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Contrary to conventional wisdom on Brazil as a case of nuclear proliferation, archival evidence indicates that, rather than geopolitical rivalry with Argentina, enduring desire for national autonomy—honor more than sword or shield—drove Brazil during the 1980s to master its own uranium enrichment cycle.

In 1987, the President of Brazil officially announced Brazilian mastery of the uranium enrichment cycle, unleashing a wide-ranging fear that the newly acquired capacity would be tied to construction of a nuclear bomb.[1]

Although this unsettling prospect never materialized, the Brazilian nuclear program remains steeped in controversy and engages different theories for why the Brazilian government started it in the first place. Explanations such as "extreme megalomania to create the bomb"[2] or "to serve the interests of German private capital, which provided technology and equipment for the program,"[3] seem to be, to say the least, precipitate. Most of the debate has been grounded on speculations rather than on documented evidence. Recently, reams of documentation on nuclear statecraft have become available through declassification. These documents shed light on a wide range of subjects about the international politics of nuclear weapons, and they have the potential to reshape the ways that scholars think about important aspects of the nuclear age.[4]

This study focuses on the reasons that led Brazil, "a peaceful country by tradition and belief," to pursue nuclear technology, a costly endeavor heavily condemned within the international community. A longstanding assumption in nuclear proliferation discussions is that states seek to develop nuclear weapons when they face a significant military threat to their security that cannot be met through alternative means; if they do not suffer such threats, they will voluntarily remain non-nuclear states[5].

Students familiar with South American history might argue that this concept could, *de facto*, explain the Brazilian case. Brazil and Argentina, the most influential countries in South America, have been rivals since before their independence from Spain and Portugal was achieved. During negotiations for the Latin American Nuclear Weapons-Free Zone treaty (NWFZ) between 1964 and 1967, the two countries sought to preserve the right to conduct "Peaceful Nuclear Explosions"

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[2] *Revista Veja*, "Sarney Arma Seu Ciclo," September 1987, *Arquivo Veja, 992,* accessed December 07, 2014, http://veja.abril.com.br/arquivo_veja/capa_09091987.shtml.

[3] Rafael Vaz da Motta Brandão, "O Negócio do Século: O Acordo de Cooperação Nuclear Brasil-Alemanha" (Master Diss., Universidade Federal Fluminense, 2002).

[4] This paper relies on extensive use of primary sources made available by the Nuclear Proliferation International History Project in the Woodrow Wilson International Center in collaboration with Fundação Getúlio Vargas. I would like to record my special obligation to those institutions.

[5] Scott Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security 21*, no. 3 (1997): 54-86, p. 54.

(PNEs), which they argued could augment their security, sovereignty, socioeconomic prosperity, and prestige.
Our research, however, challenges the traditional wisdom asserting that Brazil attempted to develop nuclear weapons to face Argentina in an arms race. The key independent variable in the Brazilian decision to start a nuclear program does not rest on a security dilemma. It builds on a rooted conception of Brazil's national identity: specifically, its value on autonomy.

Autonomy is a fundamental concept for Brazilian foreign policy, but one not generally well understood in the North Atlantic World. The construction of a nuclear bomb was never a primary goal for Brazil. The program materialized Brazilian long-lasting aspiration for technological independence and, ultimately, state independence.

The Brazilian government initiated the secret "Autonomous Program," also known as the parallel program, in 1978, under American pressure for its attempt to develop nuclear technology. This essay builds the theoretical argument for why the Autonomous Program, rather than responding to the supposed compelling security threat from Argentina, addressed a broader, national, sovereign desire for greater autonomy in the direction of Brazil's foreign affairs.

WHY STATES BECOME NUCLEAR

The predominant tendency in studying nuclear proliferation is to assume that external threats to state security drive efforts to reach the nuclear threshold.[6] This concept is largely based on the Neorealist theory of International Relations, in which states exist within an anarchical system and must, therefore, rely on self-help to protect their sovereignty and national security.

Without rejecting this claim, Scott Sagan, in his work "Why Do States Build Nuclear Weapons?" provided a more comprehensive approach to the study of nuclear proliferation. Sagan suggested three models to assess the reasons motivating the search for a nuclear bomb. He held that the actions of a state in the international system should be assessed not only through the security lens but also by a set of domestic and cognitive variables, such as state institutions, the effect of societal decision-makers on foreign policy, and perceptions (or misperceptions) of systemic pressures.[7]

A distinct approach to the subject was developed by Victor Cha when analyzing North Korea's nuclear endeavor.[8] Cha used metaphors to represent the reasons behind the nuclearization of a state. His first image was the shield that would ensure against acts by the United States and others to crush the North Korean regime. Sword was the second symbol, representing aggressive and revisionist purposes. Cha's third metaphor was the badge, a symbol of prestige for an otherwise bankrupt regime.

The political scientist Jacques Haymans developed a compelling theory based on the notion that decisions to go or not to go nuclear reflect the psychology of the leaders who make them.[9] Haymans argued that big decisions are likely to stem from something

[6] Michael Barletta, "The Military Nuclear Program in Brazil," *Center for International Security and Arms Control* (August 1997), p. 2.
[7] Fareed Zakaria, "Realism and Domestic Politics: A Review Essay." *International Security* Vol. 17, No.1 (1992), p. 179.
[8] Victor D. Cha, "North Korea's Weapons of Mass Destruction: Badges, Shields, or Swords?" *Political Science Quarterly*, Vol. 117, No. 2 (Summer, 2002), p. 211.

[9] Jacques E. C. Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions and Foreign Policy*

other than a straightforward material cost-benefit calculation. In the case of the decision to go nuclear, which is located in the arena of high international politics, the relevant factors are nevertheless found in the leader's national identity conception. In his words, "there are discrete decisionmaking pathways leading from different national identity conceptions, through emotions, to ultimate nuclear choices."

