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Brazilian Automotive Industry: Decades of incentives and their results

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SUMMARY: *This article aims to critically examine public policies to encourage the automotive industry in Brazil, focusing on the failures and limitations of historical programs, such as Inovar-Auto and the Automotive Policies for Regional Development (PADR), and the challenges of Rota 2030. It analyzes how dependence on the domestic market, protectionism, low technological innovation, tax complexity and lack of integration into global value chains have contributed to the sector's lag and low competitiveness, despite the large public resources invested. It suggests that incentive programs for the Brazilian automotive industry have been marked by recurring structural and design flaws. Excessive protectionism (evidenced by the condemnation of Inovar-Auto in the WTO), dependence on the domestic market, insufficient promotion of innovation and cutting-edge technology, and the inability to overcome chronic bottlenecks such as the high and complex tax burden, deficient infrastructure and unskilled labor, have condemned these policies to mediocre results.*

KEYWORDS*: Industry Incentives; Tax Policy; Public Policy*

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I. Introduction

The automotive industry is of great importance to the Brazilian economy and to the employment chain. However, historically, it has been shown to be basically dependent on the domestic market, which makes it susceptible to frequent crises, given the lack of support from exports during periods of economic decline in the country. To overcome these limitations, Brazil has implemented several public policies, with the aim of modernizing the sector, improving the quality and technology of vehicles, and promoting insertion in global value chains (GVCs). However, an in-depth analysis reveals that, despite the efforts, many of these programs have presented significant flaws that prevent the sector from achieving global competitiveness.

The shortcomings of Brazil's automotive industry incentive programs are multifaceted, ranging from historical structural problems to deficiencies in the design and implementation of more recent policies. Excessive protection and stagnation: Since their implementation in the 1950s, the Brazilian automotive industry has been heavily protected from foreign competition by the state, a scenario that intensified from the 1970s onwards, creating an environment of stagnation.

Lack of long-term strategy: In the 1980s, amid neoliberal policies and oil crises, the state reduced its role in industry, with short-term concerns about macroeconomic policy prevailing. This resulted in low rates of robotization and automation, and very little basic education for the workforce.

Failure of the Brazilian Automotive Regime (RAB): Although the RAB (1995-1999) sought to expand and modernize the industry and promote exports, its main goal of increasing production from 1.8 million to 2.5 million units by 2000 was not achieved, registering a significant drop in production (-24.8% between 1996 and 1999). This situation was influenced by international crises and inflation control policies, with a lack of economic policies for sustainable long-term growth.

II. THEORETICAL FRAMEWORK

This theoretical framework aims to explore the interconnection between the closure of the economy, sectoral policies and the performance of the national industry, focusing on the case of the Brazilian automotive sector. Bacha (2022) argues that the refusal to open the economy to foreign trade and the persistence of import substitution policies are central causes that prevent Brazil from growing rapidly and developing competitive industrial sectors.

Modern economic literature, since David Ricardo, has argued that a country benefits from integrating into the international economy by specializing in the products in which it is relatively more productive (comparative advantages). This integration allows all countries to produce more and to lower prices. Currently,

international trade is predominantly in intermediate products via international value chains, where countries specialize in stages of production.

Bacha (2022) argues that in addition to specialization, trade integration offers three other dimensions of benefits that are crucial for growth, namely: technology absorption, where trade allows companies to absorb technologies available on the frontier of international production, either through the installation of multinationals or participation in global production chains, making them more productive; market expansion and economies of scale, showing that the expansion of markets through international trade allows more productive companies to expand beyond the domestic market, gaining scale and producing goods and services at more competitive prices..; and, finally, natural selection and reallocation of resources, showing that increased competition promotes natural selection, where the most productive firms stand out, and resources (capital and labor) are transferred from the least productive companies to the most productive ones, benefiting the economy as a whole.

Each of these mechanisms offers a potential source of dynamic welfare gains, expressed as higher economic growth rates. Recent literature suggests that these gains are substantial relative to the static gains of Ricardian theory. As explained by Bacha (2022), “Not all countries that opened up to trade developed, but all countries that developed did so with significant commercial integration with the rest of the world”.

Donaldson (2015) and Irwin (2019) reviews of recent literature on trade and growth empirically confirm the benefits of trade. There is a positive causal relationship between trade share and GDP size, and liberalizing trade reforms has a positive impact on economic growth. In a macroeconomic model that considers the existence of the informal sector, using data from Brazil, Dix-Carneiro et al. (2021) suggest that a 40% reduction in barriers to foreign trade would bring a 9.6% productivity gain for the country.

