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The evolution of Brazil's nuclear intentions

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ABSTRACT

Existing literature usually portrays Brazil as a country that set out to build nuclear weapons but ended up “rolling back” its original plans while keeping a nuclear “hedge” for an uncertain future, evidenced by Brazil’s investment in uranium enrichment and its commitment to building a nuclear-powered submarine. This article draws on the historical record to offer a more nuanced view of Brazil’s nuclear intentions as they evolved. It also focuses on the role of external pressure—mostly from Argentina and the United States—in shaping those motivations.

KEYWORDS

Brazil; uranium enrichment; nuclear-powered submarine; Treaty on the Non-Proliferation of Nuclear Weapons; Argentina; South America

Nonproliferation literature and commentary typically cast Brazil as a state that held and later relinquished ambitions to develop nuclear weapons.¹ The underlying assumption in many of the works is that if the country does not possess nuclear weapons today, it is not because it did not want them, but because it could not get them, or because it chose to relinquish them after a period of trial.² This is not the only view, but it is the one that dominates the field.³

The claim that Brazil once aspired to develop nuclear weapons is generally based on three major factors. First, Brazil’s nuclear posture has historically included the commitment to acquire or indigenously develop uranium-enrichment technologies. Second, during the 1980s, Brazil developed uranium-enrichment and missile programs under military supervision, which prompted the United States to impose trade restrictions and sanctions. Third, Brazilian authorities publicly defended the right of states to undertake “peaceful nuclear explosions” (PNEs) up to 1990, and only joined the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as latecomers in 1998. As the 1990s progressed, however, concerns about Brazil’s nuclear intentions abated, as successive administrations decreased nuclear funding, increased transparency, and signed on to a plethora of nonproliferation agreements and initiatives. Crucially, in the aftermath of military rule, a democratically elected constitutional assembly passed a law that prohibits the use of nuclear energy for non-peaceful ends.

And yet, in the early 2000s, anxieties about Brazilian nuclear intentions rebounded. Not only did authorities build a new industrial uranium-enrichment complex in Resende—inaugurated in 2006—and move forward with the construction of a third nuclear-power plant in Angra dos Reis, but they also set out to build a nuclear-powered submarine featuring an indigenously built reactor. Trouble emerged when nuclear authorities denied inspectors from the International Atomic Energy Agency (IAEA) visual access to the

centrifuges at Resende in 2004, and when Brazil included in its 2008 *Estratégia de Defesa Nacional* (National Defense Strategy) a statement that it will not sign an Additional Protocol to its existing safeguards agreement with the IAEA unless the NPT nuclear-weapon states disarm.

This article uses declassified documents and interviews to re-examine Brazil's historical nuclear trajectory. Its main conclusion is that at no point were Brazil's nuclear policies primarily motivated by the goal to build nuclear weapons. While domestic proponents of a weapon option existed, they were always a distinct minority. Brazil's quest for nuclear technology ought to be seen instead as part of a much wider project aimed at modernizing its national economy and exerting political autonomy in the international system. The application of "big science" to the nuclear sphere was—and remains—foremost conceived as an instrument for economic development and political emancipation.

This article also concludes that the application of US-led nonproliferation policies to Brazil has been counterproductive: the more Brazil was targeted, the more that Brazilian leaders felt the need to commit to accelerating the acquisition of nuclear technologies. Along the way, significant opportunities were missed to bring Brazil into the nonproliferation regime.

Contrary to conventional wisdom, the argument here additionally contends that the rivalry with neighboring Argentina never really spilled over to the nuclear field. For all of the misperceptions and low levels of trust that have historically marked the relationship between the two countries, security-dilemma dynamics do not satisfactorily account for Brazil-Argentina nuclear relations. A new interpretation of that history will help explain why and how the two came to develop their unique system for mutual nuclear inspections.

Finally, the article highlights the extent to which Brazil's shift toward nonproliferation should be seen in the context of its own historical experience with liberal internationalism. While Brazil undeniably has made an effort since the 1990s to partake in the web of norms and institutions that comprise the current nonproliferation regime, it is equally the case that Brazilian leaders have remained committed to mastering the full nuclear-fuel cycle. They have embraced liberal nonproliferation norms while believing that the existing regime is unfair, selective, and skewed in favor of the strong.

The article is organized into five parts. The first explores the motivations that drove Brazil in the 1940s—then considered a predominantly rural economy—to aspire to a nuclear program. In so doing, it shows that nuclear ambitions were never driven by concerns with security, regional competition, or domestic energy needs. Instead, they were deeply intertwined with notions of economic modernization and political emancipation. The concept behind this reasoning was that (a) an indigenous nuclear-industrial complex would have positive ripple effects, benefitting local industries and training specialists that Brazil's economy sorely lacked (mathematicians, engineers, metallurgy experts, chemists, etc.); and (b) in a world where the possession of nuclear technology was unevenly distributed, the acquisition of such technologies would allow Brazil to move up in the pecking order of states.

The second section looks at Brazil's decision in the late 1960s to build a major nuclear-industrial complex that included uranium-enrichment technologies. The third section focuses on the 1979 decision to drive the enrichment program underground and the manifold unintended consequences that followed in subsequent years. The

fourth section deals with the piecemeal and protracted moves in the 1990s toward the nonproliferation regime.