This research adopts Scott Sagan's framework to analyze the Brazilian case in that it provides distinct and well-defined models to explain why states engage in proliferation. Sagan's first approach is the traditional "security model," according to which states build nuclear weapons to increase national security against foreign threats, especially nuclear threats. The "domestic politics model" envisions nuclear weapons as political tools used to advance parochial domestic and bureaucratic interests. The third line of reasoning, the "norms model," considers the fact that weapons acquisition, or weapons development, provides an essential normative symbol of a state's modernity and identity.[10] It is precisely this model that provides the strongest explanation for Brazil's nuclear trajectory.

In the next pages, we analyze the contributions of each of these three models on the Brazilian impetus to achieve nuclear capability.

THE BRAZILIAN NUCLEAR PROGRAM IN HISTORY

Brazilian internal debates on nuclear energy started in 1945 when the country was supplying atomic minerals for the Manhattan Project.[11] By that time, deliberations concerned whether to utilize and preserve the country's own natural resources to produce atomic energy.[12]

In 1947, the Brazilian National Security Council, comprising the president and the most important ministries in his cabinet, held a meeting to discuss a proposal made by the United States for the creation of an international acquisitions institution. The new organization would have exclusive rights for the acquisition of raw materials in the production of nuclear fuels using a quota system.

During this meeting, the primary concern of Brazilian officials was possible restrictions by outside authority of the country's minerals from its own soil for energy production. The discussion focused on a statement that would accept the American proposal while ensuring the use of raw minerals as an alternative source of energy for Brazil.

In its response, Brazil supported the creation of the international agency charged with the control of atomic minerals. Nevertheless, the reply stated that "because Brazil was poor in current fuels, such as coal, we believe that it should not relinquish the right to utilize its own raw material for peaceful purposes and under the control of the international agency,

(Cambridge: Cambridge University Press, 2006).
[10] Sagan 1997, 55.
[11] Brazil has known resources of 278,000 tons of uranium—5% of world total.
[12] Minutes (1), August 27, 1947, Brazilian National Security Council, Tenth Session, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center.

after having supplied the quota assigned to it for world distribution."[13]

Several years later, Brazil acquired its first research reactor, thanks to a cooperation agreement signed with the United States under the program "Atoms for Peace." In the early 1950s, Brazilian activities in the nuclear sector were essentially confined to academic and theoretical studies on the nature of the materials. In 1964, beginning a pattern that would encompass almost all South America, a coup and permanent military government took control in Brazil. The military ruled the country until 1985, and the decision to develop indigenous nuclear technology materialized, earlier, in 1972. At that time, Brazil acquired a uranium power reactor from the United States, which supported its first nuclear power plant: *Angra I.*

The world oil crisis of 1973 advanced Brazilian nuclear plans and, in 1975, Brazil signed a nuclear cooperation agreement with West Germany. The agreement envisioned the construction of eight nuclear power plants along with full technology transfer related to the nuclear fuel cycle, and the design, engineering, and manufacturing of nuclear power plant components.

Although Brazil invested heavily to assemble an industrial structure and acquire technology required for the construction of nuclear power plants and to produce uranium concentrate, the 1970s witnessed renewed international concern against nuclear proliferation. India successfully tested its nuclear device (1974), and numerous developing countries such as Argentina, Iraq, Libya, Pakistan, South Korea, Taiwan, and Brazil made strides in the field of nuclear technology.[14] In response, U.S. President Jimmy Carter, encouraged by the American Congress, made nuclear non-proliferation a top policy priority early in his administration. Even before entering office, in November 1976, Carter gave a speech that set the tone for a very assertive stance on non-proliferation, specifically, to block the sale of fuel reprocessing plants from France and West Germany, respectively, to Pakistan and Brazil.

Carter's vice-president, Walter Mondale, in an official visit to FRG President Helmut Schmidt, reiterated his administration's viewpoint and requested that the German-Brazilian agreement be suspended for review.[15] The demand triggered negative responses from both the Brazilian and German administrations and led to an immediate souring of US-Brazil relations. Expressing Brazilian government reaction, an official of the Ministry of Mines and Energy stated that the nuclear program would continue…

"at least to the extent it depends on us, against all internal and external pressures. The Germans know that we acted with seriousness in signing the agreement. We do not want the atomic bomb. We want to be independent, to construct our future, and to prevent (the effects of) any future world petroleum and energy crisis. Brazil will not give way."[16]

Constraints imposed by the United States, perceived as an external actor meddling in the

[13] Currently, coal accounts for less than 6% of Brazil's total primary energy supply. The country imports 50% of the coal consumed. Minutes (1) 1947.

[14] Dani Nedal, "US Diplomatic Efforts Stalled Brazil's Nuclear Program in 1970," *Nuclear Proliferation International History Project*, Wilson Center (Jul 2012), https://www.wilsoncenter.org/publication/us-diplomatic-efforts-stalled-brazils-nuclear-program-1970s.

[15] Ibid. FRG stood for Federal Republic of Germany (West Germany).

[16] Cable (1), Nov. 19, 1976, US Embassy in Brazil, "Brazilian Public Reaction to US Nuclear Policies," History and Public Policy Program Digital Archive, National Archives and Records Administration.

country's sovereignty, had great bearing on technical and political aspects of Brazil's nuclear program. The construction of *Angra I* by the American company Westinghouse was severely delayed, as were the *Angra II* and *Angra III* plants, also specified in the initial agreement. U.S. opposition to the transfer of German ultracentrifugation technology led to a German-Brazilian joint investment focusing on the development of enrichment by jet nozzle, which ultimately proved to be technically and economically impractical. Most important were the safeguards placed in the arrangement between Brazil and Germany and the subsequent tripartite agreement with the IAEA. Together, they imposed severe limits to the range of research and experimentation that could be performed in Brazil with materials, technology, and facilities associated with the German agreement.

The development of nuclear technology through cooperative agreements with other countries could not meet Brazil's aspirations. Given the constraints imposed by major powers and international regimes, if the country wanted to make real progress on enrichment technology, the argument went, it would have to work covertly and by cooperating with other countries on the margins of nuclear regimes. The rationale led to the creation, in 1978, of the Autonomous Nuclear Program, also known as the parallel program, free of safeguards and supposed to develop Brazil's indigenous enrichment process.

Military and civilian institutions were secretly assigned specific pieces of the nuclear project. The strategy was based on an association between the technical areas of the Navy, Army, Air Force and the National Nuclear Energy Commission (CNEN), supervised by the General Secretariat of the National Security Council. Several projects were assigned to the participating institutions.[17] The Air Force was responsible for developing the technology of uranium enrichment by laser. The Army would develop the technology of nuclear-pure graphite, with the objective of manufacturing moderators for natural uranium reactors. CNEN was assigned a variety of projects, ranging from the production of uranium compounds (natural and enriched), fuel reprocessing for the production of plutonium, and the preparation of metallic uranium and its applications.

Ultimately, two projects assigned to the Navy stood out: *Project Cyclone*, aimed at uranium enrichment through the process of ultracentrifugation, and *Remo*, which focused on the development of naval propulsion technology to equip nuclear submarines.[18] According to the report of a former Minister of the Navy, the construction of the first ultracentrifuge was completed in December 1981 through the work of seven engineers under the leadership of a Navy officer who had been studying nuclear energy in the United States from 1975 to 1978.[19] The minister explained that "among the technicians who worked on its development, there was a group dedicated exclusively to the nationalization of components, since they could not be purchased abroad, as a result of external pressures contrary to our project."[20]

[17] Memorandum (1), Danilo Venturini to João Baptista de Oliveira Figueiredo, February 21, 1985, Secretary-General of the National Security Council, Autonomous Projects in the Nuclear Field, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center.
[18] Memorandum (1) 1985.
[19] Then Captain Othon Luis Pinheiro da Silva.
[20] Brasil, Congresso Nacional, 1990, Relatório Final Da Comissão Parlamentar Mista De Inquérito Destinada A Apurar O Programa Autônomo De Energia Nuclear. Brasília: Senado Federal, 8, http://www2.senado.leg.br/bdsf/item/id/194598.

In September 1982, an isotopic uranium enrichment experience was successful, employing an entirely indigenous ultracentrifuge. In September 1984 the operation of the first mini-cascade of ultracentrifuges was initiated. Three years later, after the first centrifuges "accumulated thousands of hours of operation," José Sarney, the first civilian president after the military dictatorship, officially announced Brazilian mastery of the uranium enrichment cycle. In his announcement, Sarney highlighted "a fact of greater transcendence in the scientific history of the country."[21]

Worth noting, the announcement was not followed by the development of a nuclear bomb or attempts to develop or acquire vehicles to deliver a nuclear warhead (strategic bombers, intercontinental ballistic missiles, or submarine-launched ballistic missiles). Presumably, the country took the opposite direction because in 1988 Brazil promulgated a new constitution where it openly renounced the development of nuclear weapons.

In 1991, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) was set up.[22] Conversations led to the Quadripartite Agreement among Brazil, Argentina, ABACC and the IAEA, which entered into force in 1994 with full-scope safeguards under IAEA auspices including naval facilities.

Brazil became a member of the Nuclear Suppliers Group in 1996. The country traditionally opposed the Nuclear Non-Proliferation Treaty (NPT), arguing that it did not exempt peaceful nuclear explosions for civil engineering and that it addressed non-proliferation rather than the more fundamental question of nuclear disarmament.[23] It was only in 1998 that Brazil signed the NPT as a non-nuclear-weapon state under President Fernando Henrique Cardoso.[24]

SECURITY MODEL: ARMS RACE AGAINST ARGENTINA?

History provides compelling arguments favoring the security model as an explanation for national nuclear quests. Britain and France are seen to have built nuclear weapons due to the growing Soviet military threat. Also contributing to their initiatives was reduction in credibility of the U.S. nuclear guarantee to NATO allies, once the Soviet Union was able to threaten retaliation against the United States. China developed the bomb because Beijing was threatened with possible nuclear attack by the United States at the end of the Korean War and again during the Taiwan Strait crises in the mid-1950s. After China developed the bomb in 1964, India, which had just fought a war with China in 1962, was bound to follow suit and detonated what was called a "Peaceful Nuclear Explosion" (PNE) in May 1974. After the Indian explosion, however, the nascent Pakistani weapons program had to move forward according to the security dilemma: facing a recently hostile neighbor with both nuclear weapons and conventional military superiority, the government in

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[21] José Sarney, "Ao Anunciar a Vitória do Programa Autônomo de Tecnologia Nuclear" (speech, Brasilia, DF, September 04, 1987), Casa Civil da Presidência da República do Brasil, http://www.biblioteca.presidencia.gov.br/ex-presidentes/jose-sarney/discursos/1987/76.pdf

[22] In the same year, Brazilian president Fernando Collor de Melo finalized the "Parallel Program", as an attempt to reinsert Brazil in the international system.

[23] Nevertheless, the country signed the Tlatelolco Treaty on the regional prohibition of nuclear weapons in 1967.

[24] Tlatelolco refers to the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean.

Islamabad sought to produce a nuclear weapon as quickly as possible.[25]

Due to the enormous destructive power of a nuclear device, any state that seeks to maintain its national security must balance against a rival state that develops nuclear capacity by gaining access to a nuclear deterrent itself. Strong states can adopt the costly but self-sufficient policy of developing their own nuclear weapons. Weak states can join a balancing alliance with a nuclear power, exploiting a promise of nuclear retaliation by that ally as a means of extended deterrence. For developing countries, acquiring a nuclear ally may be the only option available.[26]

Karsten Frey has argued that, although security-centered explanations have deficiencies, it is reasonable to assume that the desire for self-preservation figures prominently in the preference system of any state with regard to its nuclear choice. This desire, however, is guided less by relative power distribution than by security perceptions that originate from nuclear weapons' symbolic stature as the ultimate weapons and the embodiment of the human fantasy of invulnerability. In other words, from the viewpoint of the "proliferant," nuclear weapons figure as totems of power, which increase the perception of security. Notably, the motivation for doing so is the actor's abstract sentiment of fear, not necessarily existing danger.[27] This concept is critical when we assess the Brazilian security environment during the period when the country pursued nuclear capability.

Brazil peacefully settled all of its unresolved territorial disputes with neighboring countries early in the twentieth century. As a result, for over a hundred years the country has considered itself "geopolitically satisfied," with state-building progressing through diplomatic negotiation rather than engagement in military disputes.[28]

Interstate relations within South America have been remarkably placid, to a degree unmatched in most other regions of the world. Regardless of enduring bilateral rivalries and several militarized interstate crises, countries in South America in general paradoxically avoided large-scale, intra-regional war. In two hundred years (1816-2016), they waged four major wars in the nineteenth century, one in the first half of the twentieth century, and none since the end of the Chaco War between Bolivia and Paraguay in 1935.[29]

Miguel Angel Centeno attributes this relative scarcity of international wars in Latin America to the absence of a strong centralizing state authority during a long period of the region's history.[30] Because Latin American states developed so late, in the late nineteenth century, there were simply too many conflicts occurring within each state for these countries to have much energy to fight one another. Centeno argues that the internal struggles, the never-resolved social and economic divisions, and lastly, the inertia

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[25] Sagan 1997, 59.
[26] Sagan 1997, 57.
[27] Karsten Frey, "Nuclear Weapon as Symbols: The Role of Norms in Nuclear Policy Making," *IBEI Working Papers 3* (2006), p. 11. Frey expresses similar concepts as Robert Jervis in his classic *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press, 1978).
[28] Maria Regina Soares de Lima and Mônica Hirst, "Brazil as an Intermediate State and Regional Power: Action, Choice and Responsibilities," *International Affairs* Vol. 82, No. 1 (Jan 2006): 21-40, p. 22.
[29] Felix E. Martín, "The Militarist Peace in South America, 1935-2003" (paper prepared for delivery at the 2004 Annual Meeting of the American Political Science Association, Washington, DC, Sep. 2004), p. 2.
[30] Miguel Angel Centeno, *Blood and Debt: War and the Nation-State in Latin America* (University Park, PA: Penn State University Press), 2002.

of peace "made it practically unimaginable to break with the geopolitical status quo in Latin America."[31]

The most troubling rivalry in South America nevertheless pitted Argentina and Brazil. Beginning before they achieved independence from Spain and Portugal, the rivalry heated up in the nineteenth century when Hispanic nations opposed Brazil's attempts to maintain a presence in the area of Rio de la Plata. Countries engaged in repeated armed clashes, the most important being the Cisplatine War (1825-28) between Argentina and Brazil. Even after most of the border conflicts were settled, the rivalry between these countries persisted.[32]

By 1979, however, the two countries achieved an important diplomatic rapprochement, concluding the "Acordo Tripartite" among Brazil, Paraguay, and Argentina over the construction of a hydroelectric dam on the Paraná River located on the border between Brazil and Paraguay.[33] The agreement constituted a key factor in stabilizing relations in the region and is considered the gold standard with respect to international politics and diplomacy.[34] After harmonization between the most prominent actors of the continent, regional integration continued apace in South America: Brazil and Argentina engaged in fruitful cooperation, and this appeared to lay the foundation for South American integration.

As early as 1967, civilian bureaucracies engaged in nuclear research both in Argentina and Brazil were already seeking "a direct exchange of ideas between Brazilian and Argentine technicians to establish broader contact and cooperation between the two countries in the field of nuclear energy."[35] Beginning in 1976, Brazil bore the brunt of American pressure to change its nuclear program with the Federal Republic of Germany. Remarkably, to balance the pressure from Washington, Brazil found support only from Argentina.[36] Collaboration between the two countries on nuclear subjects was reinforced from 1980 as a consequence of signing cooperation agreements and by means of diplomatic events such as the 1988 visit of Argentine President Alfonsín to the isotopic enrichment plant in Iperó.

In many cases, Buenos Aires and Brasilia coordinated their policies concerning international non-proliferation regimes.[37] Both governments decided to impose limits on their respective nuclear programs and to rewrite their doctrines of national security, transforming the neighbor into a partner. They created formal mechanisms for generating mutual trust, as was the case of the "cross-check," method by which inspectors

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[31] Ibid.

[32] H. Jon Rosenbaum, "Argentine-Brazilian Relations: A Critical Juncture," *The World Today* Vol. 29, No. 12 (Dec. 1973): 537-538.

[33] Argentina was concerned that, in the event of a conflict, Brazil could open the floodgates, raising the water level in the Río de la Plata and consequently flooding the capital city of Buenos Aires.

[34] Tullo Vigevani, Gustavo Favaron, Haroldo Ramanzini Júnior and Rodrigo Correia, "O Papel da Integração Regional para o Brasil: Universalismo, Soberania e Percepção das Elites," *Revista Brasileira de Política Internacional* Vol. 51, No. 1 (2008): 477.

[35] Letter (1), Director of the Argentinian National Atomic Energy Commission (CNEA) to Argentinian Foreign Ministry, December 29, 1967, Possible agreement for nuclear cooperation between Brazil and Argentina, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center.

[36] Memorandum (2), Héctor A. Subiza, Head of the Latin American Department of the Argentinian Foreign Ministry to the General Political Directorate, August 23, 1979, Cooperation with Brazil in the Nuclear Field, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center.

