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Technology, politics, and development: domestic criticism of the 1975 Brazilian-West German nuclear agreement

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Abstract

The article analyzes the domestic debate regarding the Brazil-West Germany nuclear agreement of 1975. A number of scientists and opposition politicians sought to use the apparent failings of the agreement to critique the military's claims regarding the deal's contribution to Brazilian economic development and nuclear status. While limited in its immediate impact, the opposition outlined major themes that would come to the fore later in the decade as Brazilian society began to question the wisdom of the agreement. Concerned with asserting Brazil's nuclear autonomy, the opposition's efforts also add a new dimension to global narratives of nuclear protest.

Keywords: Nuclear history; transnational history; history of science, political history.

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Introduction

What were Brazil's guidelines within the global nuclear order during the mid-1970s? Focusing on the scientific and congressional reaction to the 1975 Brazil-West Germany nuclear deal, this article answers this question in more nuanced terms. Accounts of the 1975 Brazilian nuclear agreement tend to emphasize the lack of domestic criticism of the agreement, which the country's military dictatorship claimed would lay the foundation for Brazil's nuclear independence, through the transferring of key technologies. According to Thomas Skidmore (1988) in his classic account "The Politics of Military Rule in Brazil", "the overwhelming majority of the political elite were delighted with Brazil's enhanced image as a sovereign nation" (Skidmore 1988, Loc 3194; Patti 2011). The analysis has been conducted on domestic criticism at the time of the deal's signature and tended to focus primarily on the role of scientists in criticizing the agreement (Solingen 1996; Chaves 2014). However, the research of records from the military

regime, politicians in the opposition and congressional sources has shown there was a small but significant dissent from both scientific and political figures, who questioned the deal on a variety of grounds. Backed by some of Brazil's leading scientists, as well as members of the "Authentic" faction of the official opposition party, *Movimento Democrático Brasileiro* (MDB, or Brazilian Democratic Movement), the criticism caused the regime some uneasiness, drew the attention of foreign observers, and was used as a basis for future congressional investigations into the nuclear agreement during the late 1970s.

This story, therefore, adds further depth to the understanding of objections made by non-state actors to the dictatorship's portrayal of its nuclear program's aims and dimensions. Criticism by the opposition attempted to undercut the military's claims regarding the nuclear agreement in three critical aspects: the specific technological advantages of the deal in and of itself; the benefits of the regime's authoritarian model of modernization; and its utility in securing Brazil a position of true geopolitical and geo-economic independence from the industrialized Global North.

Firstly, prominent scientists pointed out the fundamental technical weaknesses of the agreement, including its reliance on unproven jet-nozzle enrichment technology. This led to a second critic, in the political realm: the allegation that these technical errors could have been easily avoided, had the government engaged in a more open and transparent process involving Brazil's growing scientific establishment. Members of the MDB **Authentic**s who had already attacked the government for the exclusion of professors from political life, took up this criticism and exposed it in Congress. Added to these technical and political critics, there was a third element, which cast doubt on the extent to which the deal would serve Brazil's international agenda. Mainly, they doubted the regime's claims that it would encourage the achievement of genuine economic and political independence from both superpowers and industrialized Europe. This criticism was most strongly manifested in an amendment to the agreement proposed by Lysâneas Maciel, a congressman from the Authentic faction of MDB, from the state of Guanabara, who sought to reaffirm Brazil's stated right to develop nuclear explosives for peaceful purposes.

This article also sheds new light on narratives of nuclear activism. These stories, focused on the Global North, have tended to emphasize the anti-nuclear nature of protest movements, which sought to challenge states' policies in this field by pointing out the risks they posed to humanity. In most cases, these activists tried to halt or roll back the role of the atom in political life (Higuchi 2011; Jasanoff and Kim 2009; Wittner 1993; 1997; 2003).

The Brazilian narrative is of a different nature, thereby underlining the importance of a truly global perspective when evaluating the dimensions of nuclear protest. Instead of seeking the rollback of nuclear power, scientists and politicians criticized the military regime for not being assertive enough in its quest for Brazil's independence in the field. Dedicated to Brazil's achievement of greater economic and political autonomy from the developed world, the majority of the opposition never advocated for revocation of the deal. Indeed, they recognized that it was a significant improvement on the 1971 agreement with the United States, which built the nuclear

power plant of Angra I near the city of Rio de Janeiro. Instead, they sought to draw attention to the fact that the deal was far less significant than the government claimed.

In its most radical form, the criticism failed to muster widespread support. With that in mind, it is important not to overestimate the political impact of this resistance, which was always highly limited and besieged by practical circumstances. Major MDB figures in Brazil's Senate were supportive of the agreement; Maciel represented only one faction of the official opposition, which meant that his influence was limited. Lacking even the votes of the entire official opposition, Maciel's amendment to the agreement did not pass. Legislative resistance was bound to fail in any case, since, *in extremis*, the government could invoke emergency powers to push the deal through Congress. Similarly, beyond Congress, regime supervision of mass media meant that criticism of the deal was restricted to some opposition magazines, thereby limiting its impact on Brazilian society as a whole.

