the Brazilian National Congress. Then, throughout the decision-making process, “[government] leaders need the support of interests groups, and to gain it, they must promote (retard) the policies that help (hurt) these groups” (Milner, 1997:35). As interests groups seek to maximize their income, policies adopted by the government influence their ability to do so, since these policies are responsible for the distributional income for interests groups (Milner, 1997:60). So, oil sector power over the Brazilian political system increased the Brazilian conservative profile towards climate change unfolding two outcomes: 1) reinforcement of fossil fuel consumption and production; 2) reduced ethanol competitiveness.

Despite of Brazilian advances on climate policy in 2009/2010 (Climate Bill and COP15
commitments), we can observe a lack of institutional sensibility towards low-carbon development in the energy field. This element reflects the high degree of Brazilian politics fragmentation, dysfunctionality, and policy coherence towards biofuels. Moreover, these three elements can be seen through short-term policy concerns and the prevailing of private interests of big companies (especially those related to oil). This way, there is a carbon lock-in situation in Brazilian energy policy, in which renewable energy has had difficulties to develop due to the close ties between the Executive power and the oil sector, especially since 2011.

The lack of long-term policies lies on the sovereignty view of Brazilian energy policy, in which national interests attached to Petrobras (State-owner company). Then, to escape from a carbon lock-in situation and moving towards decarbonization is necessary to adopt a post-sovereignty view. However, this movement is difficult since conservative forces related to oil sector are increasingly interrelated to political parties, revealing difficulties of ethanol complex to influence the Executive power to promote renewable fuels, despite of the hard work done by the Brazilian Sugarcane Industry Association lobby (UNICA, in Portuguese).

Finally, since pre-salt discoveries (2007), then, the convergence between the government coalition and the oil coalition has been due to government economic interests to avoid huge inflation rates. On the other hand, this convergence left little room for the ethanol sector influence on the decision-making process. So, the lack of investments, decrease in FFV sales, increasing subsidies on oil industry, ethanol diplomacy erosion, and the mismatch between Brazilian energy policy and international oil prices reinforces the strong ties between government and conservative forces, considering the high degree of influence of the latter in the energy policy decision-making.

5. Concluding Remarks

This article aimed to understand which domestic and systemic factors shaped Brazilian domestic and foreign policies for ethanol from 2003 to 2016, emphasizing the role played by conservative forces. Then, we first developed some theoretical guidelines about the interplay between domestic and foreign politics in order to understand the framework proposed by Viola et al. (2013) of international system under conservative hegemony as an eclectic approach to better analyze the Brazilian energy behavior within country’s climate policy.

The acceleration of the history brought some new challenges to the international system.
Among these challenges, climate change appears as a civilizational driver, requiring cooperation and changes in the global consumption pathways. However, some countries are resisted to change and to build up an effective global governance to cope with climate change problem due to a sovereignty profile strongly marked by national interest concerns. This resistance has led to an international system under conservative hegemony, with the prominence of conservative forces over reformist ones. Also, this is especially true when we look at countries’ energy behavior; extremely lock into carbon structures (fossil fuels), which slow down the decarbonization process, as the Brazilian case.

Accordingly, we presented three analytical dimensions: foreign policy, domestic policy, and international prices (oil). As noted previously, ethanol diplomacy remained very low active since 2010 due to the lack of Brazilian efforts to promote ethanol internationally. This is reinforced through the domestic policy dimension: low investment rates, decline in FFV sales, pre-salt oil discoveries (which required huge investments), federal subsidies applied to gasoline (freezing its price, while ethanol prices continued to increase). International prices (mainly oil prices) influenced Brazilian ethanol policy from the 1970s until 2007/2008, when domestic politics concerns (conservative forces related to oil sector) started to strongly influence the Executive power – the ultimate decision-maker in the energy policy – leading to a process of petrolization of politics.

Ultimately, besides some authors argued that the increased State intervention was a good deal for ethanol sector regulation in order to give more competitiveness to this industry, what we see in the Brazilian case is the opposite: ethanol has lost competitiveness since 2008 due to policy mistakenly adopted by State, which stimulates oil rather than ethanol. Indeed, the Brazilian State is strongly committed to the oil sector rather than ethanol, especially after 2011, when the ties between domestic political parties have became stronger. Moreover, international oil prices seem to be detached from Brazilian energy policy outcomes. Thereby, these oligopolistic ties and excessive short-term concerns about elections reinforce Brazilian conservative forces (oil) over reformist (renewable energies) due to the domestic politics embeddedness into a carbon lock-in situation, which is widespread around the international system under conservative hegemony.

References:

AFIONIS, Stavros; STRINGER, Lindsay; FAVRETTO, Nicola; TOMEI, Julia and BUCKERIDGE, Marcos (2016). Unpacking Brazil’s Leadership in the Global Biofuels


______ (2017). Fotografia do setor sucroenergético no Brasil. Available at:


