UNEVEN AND COMBINED: THE BOOM-BUST OF EMERGING POWER DEVELOPMENT AS SEEN THROUGH EMBRAER

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This article explores the boom-bust cycle of Brazilian development through the lens of aeronautics, specifically Embraer. Developing countries experience cycles of boom and bust because of the particular way they fit into the world economy. While boom periods require state capacity supported by cross-class coalitions, they are repeatedly undone by the rise to prominence of factions of capital subservient to international capital and uninterested in cross-class coalitions or supporting state capacity. To explore this pattern, the article focuses on the aeronautics sector, one of the few technologically advanced sectors in which Brazil competes and even leads internationally, with implications for development and security. The expansion of aeronautics in Brazil was a fifty-year trajectory of investment in state capacity and collaboration between leading factions of domestic capital, and it required redoubled investment at each moment of downturn in the business cycle. The significant downturn that occurred at the end of the 1980s prompted a particular kind of investment, however, turning control over the flagship national enterprise, Embraer, to financialized factions of Brazilian capital. While this restructuring saved the company and navigated to a new boom, it left the company vulnerable at the next downturn, when financialized factions of Brazilian capital were content to hand control to international capital, represented by the sale of Embraer to Boeing. For five decades, Brazil navigated the cycle of boom and bust to expand a key sector and preserve domestic control. In the end, the structure of intra-class forces conspired to doom the sector to foreign capture.

Keywords: Brazil, Development Cycles, Emerging Power, Global Economy, Embraer.

DESIGUAL E COMBINADO: A EXPANSÃO E QUEDA DO DESENVOLVIMENTO DE UMA POTÊNCIA EMERGENTE SOB A ÓTICA DA EMBRAER

Este artigo explora o ciclo de expansão e queda continuado do processo de desenvolvimento brasileiro sob a ótica da indústria aeronátutica, com especial atenção ao caso da Embraer. Países em desenvolvimento enfrentam tais ciclos econômicos pela forma particular com que se inserem na economia global. Períodos de expansão requerem apoio estatal possibilitado por alianças multiclassistas, mas estas tendem a ser repetidamente desfeitas pela ascensão de setores econômicos subservientes ao capital internacional desinteressados em tais arranjos sociopolíticos amplos. A fim de explorar tal padrão histórico, o artigo foca no setor aeronáutico brasileiro, um dos poucos que foi capaz de desenvolver uma tecnologia de ponta que permitiu competitividade internacional ao país, com implicações claras para seu desenvolvimento, assim como para a área de segurança interna. A expansão do setor se deu ao longo de uma trajetória de cinquenta anos de investimentos na capacitação técnica estatal e de áreas-chave do capital nacional, durante um processo que requereu investimentos redobrados em momentos cruciais. A crise do setor nos anos 1980 obrigou a entrega de partes centrais da indústria a setores financeiros do capital nacional. Ainda que essa experiência tenha salvaguardado a companhia de uma crise maior, e assim

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permitido a sua expansão ao longo dos anos 1990, ela se tornou mais vulnerável ao seguinte momento de queda do setor: quando o setor financeiro nacional concordou em ceder controle da empresa ao capital internacional, experiência, por fim, consolidada na venda da Embraer a Boeing no decorrer do último ano. Assim, fica claro que ainda que o Brasil tenha navegado de forma bem-sucedida os ciclos econômicos de expansão e a queda das últimas cinco décadas, ao fim e ao cabo desse processo, a lógica das forças dos arranjos interclasse terminaria por entregar as conquistas nacionais dessa importante indústria ao capital internacional.

Palavras-chave: Brasil, Ciclos de Desenvolvimento, Potência Emergente, Economia Global Embraer.

DESIGUAL Y COMBINADO: LA EXPANSION Y CAÍDA DEL DESAROLLO DE UNA POTÊNCIA EMERGENTE BAJO LA ÒPTICA DE EMBRAER

Este articulo investiga el ciclo de expansión y declino del desarrollo Brasilero a través de la óptica de aeronáutica, específicamente Embraer. Los países en desarrollo experimentan ciclos de expansión y declino por la forma que se insertan en la economía global. Los periodos de expansión requieren capacidad estatal apoyado por coaliciones entre clases, pero son repetidamente deshechos con el ascenso de facciones de capital obediente al capital internacional y sin interés en coaliciones entre clases o apoyo a la capacidad del estado. Para investigar este padrón, el articulo tiene enfoque en el sector de aeronáutica, uno de los pocos sectores de tecnología avanzada en donde Brasil compite y lidera internacionalmente, con implicaciones al desarrollo y la seguridad. La expansión de la aeronáutica en Brasil era una trayectoria de cincuenta años de inversión en la capacidad del estado y colaboración entre sectores dinámicas del capital doméstico, y tenía como requisito inversión renovada en cada momento de declino del ciclo empresarial. El declino significante que ocurrió al final de los 1980 promulgó una inversión particular, entregando control de la empresa nacional dominante, Embraer, a sectores financieros del capital Brasilero. Esta reorganización salvó la compañía y navegó a una nueva expansión, pero dejo la compañía vulnerable al próximo declino, cuando sectores financieros eran contentos a entregar control al capital internacional, representado por la venta de Embraer a Boeing. Por cinco décadas, Brasil navegó el ciclo de expansión y declino para expandir un sector estratégico y preservar el control nacional. Al final, la estructura de las fuerzas intra-clase conspiraron para condenar el sector a la captura extranjera.

Palabras clave: Brasil, Ciclos de Desarollo, Potência Emergente, Economia Global, Embraer.

JEL: N46.

1 INTRODUCTION: BOOM AND BUST IN THE INTERNATIONAL POLITICAL ECONOMY

Much was written about the emergence of Brazil and other middle powers in the early years of this century. Brazil seemed poised for a steady climb in international rankings, along with other large, fast-growing countries such as Russia, India, China, and South Africa. The investor-coined label, BRICS, summed up the exuberance, and all seemed confirmed when Brazil successfully navigated the 2009 financial crisis.

Such exuberance was not new to Brazil. Equally optimistic views were written about the period of the Brazilian "miracle" from 1968-1973 as well as the growth spurt of 1955-1960, when the president proclaimed "50 years of progress

in five." Following each boom, sudden and apparently surprising busts ensued. In short, every few decades, Brazil experiences a period of rapid growth, only to be struck by debilitating crisis, leading to the well-known Charles de Gaulle swipe, "Brazil is the country of the future, and always will be."

Periods of boom and periods of bust are too often viewed in isolation. Observers focus on a single period and ask why did Brazil develop rapidly in certain years or why did Brazil stagnate. This narrow approach produces amusing patterns, as observers appear triumphant with every boom and surprised by each bust. When the same observer mischaracterizes both boom and bust, one has to wonder if we are even asking the right questions. The twin covers of the Economist exemplify the confusion, "Brazil Takes Off" from November 2009 and "Has Brazil Blown It?" from September 2013.

The fact of repeated boom and bust calls for better understanding of the pattern as a cycle. Rather than an explanation that focuses solely on specific and short-term factors of one phase of the cycle, a period of boom or a period of bust, the current article lays out an understanding rooted in factors that are long-term, macro-structural, and help make sense of both rise and fall. Further, by focusing on macro-structural factors characteristic of large developing countries, the article suggests a cyclical pattern that may help to explain the difficulty of late development more generally.

FIGURE 1
Shifting International Perceptions of Brazilian Potential

Sources: Economist covers, 12 November 2009 and 27 September 2013.

The two interrelated causal factors outlined here include the international system and domestic class structure. In short, an international system of competing states and rival national bourgeoisies penetrates late developers and alters the relative power of domestic factions of capital and their relation with lower classes. Booms represent periods in which dynamic domestic class factions bargain with international capital to secure control over critical aspects of production, investment, and especially technology, thereby inserting themselves more profitably in global patterns of accumulation. Busts represent periods in which international capital asserts its leverage more forcefully, reestablishing control of surplus, production, and investment.

The key mechanism swinging from boom to bust is the class composition of the state in developing countries. Compared to bourgeoisies of developed countries, dynamic factions of capital are weak in developing countries, and they require the local state to negotiate international relationships. Yet, states in developing countries are themselves relatively weak, only as capable as the accommodation they can strike between dynamic factions of local capital and social forces among rival elite and popular sectors (Boito Junior, 2018). Periods of boom are characterized by an accommodation between dynamic factions and other actors that strengthens the local state. This requires that dynamic factions of local capital dominate factions subservient to international capital, often requiring a coalition and political support from popular sectors. During periods of bust, those factions of capital subservient to international actors rise to prominence. They are uninterested in using the power of the state to bargain more effectively, uninterested therefore in preserving an alliance with popular forces, and ambivalent about their relationship with more dynamic factions of domestic capital when they get everything they need from international capital. The rise to dominance of subservient factions of national capital comes at the cost of sovereignty and autonomy in the international system and the squeezing of popular sectors.[3]

Which factions of domestic capital are dynamic depends on what the international economy requires of developing countries, something that changes over time. Overcoming the boom and bust cycle requires identifying new dynamic sectors, negotiating their relationship with other social forces, building a niche in the international economy, and charting a path to the next boom – before bust sets in. This presents challenges that are both internal (accommodating rival social forces) and external (gaining and preserving access to rent in the international economy). It is precisely the difficulty of managing these internal and external challenges that makes overcoming the boom-bust cycle so difficult. Yet, creating a boom, sustaining it, and surfing to the next one is what distinguishes highly

3. The concept of autonomy has become central to debates on Brazilian foreign policy, see Vigevani and Cepaluni (2016).

developed countries from middle powers. It is the descent into bust that sets developing countries back.

To advance this argument, the article focuses on the aeronautics sector in Brazil, led by Brazilian champion, Embraer. Aerospace is an especially good place to understand development because it requires advanced technology and business know-how, and successful entry to the sector promises high-income jobs, large-scale production, prestige, and spillovers to upstream and downstream activities as well as other economic sectors (Ghemawat, Herrero, and Monteiro, 2000). Aeronautics is also characterized by imperfect competition, non-homogeneous products, and major economies of scale,[4] along with dual-uses with implications for international military influence (Goldstein, 2002). Further, high barriers to entry and fierce international competition mean that government support is essential in the form of subsidies, investment, regulatory structure, procurement, and protection. Still, such support can easily slip into entrenched interest and rent-seeking, calling for capable but disciplined state agencies. Many countries have attempted to enter the sector, and Brazil's success places it among one of only a few places in the world with the capacity to compete.

Furthermore, the long history of Brazilian aeronautics has experienced at least three different periods of boom and bust. After an initial boom associated with World War II, the Brazilian aeronautics industry faced decline and apparent extinction in the 1950s, only to be resuscitated in the late 1960s through the creation of Embraer as a mixed economy state-owned enterprise. After steady growth, a late-1980s bust coinciding with the debt crisis came close to bankrupting the enterprise. An infusion of public funds, a new relationship to domestic and international capital through partial privatization, and a well-timed international niche produced a rapid rise through the 1990s and 2000s. Yet, the return of downturn after the 2009 financial crisis has culminated in the abrupt end of Brazilian ownership of Embraer with its apparent 2018 sale to Boeing. Aeronautics offers distinct advantages as an exhibit of the typical extremes of boom and bust cycles within a critical sector for Brazil and for development more generally.

The next section outlines theoretical approaches to booms and busts in development, building an explanation that highlights domestic and international structural factors. The following section reviews the history of state activism in advanced sectors in Brazil, with particular focus on the years that led up to the creation of Embraer. Subsequent sections explore cycles of boom and bust in Brazilian aeronautics, with particular attention to the most recent period that

4. Since at least the work of Gerschenkron, economies of scale have been viewed as central to late development (Gerschenkron, 1962).

culminated in the apparent sale to Boeing. The final section explores implications for late development more generally.

2 AERONAUTICS WITHIN THE BRAZILIAN TRADITION OF PASSIVE REVOLUTIONS

The boom-bust cycle of development in Brazil prompts several political economy questions of theoretical import. First, what allows developing countries to compete for global rents and control of production and investment? In particular, how can they leapfrog to the front of the technology frontier and secure rents through competition in the highest value activities in the international economy? Second, what explains patterns of bust, in which apparent gains disappear? Further, in examining these busts, can the explanation go beyond explaining either boom or bust as independently determined phenomenon and instead explain the recurring boom-bust cycle itself?

Some might argue that everything can be explained by commodity prices. When prices are high, capital is abundant to developing countries for investment (Mazzuca, 2013). By contrast, when prices are low, fiscal resources are scarce, and attempts to promote development are more likely to result in deficit, inflation, debt, and slowdown (Edwards, 1991). Yet, such an explanation does too much. Commodity booms are associated with the "resource curse," one aspect of which makes investment in more advanced activities unattractive. When prices are high, commodities are the most attractive place to invest, but the capital inflows they provoke raise exchange rates and complicate exports, dissuading investment in other sectors. When prices are low, there are simply no resources with which to promote other sectors. This is the "Dutch disease" by which sectors outside booming commodities wither, in boom times and in bust (Ross, 2015).

While fluctuating prices can help explain boom and bust in the commodity sector and secular declines in development overall, commodity prices cannot explain boom in other sectors, especially advanced ones. Alternative approaches have recently focused on the middle-income trap. Taken literally, such approaches link explicitly to GDP per capita, creating a causal claim out of the way increases in average income can occur without necessarily increasing productivity (Gill and Kharas, 2007). Middle-income states appear trapped, "unable to compete with low-income (LI), low-wage economies in manufactured exports and unable to compete with advanced economies in high-skill innovations" (Kharas and Kohli, 2011, p. 282).

One nuance of the middle-income trap is the observation that the path from low-income to middle-income has different requirements than passage to high-income. To emerge from low-income status, countries count on low labor

costs (often associated with inequality and informality) and large influxes of foreign capital. Moving to high-income status includes moving away from low-wage production and into higher value activities, requiring efforts such as expanding and improving education, increased savings and investment, and movement towards the technology frontier through research and development (Aiyar *et al.*, 2013; Agenor and Canuto, 2012, p. 3-4; Lin and Treichel, 2012). In addition to these more complicated economic policy requirements, observers point to institutional upgrading with respect to things like property rights, labor flexibility, anti-corruption, and deepening financial systems (Gill and Kharas, 2007).

A critical version of the middle-income trap notes that most of these requirements focus on the supply side – supply of skilled workers, supply of capital, supply of technology, supply of developmental institutions – while missing the demand side. In particular, the mechanisms that "allow for higher wages to expand consumption and to avoid external constraints, are and have been central to growth and development" (Vernengo and Caldentey, 2017, p. 5). This critical view allows more explicitly for a state role in expanding domestic markets, funding research and development, and opening foreign markets while managing foreign access to domestic markets.[5]

Comparative politics rightly notes that the reference to demand ought to refer not only to domestic market purchasing power but also to political demand for the policy and institutional changes required to upgrade productivity. The class actors and institutional relationships left-over in escaping low-income status leave legacies that themselves constrain the political coalitions needed to escape middle-income status. "Growth trajectories on the way to middle-income status fractured the groups, especially business and labor, which are the core potential constituencies for a coalition that could take the big leap" (Schneider and Doner, 2016, p. 611). Big business is split between foreign and domestic firms, labor is split between formal and growing informal sectors, and overall inequality undermines support for broad public goods of the sort required to escape middle-income status, such as education, research and development, and rational-legal Weberian institutions.[6]

While the difficulties of escaping middle income status are many, a few late developers who have overcome. The developmental state literature, drawing especially on the experience of East Asian newly industrialized countries of Taiwan, Korea, Hong Kong, and Singapore, argues that particular combinations

5. "New developmentalist" variants of these critical views additionally advocate correcting overvalued exchange rates and emphasizing industrial policy to upgrade capacity for export competitiveness (Paus, 2014; Ohno, 2009).

6. "Broadly put, big business is split between foreign and domestic firms, labor is divided between formal and informal sectors, and societies overall are riven by high inequality. These cleavages splinter interests and make coalition building more difficult" (Doner and Schneider, 2016, p. 611).

of state institutional characteristics, relations with critical class forces, and international context allowed graduation into high-income status. In contrast to market-conforming policy prescriptions,[7] developmental state action was necessary to overcome market failures in establishing new activities, accessing finance, and upgrading technology. To "govern markets" in such fashion (Wade, 1990), strong executives preserved autonomy from powerful interests, delegated authority to meritocratic Weberian bureaucracies, enjoyed close relationships with the private sector, while subordinating labor (Johnson, 1982). At least in part, these features could be achieved because the international context provided both a market for surplus output and sufficient threat to discipline potentially predatory state actors (Amsden, 1989).

While the experience of the East Asian NICs indicates that late development is possible, few countries have actually achieved the feat. Further, the developmental state literature leaves the somewhat unsatisfactory implication that late development depended on the particular domestic and international conditions of post-World War II East Asia. At the very least, global competition and institutions such as the World Trade Organization, TRIPS Accords on intellectual property, Basel Accords on finance, and other international agreements place constraints on the ability of contemporary middle income countries to use the tools that previous graduates used to reach high-income status (Chang, 2002).[8]

Instead, we see ongoing cycles of boom and bust, often in synch with global cycles of power and accumulation.[9] To bring international and class structural analysis to the understanding of boom-bust cycles, we can begin with the particularities of domestic class structures in late developers as described in Antonio Gramsci's concept of passive revolution. For Gramsci, Northern European countries had passed through a thorough transition in which a hegemonic industrial bourgeoisie fully displaced previously dominant elites.[10] By contrast, in places where the rising bourgeoisie could not fully displace oligarchic, feudal elites and lacked dominance within civil society, there was an incomplete transition. As observed by Cox, "these last were caught in a dialectic of revolution-restoration which tended to become blocked as neither the new forces nor the old could triumph" (Cox, 1983, p. 166).

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7. There was an attempt by international institutions and neoclassical economists to claim the East Asian NICs as their own (World Bank, 1993).

8. Chang asserts more than the simple evolution of capitalism but rather the intentional "kicking away the ladder" by already developed states.

9. The Japanese theory of "flying geese" places international dynamics at the center of the argument "it is impossible to study the economic growth of the developing countries in modern times without considering the mutual interactions between these economies and those of the advanced countries" (Akamatsu, 1962, p. 3).

10. Even where they allowed such feudal elites to retain some role in government, as in the landed gentry of England or the Junkers in Germany, a hegemonic rising bourgeoisie could be confident that the policies of the state would obey their requirements for industrial development (Gramsci, 1971, p. 366).

The inability of rising elites to displace entrenched elites shapes the character of developing country states.[11] In late developers, the power bloc at the heart of the state remains a site of conflict, with rival factions of capital rising and falling in dominance but never securing hegemony. For their part, popular sectors may gain temporary access, but they remain secondary partners, relevant mostly for the degree to which they tilt the balance between one or another elite faction and in the process secure a few additional social benefits from growth (Boito Junior, 2018).