However, the opposition had sophisticated critics regarding the 1975 German-Brazilian agreement, which contradicted the government's claims on a technical level, as well as in domestic and international policies. In merely articulating such a position, critics undercut the government's claim that the deal had been met with universal approval from all sections of society, leading the regime to consider whether it would have to use its emergency powers to push the pending legislation through Congress. In this respect, this is an essential example of rhetoric opposed to the dictatorship, which helps to illuminate the domestic political context in which the 1975 German-Brazilian agreement was received, and the structures within which the regime worked as it attempted to portray the deal as a significant political, economic, and international achievement. While not as politically influential as criticism of the Germany-Brazil nuclear agreement during the late 1970s, in outlining the fundamental contours of this latter case, the opposition's criticism in 1975 served as the basis for those developments.

Domestic political context

To comprehend the significance of the Brazilian-West German nuclear agreement inside Brazil, it is essential to understand the domestic political context in which it was elaborated. At the time of its signature, in late June 1975, the dictatorship and the ruling party, *Aliança Renovadora Nacional* (ARENA, or National Renewal Alliance), were still reeling from their surprise setback in the November 1974 congressional elections. In the freest electoral process since the military took power in 1964, the official opposition party, MDB, increased its representation in the Chamber of Deputies, the lower house, from 87 seats to 165, more than doubling its vote to 10.95 million. In the Senate, MDB gained 13 seats, bringing its total to 20, with 14.6 million votes, compared to 10 million for ARENA. While still in control of both houses, ARENA suffered a major electoral setback, which showed the depth of public disillusionment with the regime, particularly in Brazil's cities (Skidmore 1988).

This surprising result complicated President Ernesto Geisel's political program in some meaningful ways. Since his accession to the presidency in March 1974, Geisel had pursued an attempted *distensão* (relaxation) policy, under which some elements of the government's repressive apparatus had been loosened. This policy included the decision to give MDB free rein in Brazil's media during the elections. MDB's success had thrown this strategy into disarray. It was far from clear that the president and ARENA could manage *distensão* in a way that would not destabilize the regime. Those inside the regime who favored reform worried that possible instability could lead to a backlash from hardliners in the military, who would take matters into their own hands. While the government showed no intention to contest the results of the election and even loosened its control over the major opposition newspaper *O Estado de São Paulo*, it took some other measures designed to reassure the hardliners that it remained in control of Brazil's political life. That included torture in the detention of Brazilian Communist Party activists, who were accused by Justice Minister Armando Falcão to have secretly ensured MDB's electoral success (Skidmore 1988).

These political problems were both accelerated and aggravated by Brazil's deteriorating economic situation. The official inflation rate – a recurring scourge for Brazilian development – began to reach dangerous levels, at 34.5 percent that year, even as growth remained high, at 9.5 percent. The government's economic problems stemmed, in large part, from its dependence on oil imports. Brazil imported 75 percent of its oil in the mid-1970s, which made it extremely vulnerable to OPEC's quadrupling of global oil prices between October 1973 and January 1974. As a result, Brazil's balance of payments deteriorated sharply, from a small deficit in 1973 to one of \$7.3 billion in 1974 (Skidmore 1988; Hurrell 2013).

As negotiations on Brazil's agreement with West Germany drew towards their conclusion, the Geisel administration faced many challenges, which contained the seeds for political and economic instability. There was a possibility that Geisel would lose the confidence of broad sectors of Brazilian society: in its ability not only to sustain high levels of growth without overheating the economy but also to manage a political liberalization program that would both satisfy the growing demands of civil society and safeguard the military's interests.

The deal is announced

In this context, the West German-Brazilian nuclear deal, signed on June 27, 1975, provided the government with a significant platform to sustain its political legitimacy at an uncertain time. Notably, it ensured its authority as the custodian of Brazilian economic and social progress (Solingen 1996). This new step in Brazil's nuclear development was designed, "To promote [...] as a high priority, the use of nuclear energy, in all of its peaceful forms, in the service of economic development, national science, and technology, as well as the wellbeing of the Brazilian people" (Folha de S. Paulo [FSP] 1975, 2–3). Consisting of an agreement on nuclear cooperation and a protocol for cooperative implementation, the FRG-Brazil agreement would be the primary vehicle

by which this vision would become a reality. The agreement covered four key areas: mining and processing of Brazilian uranium; the construction of nuclear reactors; the provision of the means of enrichment and **enrichment services**; and fuel production and reprocessing.