The final section then examines the evolution of Brazil's nuclear ambitions in the last fifteen years, when old arguments about the utility of nuclear power were dusted off, repackaged, and introduced to the Brazilian public once again.

Motivations at inception (1940s–70s)

Brazil began to develop a program of purchases of nuclear technology for civilian purposes in a period that stretched from the mid-1940s to the late 1950s. The initial priority was to buy “turn-key” cyclotrons, centrifuges, conversion plants, and small research reactors from the United States and West Germany. Nevertheless, Brazil retained its ambition to develop an autonomous capability in nuclear research and development. Primary-source records from this period contain no evidence of either concern over future domestic energy needs or fear of nuclear pursuits by Latin American neighbors as a rationale behind these early purchases.

Brazil's first nuclear entrepreneur, Navy Admiral Álvaro Alberto, argued that the country's nuclear science would feed into a long-term national industrialization program under state guidance and public financing. He believed that nuclear technologies, if properly embedded into scientific communities, would create positive spill-over effects into other fields of innovation. Alberto's plans ought to be viewed in the context of US President Dwight D. Eisenhower's 1953 Atoms for Peace initiative and the generally positive perception of nuclear energy's promise at that time. His specific emphasis on *national* nuclear development should be understood against the backdrop of the powerful nationalist mobilizations of 1953 in Brazil around the issue of national resources, when the government nationalized the oil industry.⁴ Self-identifying as a scientist and a diplomat rather than as a military man, Alberto founded the *Conselho Nacional de Pesquisa* (National Council for Research), which from the beginning focused on establishing a nuclear program. Alberto, who had access to high-level decision makers including Brazilian President Getúlio Vargas (1930–45; 1951–54), threw his weight behind building basic nuclear infrastructure in Brazil by training a generation of nuclear scientists abroad, attracting foreign scientists to help develop the field at home, setting up the first nuclear physics departments in the universities, generating a stream of funding for nuclear research, and creating public companies for mining Brazilian uranium reserves while banning foreign exploitation.⁵

By the mid-1950s, however, the US attitude toward nuclear cooperation with “Third World” countries had turned more guarded, leading to restrictions on Brazilian access to technical know-how. Brazil's increasingly nationalistic leadership interpreted this change less as a response to a growing fear of proliferation of nuclear weapons than as an expression of commercial self-interest by advanced nuclear powers seeking to retain an oligopoly over nuclear technologies. For unrelated reasons, the Brazilian government also decided to prioritize other items in the national modernization agenda, sidelining or severely downgrading Alberto's pursuits. The cycle of inflation and economic instability at the time had rendered investments in nuclear research unfeasible.⁶

It was not until the late 1960s that Brazil relaunched its nuclear program. It purchased a light-water reactor from Westinghouse Electric Company whose enriched-uranium fuel would have to be imported from the United States. Construction work for Angra 1 began in 1971, with the prospect of building two more reactors in subsequent years.

Brazil amid international nuclear-energy norms

At that time, Brazil also became active in nuclear diplomacy as a member of the Eighteen Nation Committee on Disarmament (ENCD) in Geneva, debating nuclear-test controls, disarmament, and arms control while also attempting to draft a new set of nonproliferation rules under UN supervision. Alongside India, South Africa, and other developing nations, Brazil refused to accede to the final version of the NPT, mostly given its discriminatory character, dividing the world into nuclear “haves” and “have-nots,” with a perceived imbalance of obligations imposed upon nuclear-weapon and non-nuclear-weapon states.⁷

During the NPT negotiations, Brazil also positioned itself as a staunch defender, alongside Argentina, of the right to conduct PNEs. This idiosyncratic perspective on the drivers of the emerging regime developed in the context of Brazil’s participation in the NPT negotiations. Officials in Brasília saw the emerging order governing nuclear energy less as a response to genuine fears of proliferation than driven by a desire to minimize future competition in nuclear commerce. Nuclear technologies—whether gas centrifuges, reprocessing, or fuel fabrication—were goods in a highly restrictive marketplace. Brasília saw the distinction between nuclear-weapon states and non-nuclear-weapon states as less important than the differences between countries that already boasted indigenous nuclear industries (e.g., Canada, West Germany, and the Netherlands—all non-nuclear-weapon states) and those that did not.⁸

We now know that NPT negotiations in Geneva coincided with the first discussions in Brasília on the utility of a PNE program. Because PNEs were perceived as a commercial enterprise and because Brazilian officials resented being excluded from what they saw as a cartel of advanced industrial nations, the issue of nuclear explosions reached the highest levels.⁹

In 1967, with the debate over international nonproliferation norms at its height, Brazilian President (General) Artur da Costa e Silva (1967–69) stated at a *Conselho de Defesa Nacional* (National Security Council) meeting that “nothing prevents us from doing research ... and even developing devices that can explode. We don’t have to call it a bomb, but a device that can explode.”¹⁰ This is the first reference to nuclear devices by a high-ranking Brazilian official currently available in declassified documentation. However, Costa e Silva did not frame explosives either as deterrents or as tools for geopolitical assertion, but spoke of them exclusively in terms of tools for big infrastructure and engineering projects (at the time there was widespread expectation that small PNEs could be used in public works). Although some of the ministers present at the gathering made vague references to the possibility that Brazil might use nuclear power for national-security purposes as well, this possibility was left unspecified, and it is significant that there was no mention of any threats against which Brazil might have to guard itself. To interpret the 1967 deliberations as planning for the development of a latent nuclear capacity is therefore misguided; the main argument during the discussions was to

diplomatically secure the right to conduct PNEs. “We must emphasize peaceful use. I consider this to be the key point,” concluded Costa e Silva at the meeting.¹¹