[37] Carlos Patti, "O Programa Nuclear Brasileiro entre Passado e Futuro," *Boletim Meridiano* Vol. 47, No. 140 (2013), p. 54.

from a country evaluated nuclear facilities of the other.[38]

In 1983, Argentina achieved uranium enrichment by gaseous diffusion. A letter was sent from Argentine President Reynaldo Bignone to notify Brazil of the achievement before it was announced publicly. After reiterating the full and steadfast adherence to the policy of non-proliferation of nuclear weapons, the letter described Argentina's achievement as having "important regional projections, since it constituted a significant step toward Latin American self-sufficiency in a highly transcendental area."[39]

In his response, Brazilian President João Figueiredo congratulated Argentina and stated that the two countries "have already developed excellent cooperation on nuclear matters, and will continue to work in this manner for mutual benefit and the economic and social development of the entire Latin American community."[40] Appropriately, President Sarney subsequently sent an emissary to Argentina to inform President Raúl Alfonsín in 1987 that Brazil had obtained uranium enrichment technology. The political gesture was much appreciated in Buenos Aires.[41]

Even so, a contemporary report by the Central Intelligence Agency of the United States assumed that the announcement in late 1983 of Argentine enrichment capability greatly spurred the Brazilians.[42] It argued that some military officers believed that Buenos Aires had built, or could build, nuclear weapons and that Argentina posed a potential military threat. In any case, the report also confirmed that relations between the countries were quite good.

If the two countries did not fully trust each other due to some inherent wariness, Brazil and Argentina were nevertheless positively engaged in settling their antagonism and in cooperating on nuclear issues. Their collaboration in nuclear policies is perceived by some scholars—along with the Itaipu Dam agreement—as a hallmark of disjunction from their traditional rivalry.[43]

In effect, Brazil and Argentina shared the view that nuclear capacity was a right of every sovereign state. Both countries perceived as a constraint great powers' exclusivity and exceptionalism on nuclear matters. During conversations between presidents Alfonsín and Figueiredo to prepare

[38] Rodrigo Mallea, Matias Spektor, and Nicholas J. Wheeler, "Origens da Cooperação Nuclear: Uma História Oral Crítica entre Argentina e Brasil," transcripts from As Origens da Cooperação Nuclear entre o Brasil e a Argentina Conference (Rio de Janeiro, 21-23 March 2012).
[39] Letter (2), Argentinian President Bignone to Brazilian President Figueiredo, November 19, 1983, Folha de São Paulo, History and Public Policy Program Digital Archive, 4.
[40] Letter (3), Brazilian President Figueiredo to Argentinian President Bignone, November 19, 1983, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center.
[41] Rodrigo Mallea, "Resolving the Dilemma of Nuclear Mistrust: From Foz do Iguacu to the Constitution of ABACC (1985-1991)", Nuclear Proliferation International History Project, Wilson Center (Aug 15, 2013), https://www.wilsoncenter.org/publication/resolving-the-dilemma-nuclear-mistrust-foz-do-iguacu-to-the-constitution-abacc-1985-1991.
[42] Estimate, Director of Central Intelligence, October 21, 1983, "Brazil's Changing Nuclear Goals: Motives and Constraints", Freedom of Information Act Electronic Reading Room, Central Intelligence Agency, http://www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000787519.pdf.
[43] See Thomaz Guedes da Costa, "La Percepcion de Amenazas Desde El Punto de Vista de Los Militares Brasileros en Las Decadas del 70 y 80" (1993), and Everton Vieira Vargas, "Átomos na Integração: a Aproximação Brasil-Argentina no Campo Nuclear e a Construção do Mercosul," *Revista Brasileira de Política Internacional* Vol. 40, No. 1 (1997).

a joint declaration on the renunciation of nuclear explosives, there were clear efforts to undermine any possible security dilemma or arms race:

"I consider it of great importance for each of our countries, for their bilateral relationship and their image in front of the international community in general, that both could dissipate, in Latin America, in the USA and Europe, any idea of rivalry or ulterior motives in our respective nuclear programs, as well as not creating an opening through which someone could try to play us against one another."[44]

Argentinians considered "of great importance to maintain a relationship of cooperation and confidence with Brazil in the area, due to the benefits that this relationship could signify for both countries in terms of resistance to the nuclear regimes as envisioned by the great powers."[45] The belief that it was necessary to avoid great powers' constraints in nuclear matters repeatedly echoed in Brazilian declarations.

The joint action of Brasilia and Buenos Aires was decisive in negotiations of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco), between 1964 and 1967. In 1968, both countries refused to ratify the Treaty on the Non-proliferation of Nuclear Weapons (NPT) because they considered it discriminatory. Coordinated action of the two states in the international system sought to keep open supply routes of materials and nuclear technology and to legitimize their policies and projects in the nuclear field.[46]

In his seminal article, Sagan saw the Brazilian case as a perfect illustration of the security model. He judged that protracted rivalry between the two major South American countries motivated the search for nuclear power as a pathway to nuclear weapons. Sagan considered their refusal to complete the necessary steps to join the Latin American nuclear weapons-free zone as a consequence of their rivalry.[47]

Contrary to Sagan's assumption in this case, archival evidence attests that Brazil and Argentina positively engaged in bilateral cooperation on nuclear issues. They understood that their best strategy was to stick together against pressures of the non-proliferation regime, preserving their autonomy vis-à-vis the international system.[48] Brazilian resistance to join the NWFZ stemmed from its belief that the treaty should only come into effect upon unanimous adherence by Latin American nations, extra-regional nations with territories in Latin America, and the world's nuclear powers. From Brazil's perspective, one rogue nation could endanger Latin America's very existence.[49]

Certainly, hawkish statements were also part of the Brazilian discussions concerning the development of nuclear capacity. In 1967, during a session of the National Security Council, the Minister of Industry and Commerce stated: "to say that Brazil will not

[44] Memorandum (4), Brazilian Ambassador Roberto Abdenur to Minister Saraiva Guerreiro, January 10, 1985, Brazil-Argentina. Nuclear energy, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center, http://digitalarchive.wilsoncenter.org/document/116862.
[45] Memorandum (4), 1985.
[46] Vargas 1997, 44.
[47] Sagan 1997, 61.
[48] This argument is also present in Togzhan Kassenova, *Brazil's Nuclear Kaleidoscope* (Washington, DC: Carnegie Endowment for International Peace, 2014), 22.
49 Ryan Alexander Musto, "Latin America's Nuclear Weapon Free Zone: Fifty Years Later," Wilson Center, Sources and Methods (14 February 2017), https://www.wilsoncenter.org/Tlatelolco-at-50.

make arms with nuclear energy someday is an illusion. It will not be in our days, we may not wish it, but it may become an imperative of national security."[50] The statement is a clear reference to the use of the nuclear program to develop nuclear weapons.[51]

But, as Matias Spektor accurately points out in his research article, although some of the ministers present at the gathering made "references to the possibility that Brazil might use nuclear power for national security purposes as well," this possibility was left unspecified. It is also significant that there was no mention of Argentina or any other state as a threat against which Brazil might have to guard itself.[52] Brazilian leadership saw the nuclear program mainly as a method to achieve autonomy, not deterrence.