Initially valued at \$10 billion, to be financed by West German loans, the deal was negotiated in secret by a small circle of individuals at the pinnacle of the military dictatorship, including the president himself (Salles 1975). It was meant to be implemented by West German-Brazilian joint ventures (JVs). One particular JV, mostly owned by *Nuclebrás*, the newly established national nuclear company, but also by a minority of shareholders from the German corporation *Uranengesellschaft*, would mine uranium. At least 80 percent of the uranium extracted would remain under Brazil's control, and 20 percent would be exported to West Germany. Another consortium would manufacture components for the eight nuclear reactors planned under the deal, while another one would focus on nuclear engineering. While gradually increasing Brazilian capacity, the FRG would be in charge of constructing the first four reactors, while Brazil would be responsible for overseeing the other four (“O Palácio do Planalto explica conteúdo e motivos do Acordo” 1975; Senador anuncia acordo e diz: ‘Não há cláusulas secretas.’” 1975). The reactors would be built primarily in the Southeast: two at Angra dos Reis in Rio de Janeiro, two in São Paulo, two in Vitória, the capital of the state of Espírito Santo, and other two in the less economically developed Northeastern region of Brazil (“Um centro atômico no Litoral” 1975).

The agreement also laid out an expansive vision for Brazil's future enrichment capacity. Enrichment services in the first instance would be provided by Urenco, the Anglo-Dutch-West German consortium. However, another JV, under equal Brazilian and German ownership, would develop a new form of uranium enrichment, known as the jet-nozzle method. This company would be based in West Germany but would have exclusive rights to the marketing and sale of the method worldwide, while an enrichment center would be built in Brazil. Besides, West Germany would provide Brazil with “**technical assistance**” in the construction of enrichment and reprocessing plants. In outline, therefore, the deal provided substantial West German help in developing the full nuclear fuel cycle. In such a way, the government claimed, the agreement would be important in “preparing Brazil for [...] the 1980s,” at the end of which the country would be able to produce 10,400 megawatts and serve approximately one-seventh of Brazil's projected energy needs by 1990 (“Palácio do Planalto explica conteúdo e motivos do Acordo 1975).

Rhetoric from the Brazilian government and its supporters underlined the potentially significant impact that the agreement could have on Brazil's nuclear status and developmental agenda in general. The senator from Ceará, a leading member of the government party ARENA, Virgílio Távora, speaking on behalf of the government, declared the deal to be “without a shadow of a doubt, a fundamental landmark” (Senador anuncia o acordo e diz: “Não há cláusulas secretas” 1975, 4) in the country's history, describing its “impact on [Brazil's] march to development” as ‘incalculable’ (Senador anuncia o acordo e diz: “Não há cláusulas secretas” 1975, 4). Indeed, government supporters also emphasized the importance of the agreement as a nationalistic symbol of Brazil's political independence from both superpowers. Távora noted that the deal had “global repercussions,” attracting the attention

of none other than U.S. Secretary of State Henry Kissinger. He declared that Brazil had conducted the negotiations in secret to limit the international pressure against its nuclear efforts, mainly from the United States – an argument that was reiterated in a government fact sheet on the deal (Senador anuncia o acordo e diz: “Não há cláusulas secretas” 1975).

The Brazilian government wished to convey a clear position: as it involved the maximum level of technology transfer, the Brazil-West German agreement would accelerate Brazil's emergence as a country at the forefront of the peaceful uses of nuclear energy. The heavy German involvement was a means to secure Brazil's energy independence, enhancing the country's sovereignty, by providing it with the capacity to expand its energy consumption without relying on the country's limited ability for further hydroelectric expansion or the increased importation of foreign oil (“Palácio do Planalto explica conteúdo e motivos do Acordo” 1975). In so doing, the government had acted in defiance of pressure from the two superpowers, further underlining its political independence.

At the same time, the government sought to use the nuclear deal as part of its broader strategy to roll back the opposition's expectations regarding further political liberalization. President Geisel put this argument forth in a presidential address to the nation on August 1, 1975, which focused on how the government was getting a grip on the twin themes of **development and security**. Geisel announced measures to maintain economic growth, combat inflation, correct the country's balance of payments, and put more emphasis on lowering inequality. As part of this strategy, Geisel described the country's nuclear development as **decisive** in the government's **intensified** energy program, which aimed to increase Brazil's self-sufficiency through the exploitation of hydroelectric and nuclear powers, as well as greater use of Brazil's offshore oil deposits. At the same time, however, Geisel sought to redefine *distensão* as a policy “not predominantly political but [...] [of] integrated and humanistic development” (Geisel 1975). This meant that many changes that opposition groups had hoped for would not occur: Institutional Act n. Five would remain in place for the time being, while further liberalization would be dependent on acquiescence by the military. The message was clear: through initiatives such as the nuclear energy program, the Geisel administration would ensure Brazil's economic and social development during difficult times, but this would entail far slower progress towards political liberalization than many in the opposition had expected (Geisel 1975). In this context, critics sought to push back against the government's claims regarding the nuclear agreement, particularly the notion that the deal was proof that the regime was the most capable of safeguarding the country's future.

Themes of dissent: technology, politics, development

Put forth primarily by groups of scientists, journalists from the opposition and politicians, criticism of the agreement took various forms. Although somewhat artificial, this separation helps to understand the basis for dissent, by delineating three primary angles of criticism, which together posed an important challenge to the Brazilian government's narrative regarding the West Germany

deal. Rodrigo Morais Chaves (2014), in his dissertation on the links between opposition to the Brazilian nuclear program and democratization, naturally places domestic political criticism at the forefront of his narrative. However, an analysis of the year of 1975 in and of itself, rather than as a precursor to later developments, combined with greater focus on congressional action on the deal, reveals a somewhat different tripartite structure, which involved technical and domestic political criticism, but ended up focusing on the developmental aspects of the agreement. Therefore, it is clear that domestic critics of the program touched on every issue, casting doubt on the government's expansive claims, while also pointing out fundamental tensions inherent to the project to import nuclear autonomy.

It is important to note that critics were not limited to the technical, political, or developmental spheres. The Brazilian scientific community, for example, naturally took the lead in technical analysis of the agreement, but it also had strong – and internally heterogeneous – opinions regarding the country's politics and economic development. Domestic criticism of Brazil's treaty with the FRG was also limited in many important aspects. The most prominent voices were not explicitly against the nuclear agreement in principle. Instead, they sought to show how the generals' rhetoric masked a series of problems, both with the agreement itself and the simplistic narrative regarding the way in which Brazil could reach its goal.

Brazil's scientific community was one of the first groups to become actively engaged in criticizing the agreement. The opinion of the scientific community was not unanimous in its criticism. Some scientific organizations adopted a critical stance regarding various aspects of the deal. Two scientific societies, *Sociedade Brasileira de Física* (SBF, the Brazilian Society of Physics) and *Sociedade Brasileira para o Progresso da Ciência* (SBPC, the Brazilian Society for Progress in Science) became significant criticism vehicles. This opposition had been building for some time. In the years following the 1964 coup, Brazilian universities became centers of anti-regime dissent. Many of the most accomplished Brazilian scientists had suffered with the Brazilian security services, and some had lost their jobs as a result of their political activism. Thus, most of the country's leading scientific figures had no involvement in the formulation of the deal, which they found to be technically deficient in a number of ways (Chaves 2014; Solingen 1996).

Some scientists objected to the entire concept of the agreement. SBF issued a statement that disagreed with the premise that Brazil required a nuclear program of that magnitude, given its vast hydroelectric capacity. Other scientists, such as José Goldemberg from the Physics Institute of the *Universidade de São Paulo* (USP), offered *limited support* for the agreement in outline, but questioned the decision to purchase the experimental jet-nozzle enrichment method from West Germany, as well as the related issue of adopting reactors fueled by enriched uranium. A long-term supporter of natural-uranium reactors for Brazil, Goldemberg's criticism of enriched uranium was not new, but the introduction of the jet-nozzle method gave it an added edge. The problem with enriched-uranium reactors, Goldemberg argued, was that they would leave Brazil dependent on countries that possessed the technology to produce the fuel. Because it had abundant deposits of natural uranium, Brazil would be much better off developing its reactors and power them with

it. The importation of the jet-nozzle method seemingly provided a way out of this dilemma, but Goldemberg argued this route was filled with risks. Goldemberg described the jet-nozzle method as unproven **on an industrial scale** and the most energy-intensive method available. As a result, Goldemberg argued, it would have been better for Brazil – without a reliable domestic enrichment capability – to opt for natural uranium reactors instead. These would not require the importation of enriched uranium and would, therefore, provide a more secure basis for Brazilian sovereignty over its energy supplies (Chaves 2014; Goldemberg 1978; “O acordo nuclear: urânio natural, ainda a opção” 1975; Solingen 1996).

Scientists did not rely exclusively on resolutions and meetings, but let it be known to the opposition media, through interviews and press conferences. Rio de Janeiro’s *Opinião* carried an interview with Goldemberg, while São Paulo’s *Movimento* dedicated a feature-length article in its first issue to the analysis of the agreement, which drew heavily on the scientists’ technical misgivings (“O acordo nuclear: urânio natural, ainda a opção” 1975, 8; Kucinski 1975a). It is on the pages of opposition publications that one can see the link between the purely technical arguments against the agreement and broader criticism of the military dictatorship’s governance, and its model of authoritarian development in particular.

Criticism from the scientific community had a domestic political agenda from the outset: by criticizing their exclusion, Brazil’s scientists pointed out the regime’s aversion to the participation of civil society in decisions of great national importance. In making a case for natural-uranium reactors, scientists also pointed to an alternative developmental model that would maximize energy independence at the expense of implementation speed and economy (Chaves 2014, 51; Solingen 1996). As a select number of opposition politicians and journalists picked up the issue, this element hardened into an even more explicitly political and developmental attack on the way in which the regime was handling the agreement.