Large economies are large exporters: the United States is the world's largest economy and second largest exporter; China is the second largest economy and first largest exporter; Japan is the third largest economy and fourth largest exporter; Germany is the fourth largest economy and third largest exporter; France ranks fifth in both size of economy and importance of exports; the United Kingdom has the sixth largest economy in the world and is the tenth largest exporter.

Brazil, in contrast, has been one of the most closed economies in the world, with its share of global exports significantly lower than its share of global GDP. In 2018, Brazil's import share of GDP was the lowest among 164 countries considered by the World Bank. This closure, combined with a history of deepening import substitution decoupled from export expansion, is associated with the collapse of Brazilian growth since 1980. The persistence in producing domestically inputs and capital goods that could be imported at lower prices and with higher productivity resulted in more expensive and less productive capital goods, contributing to stagnation. This scenario can lead to "impoverishing growth," where domestic resources are applied to inefficient import substitution rather than to internationally competitive production lines, as explained by Bacha (2022).

Opposition to opening in Brazil is multifaceted, involving:

- The complexity of pro-openness arguments, such as the theory of comparative advantage, is not intuitive for many.
- Strong opposition from vested interests such as firms and unions that benefit from the protection of the domestic market and are politically powerful.
- The perception that the benefits of integration materialize in the long term, while the costs (such as unemployment) are immediate.
- A simplistic reading of the country's history, which associates progress in the 20th century (industrialization via import substitution) with a closed economy and the stagnation of the 19th century with an open economy.
- The excessive optimism of pro-opening hypotheses which, in more simplistic formulations, may not consider price rigidity and inertia in the allocation of resources, generating unemployment and imbalances in the trade balance in the short term

The theory of foreign trade before David Ricardo was that of Adam Smith, for whom countries should export what was left over after satisfying domestic demand — trade was a vent for surplus, an outlet for excess domestic capacity.

According to Ricardo's theory of comparative advantages, explained in the study by Gontijo (2007), free trade, by inducing trading partners to specialize in those products that are comparatively more efficient, is beneficial for all countries, even for those that are less efficient, in absolute terms, in the production of all goods and services. Obviously, the theory is called comparative advantages because a country can be less efficient than another in the production of all goods and services and, even so, the productive specialization induced by foreign trade would be advantageous for it.

For scarce economic resources (capital and labor) to be reallocated from less productive activities to more productive ones, companies must close, implying the loss of jobs and market for national producers replaced by additional imports.

In relation to this simplistic view, it is worth noting that for 120 years, from the 1840s to the 1960s, the country's exports were based on coffee monoculture. From 70% at the beginning of the 20th century, the country's share of world coffee exports fell to 30% in the 1960s. It was said that Brazil was opening the umbrella of high coffee prices, under which other Latin American and African producers entered. The share of total exports in GDP fell from 20.6% in 1906, when the coffee appreciation was introduced, to just 3.3% in 1964, when coffee finally lost its dominant position in Brazilian exports.

The valorization policy was intended to increase revenue from coffee exports, taking advantage of the low response of demand to high prices and the time it took for coffee production in competing countries to react. Paradoxically, in the medium term it resulted in a chronic shortage of foreign exchange, as the share of exports in national income was reduced. This shortage was dealt with through the policy of national similarity. This meant that products that had similarities produced in Brazil could not be imported, either due to quantitative restrictions or high tariffs and complex port bureaucracy. On the other hand, these national similarities could not be exported due to their high prices and low quality. Thus, an industry was created that focused almost exclusively on supplying the domestic market.

The transition to internal and external balance can be long and painful. In democratic regimes, where politicians need to respond immediately to the population's hardships, the opening of the economy can simply be aborted. This is what happened in Brazil from 1995 onwards, when there was a setback in relation to the 1990 opening of the Collor government, preceded by two rounds of tariff reductions under the Sarney government. During this period, the opening of imports was accompanied by an appreciation of the real, which harmed the trade balance. It is necessary to stimulate demand and remove obstacles to restructure supply. Tax reform and infrastructure recovery should complement the opening up, increasing the economy's productivity and the industry's competitiveness.

When starting from a situation of trade balance, when tariffs and other protectionist mechanisms are reduced, there should be a devaluation of the currency that compensates domestic producers by making imports more expensive and increasing the competitiveness of exports. This may occur naturally because, in anticipation of an opening to imports and the corresponding increase in demand for foreign currency, financial agents would start to hoard dollars, devaluing the real.