To date, there exists no compelling evidence that the Brazilians seriously considered a nuclear-weapon option. It was not that the material basis for weaponization was lacking, or that there was no powerful domestic coalition advocating for it, or that the development of advanced arms had not figured into understandings of modernity. The most significant factor was a lack of interest in a weapon. Brazil’s external security environment—at least from the government’s perspective—was fundamentally benign.

Argentina’s nuclear ambitions

For a long time, much of the literature has assumed that nuclear developments in Argentina and Brazil were caused by rivalry and even a security dilemma between the two major regional powers.¹² New works that draw on the historical record now provide a more nuanced picture of that situation.¹³ There were, of course, deeply rooted concerns about Argentina as a geopolitical rival. Argentina had figured prominently in Brazil’s thinking about military contingencies for generations. Mutual levels of trust were low and channels for bilateral dialogue scarce. In addition, since the mid-1960s, the two countries had engaged in a heightened competition over the use of the Paraná River Basin, a territorial dispute that took their acrimony to new heights and damaged their overall relationship.

As far as nuclear capabilities went, Argentina was far ahead. The Argentine *Comisión Nacional de Energía Atómica* (National Commission of Atomic Energy) had successfully developed the capacity for spent-fuel reprocessing, and even had instituted plans to enrich uranium and export indigenously designed research reactors and fuel elements.¹⁴ Brazilian leaders were aware of this, and at least on one occasion used the Argentine example to justify Brazil’s own ambitions to acquire fuel-cycle technologies: in 1974, President (General) Ernesto Geisel (1974–79) told his military chiefs that investing in nuclear technologies was necessary because the Argentines had made progress toward developing the future capacity to “build their weapon, their nuclear artifact/device.”¹⁵ We now know that the Argentines had not made any such progress, and there is no reason to believe that Geisel seriously thought they harbored the intention to do so.

If anything, the majority of available evidence suggests that Brazil did not think Argentina’s nuclear program was particularly threatening in a security sense. Even if there was an active interest in tracking Argentine technological breakthroughs, the Brazilian leadership often empathized with their neighbor’s quest for nuclear independence. Argentina was similarly facing an expanding, increasingly intrusive nonproliferation regime that threatened to sever its access to nuclear science. Like Brazil, Argentina had refused to sign or ratify the key nonproliferation pacts. On a score of documents, including the NPT and the 1967 Treaty of Tlatelolco to ban nuclear weapons from Latin America, the positions of Brazil and Argentina were practically identical. As oral-history collections persuasively document, officials on both sides thought they were sitting on the same side of the fence.¹⁶

The absence of a powerful security-dilemma dynamic between Brazil and Argentina in the nuclear field seems to have been reinforced by transnational networks of scientists. Despite the characteristic mistrust between the two sides’ respective military and

diplomatic corps, the governments in the two countries usually worked together in diplomatic fora in order to dilute concerns about each other's nuclear intentions. Their scientists had often trained together in Europe and the United States, and regular contact was common in academic and professional settings.¹⁷ Anecdotal evidence suggests that there was a fairly significant flow of information at a practical, unofficial level, and that no scientist from either country ever seriously suspected that the other side might want to move toward weaponization.¹⁸

This is not to argue that the overall Argentine-Brazilian nuclear relationship was free of mistrust. Plenty of evidence points to suspicion, misperceptions, mutual recriminations, and a recurring frustration at the lack of progress in bilateral nuclear cooperation. But nobody in Brazil seemed to seriously have feared that Argentina might aspire to a purposeful nuclear latency or actual weaponization, either of which would have created powerful incentives for Brazil to do the same.

Enrichment with West German support (1974–79)

In the context of its ambitious nuclear development plans, in 1974, Brazil decided to acquire an enrichment capability of its own. As before, the main drivers behind the decision to expand Brazil's indigenous nuclear capabilities were economic development as well as prestige. Military intentions played hardly any role. Two major developments led to the 1974 decision.

First, as the 1973 global energy crisis struck—affecting the developing world most acutely—the United States unilaterally suspended existing nuclear-fuel supply contracts.¹⁹ Brazil perceived this step as further confirmation that the emerging norms over nuclear trade were harmful to itself and other states with plans to develop a civilian nuclear program. The Brazilians therefore set out to enrich their own uranium rather than depend on unreliable fuel supplies from advanced industrial powers.

The second development was the Indian PNE in May 1974 and its global repercussions. Here was another country from the “Third World” that, like Brazil, had engaged in extensive international cooperation in the hope of developing an indigenous nuclear program, only to find itself restrained by the nuclear “haves.” The Brazilians were fully aware that global restrictions on nuclear technology transfers would tighten in reaction to India's weaponization, and that the time to secure such a transfer was running out.

When Washington called for a conference of the six major nuclear exporters in 1974 to develop a new set of export controls, the Brazilians saw it as confirming that the advanced industrial powers were bent on organizing an exclusionary nuclear order.²⁰ The creation of the London Group, later known as the Nuclear Suppliers Group (NSG), convinced the Brazilians that they must secure complete fuel-cycle technologies before the door shut. At the same time, however, they hoped for an invitation to join the new group, as a way to secure a voice and influence over deliberations as well as to bolster major powers' support for Brazil's indigenous nuclear industrial complex. This ambivalent approach to the NSG is another demonstration of the contradictions inherent in Brazil's technological and diplomatic ambitions. (Brazil would eventually join the NSG in 1996.)

That year, the Brazilian government initiated negotiations on a massive nuclear-cooperation agreement with West Germany. The program in question was wide-ranging:

construction of four to eight reactors; the establishment of uranium-enrichment facilities; and acquisition of the technology to reprocess spent-fuel rods, thereby establishing a “complete” nuclear-fuel cycle. At an estimated cost of around \$4 billion, it was, at the time, the single largest technology transfer in history. The Brazil-West Germany agreement was perceived as a blow to the nonproliferation regime, given Brazil’s refusal to join the NPT. The *New York Times* famously called it “a tragedy for West Germany as well as mankind as a whole.”²¹ Brazil could have diverted fissile material to build a nuclear weapon as India had done before, the critics argued. The nuclear-weapon states coalesced around the opinion that an authoritarian military regime with an appalling human-rights record ought not to be trusted with dual-use technologies. The agreement marked an historic low in the relationship between Bonn and Washington.²²

The US administration was divided about the Brazil-West Germany agreement. Secretary of State Henry Kissinger leaned toward accepting it, provided tight safeguards were put in place, believing that isolating or punishing Brazil would only worsen the situation.²³ As he bluntly put it once, Brazil was not to be pushed too aggressively: “We are not a non-proliferation agency.”²⁴ The State Department began to work with the West German government to tighten the envisaged safeguards agreement with Brazil.²⁵ This was to a large extent a response to pressure from the US Congress, which increasingly began to adopt the view that the United States should directly oppose any major transfers of nuclear technology to non-nuclear-weapon states.²⁶ After painstaking negotiations involving a good deal of arm twisting, in February 1976, the Gerald Ford administration agreed to give the agreement its stamp of approval in exchange for the application of safeguards on all materials and projects included in the technology transfer.²⁷ The Brazil-West Germany accord became the first ever to apply safeguards to uranium-enrichment processes in a non-NPT signatory state. In the meantime, Kissinger secretly offered the Brazilians a package of economic incentives in exchange for accession to the NPT. Negotiations were advanced when a leak to the press from the incoming Jimmy Carter administration disclosed the state of those secret negotiations, compelling Brazil to withdraw from them and publicly deny that they had ever considered a proposal to trade their right to autonomous nuclear development for US aid. The Brazilian regime was palpably incensed at the leak, and its criticism of the NPT thereafter became sharper and ever more militant.²⁸

Post-Kissinger policy changes

Carter’s election to the presidency in November 1976 was another blow to the Brazilian nuclear program; his administration turned Brazil into a prime target for both its stance on nuclear proliferation and its human-rights policies. As a candidate, Carter had spoken of Brazil as a “military dictatorship” and had harshly criticized Kissinger for pursuing a “special relationship” with the country as secretary of state.²⁹ In an October 1976 television debate, he advocated “that we stop the sale by Germany and France of reprocessing plants to Pakistan and Brazil If we continue under Mr. Ford’s policy, by 1985 or ‘90 we’ll have twenty nations that have the capability of exploding atomic weapons. This has got to be stopped.”³⁰

Carter moved fast. Soon after taking office, he dispatched Vice President Walter Mondale to Bonn with a stern message that West Germany should abandon its agreement with Brazil. His push was reinforced in April 1978 as Congress passed the Nuclear Non-

Proliferation Act, which included a new provision that suspended enriched-uranium transfers to non-NPT signatories. For the Brazilians, Carter was only one of many problems impeding further nuclear progress. Building a massive nuclear-industrial complex from scratch was always going to be a challenge: the law had to be adapted, funds made available, companies created, and incentives for the private sector put in place. Furthermore, Bonn had refused Brazilian requests to transfer gas-centrifuge enrichment technologies, as they could have easily been abused for the production of weapon-grade uranium. West Germany had offered instead the “jet-nozzle” process, a still unproven technology at the time. The whole enterprise became more difficult as the economic environment worsened, and program managers in Brasília repeatedly clashed with the financial authorities who had to approve their budgets.³¹ By late 1978, it was clear in Brasília that the cooperation agreement with Bonn would deliver only partial results. In addition, Brazil sensed that West Germany was poised to backtrack from its commitments in response to US opposition.³²

Meanwhile, the Brazilian military devised plans to establish a separate program with the more limited goal of enriching uranium. The effort would be conducted free from international safeguards, under military supervision. In essence, the move was a response to external pressure: if Brazil was a target for an increasingly restrictive global nonproliferation regime, then technological “autonomy” became an even more valuable strategic asset. Reacting to a normative shift abroad—in particular to the Carter administration’s nonproliferation crusade—the Brazilians took their quest for a uranium-enrichment capability underground.