This was not the first time that opposition politicians had criticized the military dictatorship’s nuclear policies. In 1974, a long-running debate had broken out on the floor of the Senate between ARENA’s Távora and MDB’s André Franco Montoro on the future of Brazil’s nuclear program. During this exchange, Montoro had criticized, in the same terms as Goldemberg, Brazil’s reliance on enriched-uranium reactors imported from the United States. Natural-uranium reactors, Montoro argued, would provide a surer path to true technological and energy independence (Goldemberg 1978).

However, in June 1975 Montoro welcomed FRG-Brazil nuclear deal, declaring that MDB wished to join ARENA in the **jubilation** surrounding the conclusion of the agreement, praising Brazilian public figures, both past and present, for their contribution to its conclusion. While noting the debates that had occurred in the past, Montoro now maintained that the agreement’s provisions for technology transfer, as well as the foundation of *Nuclebrás*, created the basis for the development of true independence in the nuclear field. In this context, Montoro argued, the agreement deserved “applause, not only from Congress, not only from the parties but the whole Brazilian nation.” The only major assurance that Montoro required was that Brazilian scientists, such as Goldemberg, would be fully involved in the agreement’s implementation so that they could

ensure maximum technology transfer. Joining his MDB colleague in praising the deal's provisions for technology transfer, Senator Benjamin Farah urged Brazilian companies to participate as actively as possible, so that the country could build a new cadre of specialists in the “newest and most promising” area of energy production. Rejecting suspicions that Brazil wished to build a nuclear explosive, Farah declared: “the only explosion that we envisage is one of progress, of total emancipation.” While reserving his judgment until he had been able to examine the agreement thoroughly, Senator Itamar Franco's comments were also broadly positive (Diário do Congresso Nacional [DCN] June 28, 1975, 3100-1; DCN July 1, 1975, 3245-6).

While the Senate was supportive, this was not the case for all MDB members in Brazil's lower house, the Chamber of Deputies. Most vocal in this respect was Lysâneas Maciel, a congressman from the state of Guanabara. Elected in 1970, Maciel was a prominent member of the **Authentic** (*Autênticos*), a faction within MDB that campaigned actively on human rights, as well as against the compromise of Brazil's economic sovereignty by foreign companies (Costa and Gagliardi 2006). As such, Maciel was more assertive in opposing the military dictatorship than his higher-ranking colleagues. As part of his work on human rights during the early 1970s, Maciel was actively engaged in resisting attempts by the government to suppress academic freedom on Brazil's university campuses, particularly through Decree-Law 477, which banned students or professors from any form of “**political**” participation. Maciel denounced 477 in the Chamber of Deputies and pressured the MDB leadership to propose a Parliamentary Commission of Enquiry into its application (Snider 2011; Maciel 2008a; 2008b; Muller 2010). Eventually thrown out of the Chamber of Deputies in 1976 for his denunciation of the dictatorship, Maciel was already an object of considerable interest to the Brazilian security apparatus. He had attracted the attention of the *Serviço Nacional de Informações* (SNI, National Intelligence Service), while Sergio Fleury, the notorious commander of São Paulo's *Departamento de Ordem Política e Social* (DOPS, or Department for Social and Political Order), had threatened to deprive Maciel of his civil rights (Niilus 1975).

Maciel shared the scientists' view that the lack of consultation on the nuclear agreement was one more manifestation of the regime's predilection for shutting out dissenting voices, from experts and Brazilian society alike, which compromised informed and consistent policymaking. Speaking in the Chamber of Deputies during the debate of the agreement, on September 29, 1975, Maciel pointed out that those advocating this agreement on the basis that it promised energy independence for Brazil were “the very same men who, in the past, defended a policy of dependence” (DCN set 30 1975, 8054). They had previously spoken in support of the country's 1971 agreement with the United States to build the Angra I reactor, which had provided for a finished reactor without any significant transfer of technology. At that moment, members of Congress were being asked to approve an agreement that was a total about-turn from the executive's previous position. Furthermore, the deal had “**totally marginalized**” the Brazilian scientific community and had provided an unsatisfactory level of clarity to the parliamentary commissions designated to evaluate the agreement's efficacy (DCN set 30 1975).

These technical and political criticisms also served as the basis for a further, developmental, line of criticism that aimed at the government's claims regarding the extent to which the deal would allow for Brazil's nuclear independence. Maciel pointed out that, while the Brazilian government was touting how the nuclear agreement would make the country technologically independent, the very same nations on which it relied to facilitate that independence were tightening restrictions on nuclear exports. West German authorities appeared to be talking out of both sides of their mouths when it came to the level of technology transfer in the agreement, Maciel argued. Although Foreign Minister Hans Dietrich Genscher spoke in favor of stricter terms for technology transfer, he had also signed the deal with Brazil. Similarly, it had come to light that West Germany could not unilaterally decide to transfer any technology it had jointly developed with the United Kingdom or Holland as part of URENCO (DCN set 1971).