In 1990, five years after democracy had been reinstated in Brazil, a Joint Parliamentary Committee of Inquiry was created to investigate the "autonomous nuclear program." During one of the sessions, the former minister of the Navy, Admiral Maximiano da Fonseca, supported the argument that the parallel program was kept secret "not to hide from public opinion," but to protect the project and the Brazilian government from the tremendous international opposition. He cited several examples of equipment sales and bans on technology transfer in this area. For him, "the major powers assume that only they, exclusively they, have the right to produce nuclear artifacts." He argued that United States pressure was very strong: "Mainly American. They lead all this. The (pressure) of them is terrible. It was terrible at that time."[53]

Although security explanations convey much of the conventional wisdom about Brazil's nuclear program, the first presumption is that its foremost objective was to build a nuclear weapon aimed at balancing Argentinian power. We cannot rule out this factor as a contributor to the Brazilian enterprise, but it was not its main objective, even when the program changed to a secret character. For example, no simultaneous development of a nuclear delivery system—neither strategic bombers nor a ballistic missile program—accompanied the program.[54]

Extensive documentation shows that the Brazil-Argentina rivalry greatly *decreased* by the time Brazil proceeded with its secret nuclear program. Ultimately, the two countries joined in diplomatic efforts to face the pressure of international non-proliferation policies. In reality, today, their nuclear programs are considered a milestone in bringing the two countries together toward a stable, peaceful relationship.

DOMESTIC FACTORS INFLUENCING BRAZIL'S DECISION

Whether or not the acquisition of nuclear weapons serves the national interest of a state, it is likely to serve parochial

[50] Minutes (2), October 04, 1967, Brazilian National Security Council, Fortieth Session, Brazilian Nuclear History, Nuclear Proliferation International History Project, Wilson Center, http://digitalarchive.wilsoncenter.org/document/116914. In 2009, vice president and former minister of defense, José Alencar, told Brazilian newspaper *O Estado de São Paulo* that nuclear weapons could provide Brazil with a deterrent power and result in more "respectability" from the international community.

[51] Within the documents analyzed, this is the main reference to nuclear weapons.

[52] Mathias Spektor, "The Evolution of Brazil's Nuclear Intentions," *The Nonproliferation Review*, Vol. 23, No. 5-6 (2016), p. 635-652.

[53] Brasil, 1990.

[54] See Yogesh Joshi, "The Imagined Arsenal. India's Nuclear Decision-Making, 1973–76," in the Nuclear Proliferation International History Project, Wilson Center.

bureaucratic or political interests of at least some individual actors within the state. Sagan's second model of nuclear proliferation focused on domestic actors that encourage governments to pursue a nuclear bomb. Actors interested in the acquisition of nuclear weapons commonly belong to the military, the military-industrial complex, the nuclear scientific establishment, and the political class. Frequently, the common interest of these actors leads to the formation of a coalition, a "strategic elite," which seeks administrative as well as communicative power.[55]

Sagan posited that when such actors form coalitions and are strong enough to control the government's decision-making process—either through their direct political power or indirectly through their control of information—nuclear weapons programs are likely to thrive. Brazil's first real strides in the field occurred under the military regime that ruled from 1964 to 1985. In 1967, the government of General Artur da Costa e Silva drew up a detailed plan for the full development of nuclear energy and, simultaneously, adopted a policy of firm opposition to the Non-Proliferation Treaty (NPT) while concurring, albeit with reservations, on the NWFZ in Latin America.[56]

Naturally, military roots had—and still have—an overwhelming influence on Brazil's nuclear program. Brazil is the only non-nuclear-weapon state in which the military leases uranium enrichment technology to the civilian nuclear program. When the autonomous program was created, all three branches of the Brazilian military were engaged in the nuclear effort.

Moreover, the Navy's pursuit of uranium enrichment was the most determined and sustained effort of the entire parallel nuclear program. The Navy's nuclear-fuel-cycle commitment was largely driven by its ambition to build a nuclear-powered submarine. They implemented the initial stage of the fuel-cycle project at an impressive speed, working out of Brazil's Nuclear Energy Research Institute (IPEN, University of São Paulo). By 1981, the Navy built two centrifuges for uranium enrichment, and by 1984, it ran nine centrifuges at IPEN. The Air Force and the Army's projects eventually fizzled, but the Navy's program continued, unabated by changes in the Brazilian political landscape after 1985.[57]

Under civilian governments, the Navy program persisted, and its survival was never jeopardized, despite fluctuating funding levels. In the early 1990s, Brazil's second civilian president after the dictatorship, Fernando Collor de Mello, fully disclosed the parallel nuclear program and publicly condemned it. Notwithstanding stated objections, his appointment of Admiral Mario César Flores, one of the main supporters of the submarine program, as the minister of the Navy guaranteed enough funding for the program to survive.[58]

Whereas Brazil's domestic political situation and its regional environment underwent major transformations, the Navy's nuclear-fuel-cycle and nuclear submarine projects remained as constant elements of Brazil's nuclear landscape. This constancy was possible because, even after the military government transitioned out of power and the first civilian president took office (1985), the military retained significant authority, and managed to withstand top-down political pressures.

[55] Frey 2006, 14.
[56] Patti 2013, 51.
[57] Patti 2013, 53.
[58] Kassenova 2014, 27.