The parallel program (1979–89)

Documents on Brazil’s indigenous uranium-enrichment program are scarce. The archival evidence that exists and the interviews conducted by the Nuclear History Program at the think tank *Fundação Getúlio Vargas* suggests that the project’s main objective was to achieve the capability to produce low-enriched uranium (LEU). Any talk of highly enriched uranium (HEU) referenced an undetermined, distant future.³³ The “autonomous” or “parallel” program, as it soon became dubbed in local parlance, was narrow in scope: eschewing any ambition to develop a nuclear-industrial complex, it set out to build small-scale research facilities for enrichment technology, some of which would remain secret.³⁴ The system was largely decentralized, with the army, navy, and air force each having their own laboratories, personnel, and budgets. Such decentralization reflected not grand strategic planning, but rather competition among the armed forces. Throughout the life of the program, which was not subject to any international safeguards, Brazil sought to secure access to technology and materials in the nuclear black market. For instance, the Brazilians bought small quantities of HEU from China for a navy facility; they sold yellowcake to Iraq in exchange for subsidized oil; and some individuals claim in off-the-record conversation that they purchased parts for their centrifuges in Europe.³⁵ Anecdotal evidence suggests that many Brazilian nuclear engineers were in regular contact with former URENCO contractors who were in a position to trade information and blueprints. Informal overtures from Pakistan and South Africa to exchange knowledge and technologies, however, were promptly turned down, based on the conclusion that this collaboration would create more costs

than benefits.³⁶ The net outcome of Brazil's unsafeguarded program was an indigenously designed centrifuge by the early 1980s, and some forty research facilities across the country by the end of the decade—mostly under military supervision—where the emphasis was on basic nuclear-technology research.

The perception soon took root that nuclear activities were contributing to the skyrocketing foreign debt, which was one of the most pressing concerns among the Brazilian public at the time. Furthermore, the parallel program faced staunch domestic opposition as secrets began to leak. The *Sociedade Brasileira para o Progresso da Ciência* (Brazilian Society for the Progress of Science) became a vocal critic of the program, and social protest emerged. The left, environmentalists, and local residents' associations in cities that housed nuclear facilities all rallied against the military-led project.³⁷ Finally, in 1990, the United States suspended sales of supercomputers to Brazil due to concerns about its nuclear program. This move harmed other industrial sectors, such as oil exploration, that also relied on high-technology transfers.³⁸

The international community takes note

Global suspicion grew throughout the 1980s that Brazil was hiding a nuclear-weapon program, and not merely due to the unsafeguarded “parallel program.” Brazil's other activities, primarily those surrounding its research programs on rockets and missiles, raised eyebrows in the international community as signaling interest in potential nuclear delivery systems.

In 1979, Brasília started to design and build indigenous satellites, a rocket to deploy them to low earth orbit (Veículo Lançador de Satélites/VLS-1), and a launch site in Alcântara. The technology for the VLS-1 was derived from a civilian space assistance program with the United States that in the 1960s had led to the development of *Sonda* sounding rockets.³⁹ Governance for the rocket and missile program remained with the military, although private companies such as Orbita and Avibras also played key roles in developing ballistic missiles and establishing international contacts and collaborations.⁴⁰ Reports at the time suggested that Brazilian engineers were assisting Iraq in extending the range of Scud-B ballistic missiles purchased from the Soviet Union and providing replacement parts for them.⁴¹ Avibras sold Astros II multiple rocket launcher systems to Iraq during its war with Iran. There were also accounts of missile-technology cooperation with Libya. Brazil soon found itself at the receiving end of an embargo imposed by the newly created Missile Technology Control Regime (MTCR), which cut it off from foreign technologies. By 1992, the US Department of Commerce had listed two of Brazil's *Sonda* rockets plus the VLS-1 and other ballistic missiles as projects of concern.⁴²

There was more. Reports in the 1980s alleged that two shafts built in the northern town of Cachimbo were designed as test sites for nuclear explosions. While the story of Cachimbo is yet to be told, oral-history testimony suggests that the shafts were built under the supervision of the air force without coordination or consultation with the central government. The real motivation behind them remains unclear. One interviewee claimed that air force commanders believed that the shafts might convince other countries that Brazilian nuclear capabilities were greater than there actually were. There exists limited evidence that the air force indeed set out to test a nuclear device.⁴³

By the mid-1980s, the nuclear program was in dire straits. Brazil returned to civilian rule beginning in 1985, with presidential elections planned for 1989, the first time with universal suffrage. This development further limited the room for a program under exclusive military control. In 1987, the Brazilian government announced that it had finally developed indigenous technology for producing LEU. Soon afterward, budgets for nuclear-power-related activities dwindled and the program went into a state of hibernation.

The program, however, was never fully disbanded and the key people lingered. The new democratic Constitution adopted in 1988 banned non-peaceful uses of nuclear energy but kept the door open for a PNE. Despite democratization, the exact details of Brazil's nuclear capabilities remained in the hands of a few people. The commitment to build and operate at least three nuclear-power plants remained in place, as did the navy's plans to develop nuclear-propulsion technologies for submarines in the future.