Another part of the developmental criticism focused on the substantial participation of German companies in implementing various aspects of the agreement. The Committee of Mines and Energy, under Maciel's chairmanship, pointed out that, under Brazilian law, prospecting for and mining of nuclear minerals must be a state monopoly. The prospecting and mining would be conducted by a joint venture, in which Nuclebrás would have a scarce majority of 51 percent, while Urangesellschaft held the rest (DCN set 30 1975).

José Goldemberg also raised this issue in his interview with *Opinião*, declaring himself to be **totally against** a development model that involved the importation of the most modern reactors. This, Goldemberg considered "a sure way to permanent dependence" on the developed world, because Brazil would have to constantly import new technology, to keep up with cutting-edge developments in Europe and North America. It would be far better, Goldemberg suggested, to import less advanced natural uranium reactors that, "while considered obsolete by others, would be perfectly adequate" for Brazil's needs, and could serve as a basis for the development of an indigenous nuclear industry on Brazil's terms. Many critics noted that some countries, including Britain, Canada, Argentina, and India had managed to build a nuclear industry based on natural uranium reactors (Maciel July 18, 1975; Kucinski 1975a). Furthermore, Goldemberg worried the technology centers that were part of the deal could lead to the **emptying** of existing research institutes, while becoming little more than technical backups for the imported reactors, rather than centers of autonomous development ("O acordo nuclear: urânio natural, ainda a opção." 1975).

However, as the journalist Bernard Kucinski argued, the Brazilian government's compromises went further. While Brazil could, in theory, be able to enrich its uranium with the jet-nozzle method, that was unlikely, given the advantages enjoyed by URENCO's gasultra-centrifugation technique, which would probably come online in the 1980s (Kucinski 1975a). In a sense, therefore, as *Opinião* pointed out, Brazil would be replicating elements of dependence that had characterized its relations with the global economy since its foundation: exporting raw materials - in this case, uranium mined from Brazil - in return for finished goods, in the form of enriched uranium and nuclear technology ("Contratos de Risco para o Urânio?" 1975). Rather than seeing this as a

victory for independence, Kucinski described the deal as a shift “from total dependence to semi-dependence” (Kucinski 1975a).

This argument drew on a strong contemporary concern within the Brazilian opposition movement - particularly the Authentics - regarding multinational corporations. The adverse influence of multinationals on Brazil's economic development had been one of the major themes of MDB's surprisingly successful campaign for the 1974 legislative elections. On the other hand, criticism of multinationals' activities in Brazil was a common theme in the opposition press (Alves 1985).

Therefore, the technical, political and developmental arguments added up to a compelling criticism of the Brazilian-German nuclear agreement, which drew on many of the opposition's existing criticisms of the military's authoritarian style of governance and its consequences, which had proven so successful in the 1974 elections. Beginning with the criticism of its technical shortcomings, in particular, the dubious choice of jet-nozzle technology for uranium enrichment, Brazilian activists demonstrated that the dictatorship's closed style of governance had hindered the conclusion of the agreement. At the same time, they branched out beyond criticizing domestic policy, to show that technical independence was far more restricted than the government claimed. This cast doubt on both the importance of technology transfer and the involvement of German multinational corporations, as well as the dictatorship's claim that it had acted in defiance of both superpowers.

The government viewed critics with some interest, in particular, Maciel, who was singled out as someone who was likely “to stir a long debate” in Congress over the finer points of the deal (Acordo Nuclear com a República Federal da Alemanha August 6, 1975). As the U.S. Embassy in Brasília noted, the presidency sometimes reacted to Maciel's public claims with “promptness and strength” that suggested he often touched a nerve on specific issues – particularly in his attempts to question the government's claims to geopolitical independence. The U.S. government also worried that Maciel's activism would complicate its efforts to secure additional safeguards on the Brazilian nuclear industry that was not covered by the original 1971 agreement (United States Department of State 1975).

However, the regime was never seriously concerned that critics would block the passing of the agreement. Firstly, although scientists, journalists, and opposition figures had leveled some severe criticisms regarding various aspects of the deal, it was clear that most saw that it had considerable advantages over continued dependence on the 1971 deal with the U.S.. Secondly, the government judged that congressional opposition to the agreement was weak. It anticipated that the lower house, the Chamber of Deputies, was likely to prove the most problematic, but the government concluded that it was “unlikely that the MDB will initiate delaying maneuvers on a project of this magnitude.” Thirdly, if all else failed, the government had considerable powers at its disposal to push legislation through the National Congress. If the opposition party did attempt to do so, however, the government would invoke emergency powers to force the bill to a plenary vote – at the cost of the appearance of spontaneous approval that it desired (Acordo Nuclear com a República Federal da Alemanha August 6, 1975).