Furthermore, the Navy's aspiration to develop a nuclear-powered submarine was well established. In 1967, during the National Security Council meeting that discussed the guidelines for Brazilian nuclear policy in President Costa e Silva's government (1967-1969), the minister of the Navy emphasized the importance of nuclear energy since it could be used to propel a nuclear vessel. He stressed that the "Navy has been dealing with the question of nuclear energy because it considers that indispensable."[59]

Scott Sagan correctly pointed out that the Brazilian Nuclear program served interests of the atomic industry bureaucrats and the military.[60] However, contrary to what Sagan asserted, the military, in fact, managed to maintain the program despite new civilian regimes. The role of the military services, particularly of the Brazilian Navy, was fundamental to the nuclear program. Although construction of a nuclear bomb was not a primary goal for Brazil, the military understood (and expressed) that, once nuclear capacity was achieved, only "a political decision" would be necessary to develop nuclear weapons.[61]

THE NORMS MODEL: NATIONAL IDENTITY AS THE MOST IMPORTANT FACTOR

"It is necessary that Brazil make it clear to the United States and the world the difference between antagonizing confrontation and confrontation for autonomy. The type of world that Brazil wants is multipolar, in which the South American system will have autonomy vis-à-vis the American system." [62]

Helio Jaguaribe, Brazilian sociologist, political scientist, and writer

Sagan's third model focuses on norms concerning nuclear capacity, seeing nuclear decisions as serving important symbolic functions—both shaping and reflecting a state's identity. According to this perspective, state behavior is determined not by leaders' cold calculations about national security interests or their parochial bureaucratic benefits, but rather by deeper norms and shared beliefs about what actions a state understands as legitimate and appropriate in international relations.

Helio Jaguaribe's quote opening this section is one among countless declarations that reflects the paramount significance a particular image has to Brazilian intellectuals, military officers, political leaders, and in fact to all Brazilian society: the concept of an autonomous state. Brazilian political scientist José Flávio Saraiva Sobrinho comprehensively traced the concept of autonomy in Brazil's foreign policy since the country's independence from Portugal in 1822.[63] In certain historical periods, like the early 1960s, the concept of decision autonomy became jargon in Brazilian foreign policy. The idea penetrated various social and political layers in society, from the cabinets in parliament to the streets. It appeared in the vaunted "Independent Foreign Policy," which marked the governments of

[59] Minutes (1) 1967.
[60] Sagan 1997, 71.
[61] Estimate 1983.
[62] Quoted by Monica Hirst in "As Relações Brasil-Estados Unidos Desde Uma Perspectiva Multidimensional: Evolução Contemporânea, Complexidades Atuais e Perspectivas Para o Século XXI" (Ph.D. diss., Universidade Federal do Rio Grande do Sul, 2011).
[63] José Sombra Saraiva Sobrinho, "Autonomia na Inserção Internacional do Brasil: Um Caminho Histórico Próprio," *Contexto Interancional* Vol. 36, No. 1 (2014).

presidents Jânio Quadros and João Goulart (1961-1964).[64]

Interestingly, when Saraiva provided an example to illustrate the importance of autonomy to Brazil, he cited Admiral Álvaro Alberto Mota e Silva, who represented the country at the United Nations Atomic Energy Commission in 1947 and delineated the first proposal to establish a Brazilian nuclear program. According to Saraiva, Mota e Silva asserted Brazilian nuclear potential as a way to achieve autonomous scientific national progress.

Decision autonomy, ingrained in the "nature" of the country, did not change throughout democratic or authoritarian regimes. Appreciating the importance of this concept to the Brazilian nation is central to understanding that a key concern for the Brazilian military was possible interference of the major powers in Brazilian foreign policy. Constraints would be exerted, the argument goes, by controlling technological flows and armament transfers for the country. The concern boosted Brazilian determination to establish a national military industry. From the 1970s, Brazil's fixation on national autonomy supported efforts of nationalization for projects and components that would integrate supplies to the three services.[65] In the 1980s, Brazil addressed this aspect as not just a hypothesis, but a real factor emerging out of foreign pressure.

Autonomy as an element of Brazilian identity permeated numerous documents, meetings, and speeches concerning Brazil's nuclear program. It was present from the proposal to establish a nuclear endeavor in 1947, to the nationalistic speech announcing the success of independent uranium enrichment by President José Sarney in 1987. In his speech, Sarney lamented the difficulties and restrictions imposed by foreign states. He reaffirmed the "determined purpose of acquiring broad and unhindered access to the full extent of scientific knowledge and its practical applications." [66]
Karsten Frey argued that receptivity towards nuclear capacity is closely related to the idea of international prestige. A strong sense of sovereignty and the search for the "right place at the table" in the international arena is often translated into a pronounced sense of national prestige and status. States aim at status through the display of power, usually to increase it.[67]

Prestige, however, was *not* Brazil's foremost motivation in its search for nuclear capacity. Brazil's desire to influence international rules and regimes is better assessed under the concept of autonomy. A secret report of the General Secretariat of the National Security Council to the Brazilian President, wherein development of the "autonomous program" was discussed, illustrates this assertion:

"The right to use nuclear energy for peaceful purposes, to support our technological independence and as a perspective of progress for all of Latin America, constitutes a basic foundation of the National Nuclear Energy Policy." [68]

The report decried U.S. sanctions to the program that created "all sorts of obstacles, first of a technical nature and subsequently presenting overt political motives, with repercussions in the economic field."[69]

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[64] José Sombra Saraiva Sobrinho, Política Externa Independente – PEI (2014), 10.
[65] Costa 1993, 206.
[66] Sarney 1987, 368.
[67] Frey 2006, 4.
[68] Memorandum (1) 1985.
[69] Memorandum (1) 1985.