Transition to civilian rule and the Argentina connection

José Sarney, Brazil's first civilian president since 1964, never formally issued orders to close nuclear-research activities, and oral histories indicate that he deferred a decision on this subject to the military while simultaneously working toward trimming the program's funding. Importantly, the "parallel program" coincided with a sustained deepening of cooperation with Argentina. As this relationship progressed, the military officers running the clandestine nuclear program felt their room for maneuver was narrowing.

What drove Brazil to partner with Argentina in ways that potentially limited the nuclear program? There is no compelling evidence that Brazil sought to mitigate a perceived security dilemma with Argentina. The story is more complex, related to the simultaneous democratization of the two countries and to their common suspicions of the international nonproliferation regime.

In the face of Brazil's decision to set up an unsafeguarded enrichment program, Argentine officials had sought a diplomatic accommodation with Brasília in the early 1980s. But over the course of the decade, Brazil turned down Argentine overtures to sign a joint communiqué banning the development of PNEs, widely understood by now as camouflage for military intentions. Argentina experienced a rapid decline in its fortunes during that time: after plunging into a deep economic crisis, it tried to compensate for its decline by first threatening to wage war against neighboring Chile; and finally, in 1982, by launching and losing a war against the United Kingdom over the ownership of the Falklands/Malvinas Islands. A year later, the Argentine dictatorship collapsed. The new civilian leadership was determined to demilitarize the country's foreign policy and rebuild its regional relationships. By 1984, Argentine military academies stopped defining Brazil as the most likely enemy in future war scenarios.

That period also saw a slow but marked shift in Brazil's own regional approach. While no Brazilian head of state had set foot in Colombia, Peru, or Venezuela before 1982, Brasília now began to expand its regional linkages and relationships. The key to this process was the emerging détente with Argentina after Brasília finally responded positively to successive overtures from Buenos Aires. The two countries gradually became embedded in a set of agreements: after first establishing regular nuclear consultations, they proceeded to establish a protocol for mutual inspections of their respective nuclear installations.

One important factor behind this nuclear bilateralism was that Brazil had started to adopt the view that a common front with Argentina might work as a shield against an ever more intrusive global nonproliferation regime. Opening up to Argentina was not about bringing Brazil's nuclear program under tighter, internationally monitored controls but, to the contrary, about resisting international pressure to join the nonproliferation regime. Existing research literature and historical accounts tend to emphasize the role of key personalities, particularly those of Sarney and his Argentine counterpart, Raúl Alfonsín. The evidence, however, points toward the salience of structural factors enabling the nuclear entente. As new archives will open for public consumption in the coming years, this question is best left to future research.⁴⁴

Joining the regime (1989–98)

In the first ten years after the end of the Cold War, Brazil slowly but progressively joined the global nonproliferation regime. Starting in 1990, President Fernando Collor de Mello shut down the “parallel program,” ordered the sealing of the Cachimbo shafts as a symbolic step to underscore his commitment to keep the military away from the nuclear program, and appointed a civilian with no military ties to lead the *Comissão Nacional de Energia Nuclear* (National Nuclear Energy Commission/CNEN). Brazil formally relinquished its insistence upon the right to conduct PNEs in a statement by President Collor to the UN General Assembly in 1990, and one year later, established mutual inspections with Argentina under a formal joint institution, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC). That same year, the two countries and ABACC signed a formal agreement with the IAEA for the application of full-scope safeguards, which would enter into force in 1994.

Existing evidence points to limited internal debate on these decisions; Collor designed policy with a small group of close associates, without consulting either the military or the scientific community. Through deepening nuclear cooperation and transparency with Argentina, Collor was able to bring the nuclear activities to light and consolidate civilian control, further isolating and weakening the military establishment in the process. Nuclear bilateralism with Argentina therefore served both domestic and external objectives: strengthening civilian and democratic rule at home as well as deflecting pressures exerted by the global nonproliferation regime. In 1994, Brazil established civilian control over the missile program as well, creating the *Agência Espacial Brasileira* (AEB/ Brazilian Space Agency). Additionally, the Brazilian Congress passed legislation on export controls on missile-related goods and services. Brazil officially renounced sales of long-range missiles for military use, and terminated a series of ballistic-missile projects. In turn, the Bill Clinton administration waived existing sanctions and consented to Brazilian MTCR membership. Brazil also ratified the Tlatelolco Treaty. In 1996, it became a member of the NSG and, two years later, finally ratified the NPT itself.