Congressional action

The regime was right to view Maciel as the biggest danger to the bill passing easily. The congressman did not merely use rhetoric to criticize the agreement, but also the institutional prerogatives available to him as Chairman of the Mines and Energy Committee in the lower house. In contrast to the ARENA-chaired Justice and Constitutional Committee, which approved the bill in one day, Maciel kept it before the Mines and Energy Committee for two weeks, holding hearings on various aspects of the agreement (“PDC 27/1975: Projeto de Decreto Legislativo.” 1975). Through successive rounds of technically informed questioning, Maciel managed to extract some important confessions from government witnesses which significantly mitigated the government’s claims that the agreement would catapult Brazil into the forefront of the international nuclear energy sector. Shigeaki Ueki, the minister of mines and energy, conceded that the jet-nozzle enrichment method was “in the pilot stage” and was extremely energy-intensive, while Paulo Nogueira Batista, president of Nuclebrás, testified that the enrichment process “might not be competitive in international terms” (Kucinski 1975b). Despite approving the bill, Maciel’s committee submitted a report that outlined the various shortcomings it perceived on technical, political, and developmental grounds, not only on the agreement but also on Brazilian nuclear policy since the dawn of the atomic age (DCN set 27 1975).

In addition to his scrutiny of witnesses and the publication of a critical committee report, Maciel proposed an amendment to the text of the treaty both in the committee and in the subsequent plenary session. He proposed to amend Article 2 of the Brazil-FRG agreement, in which both parties pledged to uphold “the principle of non-proliferation of nuclear weapons” (DCN set 27 1975, 7941–2). Maciel wanted to insert an additional passage stating that such a “declaration does not jeopardize the complete transfer and absorption of technology, respecting the Brazilian understanding in the Treaty for the Prohibition of Nuclear Arms in Latin America,” commonly known as the Treaty of Tlatelolco (Maciel September 29, 1975). This understanding was that, though respecting the Treaty of Tlatelolco’s proscription of the development and storage of nuclear weapons in Latin America, Brazil reserved the right to develop nuclear explosives for peaceful purposes, “including those which involve similar devices and personnel” to those used in nuclear weapons (Nuclear Threat Initiative 1967).

On the surface, the amendment was an innocuous reaffirmation of standing Brazilian government policy. Seen in the contemporary international context, however, Maciel’s amendment could present considerable problems. With India’s Smiling Buddha test of May 1974, Europe and North America were under significant pressure to prevent any more “peaceful nuclear explosions” by states to which they exported nuclear technology. Moreover, while the agreement with West Germany had been signed, the accompanying safeguards agreement was still a matter of negotiation between the FRG, Brazil, and the Board of Governors of the International Atomic Energy Agency (IAEA). Any public statement by the Brazilian government claiming that it reserved the right to conduct peaceful nuclear explosions was likely to make this process, which was already the

subject of considerable international attention and controversy, even more difficult. As the Mines Committee pointed out, the second section of Article 3 of the Brazil-FRG deal explicitly stated that the IAEA safeguards agreement would be designed to ensure that the transferred technology would not “be used for nuclear weapons or *other nuclear explosives*” (DCN set 27 1975, 7947). With the amendment, therefore, Maciel attempted to box the Brazilian regime into a corner: it could either affirm its intention to exercise true independence over nuclear technology, potentially placing the FRG-Brazil deal in jeopardy, on the grounds of insufficient safeguards regarding its use for nuclear weapons-related activities, or it could reject the amendment, thereby limiting its pretensions to nuclear independence.

While arguing in favor of the amendment during a plenary session of the Chamber of Deputies, Maciel and his MDB colleague José Freitas Nobre pressed beyond this immediate problem, reaching the fundamental tension that underlay it. The Brazilian government’s position, Maciel argued, was built on rejecting the dominance of the global nuclear order by the United States and the Soviet Union. This order was embodied in the Nuclear Non-Proliferation Treaty of 1968, which Brazil had refused to sign. As Maciel and Freitas Nobre argued, the government appeared to be accepting clauses in the agreement that would lead to submission to this very regime and hinder Brazil’s use of nuclear explosions for peaceful purposes. In short, they argued the government could not continue to have it both ways: while playing the nationalist card by touting Brazil’s new nuclear independence, they adopted a rhetoric that brought the country closer to the spirit – if not the literal content – of the Non-Proliferation Treaty, in order to appease North America and Europe (DCN set 30 1975).

ARENA’s response to the proposed amendment was long, but it left significant issues unsolved. Alípio Carvalho, speaking in support of the agreement, merely stated that nuclear safeguards would not contradict Brazil’s position regarding the Non-Proliferation Treaty and the Treaty of Tlatelolco. However, he did not elaborate as to exactly how the regime would ensure that was the case. Instead, ARENA relied on an array of procedural rules to shut down the debate. Carvalho argued that Maciel’s amendment could not be approved because it was not in the power of Congress to amend international agreements but to accept or reject them wholesale. The President of the house, Célio Borja (ARENA), cited a procedural rule to bring the session to a vote, arguing that two members of MDB who had subscribed to speak had failed to appear, so the time for discussion was over. Other congressmen argued that the amendment could not be considered because, though supported by MDB members, it had already been rejected by the ARENA-majority Mines and Energy Committee (DCN set 27 1975; set 30 1975). Thereby, it was Maciel who found himself in an awkward position: he should either support the deal despite its imperfections or vote against an agreement that, as even he admitted, was far better than the deal the dictatorship had signed with the United States three years earlier. In the end, Maciel voted in favor of the deal, preferring to support a flawed agreement than vote against Brazil’s best hope for a nuclear power industry. After the vote had been taken, Maciel read his full justification for the amendment, in order to register his reservations (DCN set 30 1975).