Government policies designed to encourage specific sectors, such as the automotive industry, are generally associated with high costs and are only justified in situations of market failure, such as the presence of externalities (e.g., production of safer or less polluting cars, research and development activities). However, even with externalities, it is essential to assess whether government intervention is effective, whether it generates positive value for society and whether the benefits outweigh the direct (fiscal) and indirect costs (allocative distortions, inhibition of competition, increased costs and harm to consumers). An indirect cost of relevance is the risk of political capture, where the interests of already established and organized companies (such as Anfavea) may prevail over the diffuse interests of consumers. The opportunity cost of public resources must also be considered.

Economic literature suggests that sectoral policies rarely have a positive impact and that governments should focus on cross-cutting policies (e.g., legal certainty, business environment, reduction of production costs, promotion of competition and innovation) that benefit the entire industry. If sectoral policies are implemented, they should be designed to minimize risks and follow principles such as:

- Temporary intervention: With the potential to eliminate barriers and allow the sector to act independently, with a time limit and benefit reduction plan.
- Exposure to competition: Create a framework that keeps the benefited sectors exposed to competition, encouraging the search for efficiency and productivity.
- Respect for the sector's production logic: Avoid excessive control over the organization of production, so as not to increase costs.
- Transparency and impact assessment: Clarity about costs and benefits, with defined objectives and metrics for evaluation.
- Low administrative costs: Simple and transparent policies are preferable to complex programs.

III. Public Policies to Encourage the Automotive Sector

Inovar-Auto was an automotive program created in 2012 with the aim of stimulating the competitiveness of the Brazilian automotive industry through tax incentives linked to energy efficiency targets, densification of the production chain and investments in R&D (Research and Development). However, it faced several criticisms:

WTO protectionism conviction: Inovar-Auto was convicted by the World Trade Organization (WTO) for violating free competition laws. The program's measures, such as the 30% IPI surcharge for imported vehicles (except Mercosur and Mexico) and the linking of discounts to local production, were considered discriminatory. This was Brazil's biggest defeat in litigation under the WTO. (DUARTE, 2019)

Little incentive for innovation and cutting-edge technology: Despite its objectives, the program failed to

promote a significant increase in investment in automakers' research and technology centers, or to give local plants autonomy in relation to their parent companies. The World Bank, for example, has pointed out its failure to stimulate research and development in the sector. Research indicates that spending on innovation and R&D activities by vehicle manufacturers decreased during the program's term. In addition, the program failed to adequately encourage electric motorization and future-proof technologies.

Ineffectiveness in strengthening the production chain: The program did not directly benefit suppliers in the automotive supply chain, such as the auto parts sector. The trade deficit in the auto parts sector worsened during the Inovar-Auto period, totaling US$42 billion. The TCU audit found that, in the case of FCA, only 6% of the inputs were purchased from suppliers in the beneficiary regions.

Excessive dependence on the domestic market: Although it curbed the penetration of imports, Inovar-Auto failed to reverse the sector's trade deficit and did not make domestic vehicles more competitive externally. Automobile production reduced its growth rate during Inovar-Auto, with negative indices.

Legal uncertainty and high administrative costs: The complexity of the program, with 15 additional ordinances, generated unnecessary administrative costs and legal uncertainty for participating companies. Monitoring compliance with targets and calculating credits was confusing, and clear procedures were only established after the program ended.

The PADR, established by Laws No. 9,440/1997 and No. 9,826/1999, granted tax benefits to encourage the installation of automotive industries in the North, Northeast and Central-West regions.

Insufficient tax incentives alone: Studies show that tax incentives alone are not capable of effectively attracting investment. Factors such as infrastructure, quality of public services, workforce qualifications and a dynamic consumer market are more important.

Reduced and localized impact: The TCU audit at the FCA factory in Goiana-PE (which benefited from PADR) found that the impact was reduced and localized, with no capacity to boost a larger region.

Unfavorable cost-benefit: In all scenarios analyzed, the costs of PADR (forgone revenue) were significantly higher than the benefits generated (jobs and investments in R&D). Even in the best-case scenario, there was a considerable loss. The policies do not even return to the region what was not transferred through the participation funds.

Lack of formation of industrial clusters: The policies did not result in the formation of industrial conglomerates. The low acquisition of inputs in the target regions demonstrates this failure. Extensions without evaluation: The tax benefits of PADR have been continuously extended since their creation (1997/1999), without any evaluation of their results. This runs counter to the need for objective criteria and performance targets for granting incentives.