Brazil undoubtedly embraced the nonproliferation regime as part of a wider strategic move toward liberal internationalism. Liberalizing leaders like Presidents Collor and Fernando Henrique Cardoso moved away from the traditional nationalist nuclear posture in their determination to adapt to economic globalization. Collor, the modernizing liberal *par excellence*, spoke of the need to “join the ranks of the First World” and therefore closed down the “parallel program” and also signed on to global liberal regimes in

fields as varied as human rights, trade, and the environment. Despite all this, even Collor retained some traditional nuclear exceptionalism at heart. He apparently never seriously contemplated signing the NPT. Collor regarded the NPT as a fundamentally unfair treaty that did not serve Brazilian interests. It is important to highlight that even Cardoso, who eventually signed the NPT, remained every bit as attached as his predecessors to the quest for technological autonomy, consistently defending the inherent right to safeguard indigenous industrial secrets. He, like his military predecessors, was convinced that the major nuclear powers embraced the nonproliferation regime selectively, simultaneously acting as a nuclear cartel and defining the rules of the game in order to prevent developing states from acquiring fuel-cycle technologies, despite its legality under the terms of the NPT. Even as he brought Brazil under nonproliferation commitments, Cardoso and his team retained a deep suspicion of the regime and its associated networks of rules, inspectors, and institutions.⁴⁵

Recent shifts in Brazil's nuclear policy (1999–2012)

Soon after signing the NPT, the Cardoso administration quietly revived plans to enrich uranium and renewed deliberations on developing nuclear propulsion for submarines, which implied producing enriched uranium exempted from safeguards under the terms of the NPT. His administration resumed work on the Angra 2 power plant that went into operation in 2002, his last year in government. Talk of a revived nuclear program never left the planning stage, however, as the country plunged into another cycle of financial instability and slow economic growth.

The nuclear issue resurfaced during the 2002 presidential campaign. At a rally, then-candidate Luiz Inácio Lula da Silva offered a scathing critique of the NPT—and Cardoso's decision to sign it—in front of a military audience.⁴⁶ Once in office, Lula expanded the nuclear program. His administration moved ahead with the construction of a commercial-scale gas-centrifuge uranium-enrichment plant in Resende, which became operational in May 2006. This facility falls under international inspections, but President Lula insisted on the proviso that IAEA inspectors be denied full visual access to the centrifuges, arguing that proprietary technology had to be protected from industrial espionage. The conflict with the IAEA over access to Resende was resolved in October 2004 after difficult negotiations, which resulted in an agreement allowing inspectors to install cameras in the ceiling of the facility to observe containers of uranium hexafluoride, but without visual access to the actual centrifuge cascades. During the early Lula years, Brazil also resisted signing the IAEA Additional Protocol, aimed at granting inspectors wider access to nuclear facilities. Their argument was that the Additional Protocol was not only too intrusive, but that it constituted another example of advanced nuclear states imposing commercial advantages upon potential competitors from the Global South. The Lula government also moved ahead with plans to build a nuclear-propelled submarine.⁴⁷

The impasse over Resende meant a return of Brazil to its traditional ambivalence toward the global nonproliferation regime. Furthermore, a series of statements by high-ranking Brazilian officials conveyed the impression that there were still considerations of possible military usage of nuclear technology. In 2004, the minister of science and technology publicly declared that Brazil should acquire the know-how to build nuclear devices and was removed from his post as a result.⁴⁸ In 2006, the deputy foreign minister gave a

speech that questioned whether Brazil would in the future want to remain a party to the NPT.⁴⁹ And Vice President José Alencar stated in 2009 that a “nuclear weapon is a deterrent of great value for a country that owns 15 thousand square kilometers of borders to its west, and an ocean of deep-sea oil of about four million square kilometers.”⁵⁰ The office of the presidency quickly denied that this was official policy, but Alencar continued to make similar remarks thereafter.

Throughout the 2000s, Brazil engaged more intensively in nuclear diplomacy than ever before. In 1998, it co-founded the New Agenda Coalition, a group of NPT signatories that calls for global nuclear disarmament in line with the NPT. In addition, Brazil assumed the rotating presidency of the Conference on Disarmament in 2000, served as president of the 2005 NPT Review Conference, and in 2007 chaired the International Panel on Fissile Materials. The 2008 National Defense Strategy stated that Brazil would not undertake any additional nonproliferation commitments until the nuclear powers took credible steps toward disarmament.⁵¹

Meanwhile, nuclear bilateralism with Argentina continued to progress. In 2008, Brazil and Argentina agreed to establish a Binational Nuclear Energy Committee to jointly enrich uranium, produce radiological medical supplies, develop nuclear applications for agriculture, and design and build research reactors.⁵²

Contemporary nuclear diplomacy

The evolution of the nonproliferation regime over the past decade, and foremost *vis-à-vis* Iran, also has helped to renew Brazil’s critical stance. In 2010, Brazil and Turkey attempted to broker a compromise agreement aimed at resolving the nuclear impasse with Iran. Brasília and Ankara both believed that tightening sanctions against Iran would further alienate the Islamic Republic, polarize international public discourse, and raise global tensions. The initiative brought US-Brazil relations to a new low, an episode that has been studied elsewhere.⁵³ As seen from Brasília, sanctioning Iran—an NPT party—and prohibiting it from developing safeguarded uranium-enrichment technologies under IAEA supervision would create an unacceptable precedent.