After the lower house approved the agreement, the debate moved to the Senate. With the deal fundamentally endorsed by both ARENA and MDB senators, the discussion refocused on the technical details of the jet-nozzle method, the relative merits of enriched - versus natural - uranium reactors, and the best ways to maximize the benefits of technology transfer to the Brazilian scientific establishment. The senators were assisted by both Goldemberg and Professor Israel Vargas, from the Federal University of Minas Gerais, who testified before a joint session of the Mines and Energy and Foreign Affairs Committees of the upper house (DCN nov 8 1975). The Senate approved the agreement on October 16, 1975, as Távora reiterated the need for the Brazilian scientific community to be actively involved (Folha de São Paulo, 1975).

Conclusion

The opposition's criticism of the Brazil-West Germany nuclear deal reached its high-water mark with Maciel's amendment. Because it was limited by its underlying acquiescence to the importance of Brazil's nuclear independence, the opposition was ultimately unsuccessful in changing the terms of the deal. Moreover, it gained little publicity outside of Congress and a few anti-regime periodicals – so much so that it has remained peripheral to most historical accounts of Brazil's nuclear program. It was important for some reasons. Firstly, it adds further weight to existing work that questions the idea that the Brazilian public was entirely supportive of the way in which the military dictatorship pursued nuclear independence during the mid-1970s. Instead, opponents attacked the government's claims regarding the program on some fronts, which reflected their concern with the military dictatorship as a whole. One particular aspect is the regime's aversion to popular – or even expert – participation in decision-making, as well as its modernization model, which, many feared, would increase rather than decrease Brazil's technological and economic dependence on the developed world.

Moreover, many of the opposition's criticisms turned out to be correct: the jet-nozzle method did indeed prove to be a prohibitively expensive and unreliable way to enrich uranium. Consequently, Brazil never achieved the nuclear independence that Geisel's government had promised as a result of the nuclear deal. By the late 1970s, the National Congress instituted an inquiry into the shortcomings of the agreement, which eventually uncovered many of the same problems that critics had pointed out half a decade earlier. In sum, the opposition's points on the technical, political and developmental deficiencies of the deal reflected the reality far more precisely than the regime's overblown claims regarding the way in which the agreement would change Brazil's economic and political status in a global context. At the time of writing, only one nuclear power plant from the original eight is online – a fitting epitaph for the arguments of those who denounced dissenters as unpatriotic, or simply wrong.

Domestic critics of the agreement also attempted to challenge the way in which the regime placed itself in the global nuclear order. The Geisel government and its supporters in Congress tried

to portray the Brazil-West Germany nuclear deal as a triumph on its quest for independence from the superpower-imposed nonproliferation regime, by emphasizing the way in which the regime had resisted American pressure to conclude the deal. However, scientists, such as Goldemberg, showed that there were considerable problems with the idea that the jet-nozzle method could easily lead to Brazil's mastery of the nuclear fuel cycle. Through his proposed amendment and ARENA's hostile reaction to it, Maciel showed that there were significant limits to how far the regime would go to publicly articulate the rights it had claimed under the Treaty of Tlatelolco to develop peaceful nuclear explosives. This was due to fear of undermining the successful conclusion of the Brazil-West German agreement and the accompanying safeguards agreement. Seeking to criticize the regime for not being assertive enough in pressing for Brazil's nuclear independence, Brazilian critics of the 1975 agreement add a new dimension to narratives of nuclear protest, which generally focus on anti-nuclear movements. This underlines the importance of viewing nuclear protest from a global perspective.

In adding greater nuance to the regime's simplistic narrative of nuclear independence, domestic criticism of the 1975 nuclear agreement also relates to enduring themes in Brazil's search for autonomy. Scrutinizing the details of the technology transfer, Brazilian critics questioned what independence meant in practice. What did the agreement signify if it was reliant on the importation of foreign expertise provided by multinational corporations? Was this level of dependence a necessary interim stage towards full autonomy, or would it merely deepen the ties between Brazil and the Global North in ways that would ultimately impede the pursuit of this aim? Maciel's amendment raised fundamental issues regarding the costs and risks that the nation was willing to take in order to obtain real freedom of action: was Brazil ready to risk retribution from North America and Europe in order to turn the policy of independence from rhetoric into reality, or would it merely remain words on paper, while Brazil was increasingly aligned *de facto* with the superpower-sponsored non-proliferation regime? These are issues that would have never been raised in public at all, had it not been for Brazilian critics of the FRG deal. Those issues still resonate as the country continues to debate the true meaning of development.

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