Rota 2030 (2018-2023) was created to replace Inovar-Auto, seeking a long-term industrial policy for the automotive sector, focusing on predictability, legal certainty, R&D, energy efficiency and vehicle safety. Despite some good fundamentals, it has been criticized for:

Low government incentives for innovation: Although it provided for incentives for R&D, the Rota 2030 program presented low government incentives for innovation (R&D), moving in a different direction from global initiatives with high and aggressive investments in innovation. There was no provision for public money contributions or facilitated financing through public banks. (DUARTE, 2019)

Misaligned safety and environmental requirements: It required safety and environmental requirements that were misaligned with the North American and European markets and were considered simplistic and globally outdated. Maintenance of a complex tax policy: It maintained a complex tax and regulatory policy that was repellent to foreign investors. High fiscal cost: Estimates pointed to a cost of more than R$5.4 billion in lost revenue between 2019 and 2021. Maintenance of Inovar-Auto's flaws: In practice, it was seen as a maintenance of the Inovar-Auto model, circumventing the characteristics that led to the WTO's condemnation, but not solving structural problems.

IV. DISCUSSION AND RESULTS

Duarte (2019) argues that in addition to the specific flaws of each program, there are persistent structural problems in the Brazilian economy that undermine the effectiveness of any incentive:

Exacerbated dependence on the domestic market: The Brazilian automotive industry is heavily dependent on the local market, which generates instability and limits growth potential, as exports are not sufficient to neutralize the negative impact of internal crises.

Technological lag and lack of quality: Brazilian industry is technologically outdated, and vehicles are manufactured with a focus on the local market, resulting in little on-board technology and lower quality compared to global standards.

"Brazil Cost" and High Tax Burden: The sector faces problems with logistics infrastructure and high and complex tax burdens. The average tax on a car in Brazil in 2019 was 31.24% of the sales price, significantly higher than in other countries. The annual cost of calculating and processing taxes in the automotive sector is R$2.3

billion, higher than the annual investment in R&D forecast by Rota 2030.

Unskilled workforce and lack of training: There is limited availability of skilled labor. The government has proven incapable of stimulating the upskilling of the workforce. Spending on workforce training programs related to GDP has fallen significantly. The lack of investment in educational training from basic education to professional retraining is a bottleneck.

Low investment in R&D and S&T (Science and Technology): National spending on R&D has been falling since 2015, both from public and private sources, and is a small percentage of GDP. Brazilian legislation is not adequate to foster the environment necessary for the industry to achieve globally competitive quality and technology standards.

Lack of integration into global value chains (GVCs): Domestic industry has difficulty integrating into GVCs due to its technological lag and local/regional focus. Brazil is not integrated into any relevant regional market or major free trade zone. Legal uncertainty and absence of state policy: The predominance of short-term government policies, instead of long-term state policies, generates legal uncertainty, reduces predictability for investments and impedes structural transformations.

V. CONCLUSION

A critical analysis of public policies to encourage the Brazilian automotive industry, including programs such as Inovar-Auto, the Automotive Policies for Regional Development (PADR) and Rota 2030, reveals a persistent pattern of structural and design flaws. Despite the significant public resources deployed, the automotive sector in Brazil has consistently been marked by excessive protectionism, exemplified by the condemnation of Inovar-Auto at the World Trade Organization (WTO). This approach has resulted in an exacerbated dependence on the domestic market, which, combined with insufficient promotion of innovation and cutting-edge technology, has prevented industry from modernizing and competitively entering global value chains (GVCs).

In addition to the specific shortcomings of each program, the study shows that the inability to overcome chronic bottlenecks such as the high and complex tax burden, deficient infrastructure and unskilled labor, known as the "Brazil Cost", condemned these policies to mediocre results. Tax incentives alone proved insufficient to attract effective investments, failing to form industrial clusters. Additionally, the lack of a long-term strategy and the predominance of short-term government policies, instead of state policies, generated legal uncertainty and limited predictability for investments.

Considering this scenario, the article demonstrates the pressing need for a radical paradigm shift. Brazil must move beyond temporary sectoral subsidy policies and focus on robust, long-term state investments. This includes a solid commitment to quality education (from the basics to professional retraining), Research and Development (R&D), and Science & Technology (S&T), with legal and constitutional support. For the Brazilian automotive industry to achieve global competitiveness and effectively integrate into GVCs, it is essential to simultaneously reduce the burden on private productive investments, deeply simplify taxes, and make an unequivocal commitment to innovation, aligned with the demands of Industry 4.0. Only through this integrated approach, which addresses the foundations of competitiveness, will it be possible to overcome the mistakes of the past and reposition the Brazilian automotive industry in a sustainable manner in the global market.

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