Officials in Brasília worry that US nonproliferation policies have destabilized the global regime by, for example, turning a blind eye to nuclear Israel, or moving painfully slowly—if at all—toward disarmament as stipulated by NPT Article VI. A specific Brazilian view has developed, according to which there is a real risk that the United States will only adhere to nonproliferation norms as long as they justify punishing any country that refuses to align itself with US strategic interests.⁵⁴

Brazil’s nuclear renaissance in the 2000s and its reassertion of critical views toward the nonproliferation regime have also affected views in neighboring Argentina. Buenos Aires is increasingly concerned that Brazil’s nuclear intentions are in a state of flux, and the existing commitments and linkages must be adapted accordingly. Argentina has been keen on finding niches where continued cooperation with Brazil might be possible, as seen in a string of new agreements initiated by Buenos Aires in 2008, 2010, and 2011.⁵⁵ Argentina has effectively revived its strategy of the 1980s, responding to Brazilian nuclear activism by increasing levels of institutionalized bilateral nuclear cooperation, emphasizing the potential for joint technological development and joint participation in the global nuclear market. As leaked diplomatic cables have shown, the Argentine

government remains concerned about Brazilian abandonment in the future: in the “unlikely event” that Brazil “backed out of ABACC or worse developed a nuclear weapons capacity [...] Argentina would choose a course of developing and deploying an advanced peaceful nuclear technology to demonstrate capacity, without actually going the way of nuclear weapons. [Government officials] mentioned a nuclear-powered icebreaker as such a demonstration project.”⁵⁶ The Dilma Rousseff administration in Brazil seemed aware of Argentine concerns, for she and her foreign minister often used reassuring language, and her first presidential trip to Buenos Aires in January 2011 produced a string of agreements in the field of joint nuclear technological development.⁵⁷ Another element drawing Brazil and Argentina together in the nuclear space is their shared continued rejection of the Additional Protocol. Bilateral cooperation paid off once again when the NSG determined in 2011 that, for the purpose of the transfer of enrichment and reprocessing technologies, the Quadripartite Agreement between Argentina, Brazil, ABACC, and the IAEA should be regarded as an acceptable alternative to the Additional Protocol, until the two countries should adopt it. Within Argentina, the issue of the Additional Protocol has been divisive. Some argue that signing it would create new levels of international confidence, which might incentivize Brazil to follow suit. Those who disagree point out that signing the protocol would render ABACC redundant, effectively shutting down the one channel currently available to “peep into” the Brazilian nuclear program. If Argentina were to negotiate an Additional Protocol with the IAEA without coordinating its position with Brazil under the safeguards agreement between ABACC and the IAEA, many fear such move would render ABACC and the Quadripartite Agreement obsolete.⁵⁸

For its own part, Brazil is now strongly committed to the peaceful uses of nuclear energy as mandated by the 1988 Constitution and a range of international agreements to which it is party. To a significant degree, Brazil has moved toward the liberal international order, including in nuclear policy. But firm commitments to economic orthodoxy and democracy at home—and a willingness to adopt comprehensive safeguards under the umbrella of international nuclear agreements—do not exclude a self-identity based on the image of a non-status-quo power committed to challenging existing norms and institutions. While there are no indications or reasons to believe that Brazil will retreat from its NPT commitments, its dominant position is one of caution toward the global nonproliferation regime’s growing intrusiveness. From the standpoint of the policy community in Brasília, picking and choosing from the basket of rules on offer has paid off in the past, and there is no indication that this time-proven approach will change any time soon.

Notes

1. The piece draws extensively on primary-source material and oral-history interviews conducted in the context of “Argentina and Brazil in the Global Nuclear Order,” a research program hosted at the Fundação Getulio Vargas (FGV) in Rio de Janeiro in association with the Nuclear Proliferation International History Project. The work that went into this article is therefore a collective enterprise. I am particularly indebted to my colleagues, Carlo Patti and Rodrigo Mallea, for their excellent work on archives around the globe and their engagement in interpreting the primary sources at our disposal.
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 4. Ata da Décima Reunião do Conselho de Segurança Nacional, August 27, 1947, Arquivo Nacional/Brasília (AN).
 5. Leandro Pereira, “As Origens Da Política Nuclear Brasileira (1945–57),” Master Thesis, FGV, 2013.
 6. Ata da Vigésima Reunião do Conselho de Segurança Nacional, August 30, 1956, AN; see also Etel Solingen, “Macropolitical Consensus and Lateral Autonomy in Industrial Policy: The Nuclear Sector in Brazil and Argentina,” *International Organization* 47 (1993), pp. 263–98.
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 9. AmEmbassy Office Brasilia to Department of State, A-32, Confidential, August 25, 1967 <repository.library.brown.edu/studio/item/bdr:340042/> and the document selection in William Burr, “Nuclear Intelligence via Three Martinis,” *Sources and Methods*, May 30, 2017 <www.wilsoncenter.org/blog-post/nuclear-intelligence-three-martinis>.
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 13. Hymans, *Achieving Nuclear Ambitions*; and Mallea, Spektor, and Wheeler, eds., *The Origins of Nuclear Cooperation*.

14. See Hymans, *Achieving Nuclear Ambitions*, pp. 141–70.
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18. Matias Spektor, ed., *Azeredo Da Silveira: Um Depoimento* (Rio de Janeiro: FGV, 2010).
19. Patti, “North-South Relations and Nuclear Proliferation.”
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24. Staff Meeting, June 13, 1975, E5177 [formerly Lot 78D433], Transcripts of Secretary of State Kissinger’s Staff Meetings, Gerald R. Ford Library [GRFL] 1973-1977 Box 7, RG 59, NACP; see also Memorandum of Conversation, Ford/Kissinger, June 13, 1975, memcons, Box 12, National Security Archives at the George Washington University (NSA).
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