Brazil was indeed eager to establish itself as independent and self-sufficient in the nuclear realm.[70] The demands for its rightful "place at the table," a persistent Brazilian phrasing, in the case of nuclear development related to autonomy rather than prestige. The premise of Brazil's stance on the global nuclear order was that the order itself was unfair, that it benefited nuclear-weapon states, and that it put undue pressure on countries that did not possess nuclear weapons. Nuclear justice and the fight against "double standards" were at the heart of Brazilian beliefs and nuclear rhetoric.[71]

When we assess the Brazilian nuclear program, oriented toward the fundamental importance of autonomy for Brazilian identity, we understand how the program managed to progress despite international sanctions, economic difficulties, a radical change in the political regime, and the expected technical challenges. Nuclear capacity reified achievement of autonomy, and autonomy was profoundly etched in Brazilian politics.

The military initiated the autonomous program when they were ruling the country. Nonetheless, security concerns were only contributing factors to the development of the nuclear enterprise. The military, particularly the Navy, embraced emotional and nationalistic conceptions of autonomy and carried these as a flag, defended in the same way that the military conceives any given assignment: as a "mission" on behalf of the nation.

CONCLUSION

This article has argued against the commonly held assumption that Brazil developed a secret nuclear program to balance against Argentina, a long-time opponent. When the country made its first nuclear steps, Brazil saw nuclear capacity as an alternative means for energy generation, and as an ambitious endeavor that would bring international prestige. After setbacks caused by pressures of the United States and international nuclear regimes, the country determinedly latched onto the project as if it represented the national flag. Ultimately, Brazil's autonomous nuclear program was a mechanism of resistance against the international system, seen as discriminatory and designed to restrict the country's inalienable right to noninterference in its internal affairs.

Despite the rivalry of Brazil and Argentina, their respective programs for developing nuclear capacity ultimately became the cornerstone for extensive cooperation between the South American powers. Brazil and Argentina articulated together their approaches to international regimes and responses to systemic pressures against their programs. Their nuclear organizations engaged in some degree of cooperation and this new dynamic of collaboration decidedly transformed South America as a whole, opening the way for freer trade and consolidation of democratic regimes.

Certainly, military control of the nuclear program greatly contributed to the resilience of the project. The autonomous program was initiated when the military governed the state, and the Navy vigorously protected its service interest in nuclear developments in order to implement a nuclear-powered submarine. However, once the military regime had been voted out in 1985, the democratic government did not undercut the program. When announcing that Brazil finally mastered the uranium enrichment cycle, the first civilian president after the dictatorship praised the fact

[70] Kassenova 2014, 3.

[71] Kassenova 2014, 5.

as an enormous achievement in the scientific history of the country.

Brazilian diplomatic initiatives habitually express the desire to forge a uniquely Brazilian way in becoming a global player. This compelling belief influenced many of the country's subsequent nuclear decisions. Fiery reactions came in response to constraints imposed by American nonproliferation sanctions that were perceived as aggression against "the right to utilize nuclear energy for peaceful purposes, as a primary factor of national development."[72] The sanctions—and it should be stressed they were not applied exclusively to Brazil—were taken as a restraint hampering Brazilian autonomy, which was a natural right strongly intertwined with the country's identity. The removal of impositions and perceived offenses by the United States almost certainly would have minimized the problem of strong emotional response—either humiliation or pride—and would likely have minimized the sense of "mission" that the Brazilian military ultimately embraced.

This archival research demonstrates how domestic and normative factors were decisive in sustaining Brazil's pursuit of nuclear capacity. The importance of autonomy to Brazilian identity can be observed in numerous reports and speeches. More recently, the Brazilian government issued an announcement stating that its first nuclear-powered attack submarine would start operations by 2021.[73] When inaugurating the facilities of the nuclear submarine, President Dilma Rousseff emphasized "the importance and pride we feel when we look there and see written, 'Made in Brazil'. The local content, the domestic content of what is produced here, shows the strength of the Brazilian capacity."[74]

Despite technological difficulties, pressures from the international nuclear regime, and a domestic change from military to democratic government, strong and commonly held values on Brazilian autonomy led the country to press forward its nuclear program. The main fuel boosting Brazil's determination to attain nuclear power was ingrained national fixation on autonomy.

This study should inspire further research on the motivations and purposes of nuclear programs that run against long-term goals of the widely subscribed Nuclear Nonproliferation Treaty (NPT). Today, the world witnesses resurgent and assertive nuclear programs across several regions. North Korea, for example, despite strong pressures from the international community and halts in testing, continues to hold onto its nuclear reactors and weapons labs.

If the primary motivation for North Korea's program were purely to increase national security against an external rival like South Korea in alliance with the United States, then various initiatives of goodwill should have led to abandonment of Pyongyang's nuclear weapon ambitions. So far, they have not.

In 2018, United States President Donald Trump declared that a Nuclear Deal with North Korea "would take years," a shift from

[72] Minutes (2), 1967.
[73] See Travis Stalcup, "What is Brazil up to With Its Nuclear Policy?" *Georgetown Journal of International Affairs* (Oct. 2012), and Paul D. Taylor, "Why Does Brazil Need Nuclear Submarines?" *U.S. Naval Institute* Vol. 135, No. 6 (Jun. 2009).
[74] Dilma Rousseff, "Cerimônia de Inauguração da Unidade de Fabricação de Estruturas Metálicas - UFEM" (speech, Itaguaí, RJ, March 01, 2013), Casa Civil da Presidência da República do Brasil, http://www2.planalto.gov.br/acompanhe-o-planalto/discursos/discursos-da-presidenta/discurso-da-presidenta-da-republica-dilma-rousseff-na-cerimonia-de-inauguracao-da-unidade-de-fabricacao-de-estruturas-metalicas-2013-ufem-itaguai-rj.

his 2017 posture which demanded, "Pyongyang has to disarm rapidly." [75] What other reasons may be contributing to—or determining—the resilience of North Korea's program? The Brazilian case indicates that the explanation for North Korea's long-standing nuclear program may not rest solely on security concerns.

[75] David Sanger, "North Korea Nuclear Deal Could Take 'Years', Trump Suggests," *The New York Times*, September 26, 2018, https://www.nytimes.com/2018/09/26/world/asia/trump-korea-nuclear-deal.html.