The condition of dominance without hegemony is itself related to the way countries fit into the international system, as international constraints impinge on domestic class transitions. "The external aspect lies in the way the military and financial constraints of the world system limit the state's options and the extent to which its historic bloc is penetrated by class forces that transcend or are outside its own borders." (Cox, 1987, p. 399-400).[12] Yet, while the international system constrains and distorts domestic class structures, it cannot be discarded, as international partnerships are a source of capital, technology, know-how, and institutions that accelerate development.

The ambiguous role of the international system in both accelerating and distorting national development appears in the work of Leon Trotsky. Trotsky notes on the one hand late development as privilege, "Although compelled to follow after the advanced countries, a backward country does not take things in the same order. The privilege of historic backwardness – and such a privilege exists – permits, or rather compels, the adoption of whatever is ready in advance of any specified date, skipping a whole series of intermediate stages. . . The fact that Germany and the United States have now economically outstripped England was made possible by the very backwardness of their capitalist development" (Trotsky, 1977, p. 26-27).[13]

At the same time, the compressed nature of late development carries with it certain distortions, as elements of advanced capitalism coexist and interact with pre-capitalist formations.[14] "The development of historically backward nations leads necessarily to a peculiar combination of different stages in the historic

11. For Poulantzas, the state is itself a "power bloc" that institutionalizes the relationships among rival social forces (2000).

12. Gramsci himself, in observing an Italian experience of state-building imposed by the pressures of external actors, notes that instead of reflecting the rise of a newly dominant industrial bourgeoisie, the Italian state "is instead the reflection of international developments which transmit their ideological currents to the periphery" (Gramsci, 1971, p. 116).

13. Writing around the same time, Hilferding notes, "capitalist development did not take place independently in each individual country, but instead capitalist relations of production and exploitation were imported along with capital from abroad, and indeed imported at the level already attained in the most advanced country. . . so capitalism is now imported into a new country in its most advanced form and exerts its revolutionary effects far more strongly and in a much shorter time than was the case, for instance, in the capitalist development of Holland and England" (Hilferding, 2006, p. 322-323).

14. "The law of combined development – by which I mean a drawing together of the different stages of the journey, a combining of separate steps, an amalgam of archaic with more contemporary forms" (Trotsky, 1977, p. 23).

process. Their development as a whole acquires a planless, complex, combined character" (Trotsky, 1977, p. 27).[15] Trotsky associates combination especially with late development, recognizing the geographic and temporal unevenness of world capitalist development.[16] "The entire history of mankind is governed by the law of uneven development. Capitalism finds various sections of mankind at different stages of development, each with its profound internal contradictions" (Trotsky, 1969, p. 19).

It is precisely this unevenness of development across geographic units that creates the opportunity for capital and technology from early developers to penetrate late developers. Indeed, these opportunities are essential to managing crises of overaccumulation and falling profit in the capitalist core, exporting capital and in the process opening opportunities for accumulation in the periphery. Harvey (2005) describes a geographic and temporal cycle in which "the opening up of global markets in both commodities and capital created openings for other states to insert themselves into the global economy, first as absorbers but then as producers of surplus capitals. They then became competitors on the world stage" (2005, p. 185).[17] Harvey sees this as the attempts of capital to displace crisis, geographically and temporally, rather than resolve it.[18]

The ambiguous position played by middle powers is taken up by world systems theory, identifying them as semi-peripheral, able to benefit from the secondary industrialization at the margins of the core but not subject to the same degree of extraction as the periphery (Wallerstein, 1974). For Chase-Dunn, the semi-periphery takes on a legitimating role, "the main function of having a stratum in the middle is to somewhat depolarize the larger system analogously to a large middle class within a national society" (Chase-Dunn, 1997, p. 6).

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15. Marx had identified the combination of extra-economic coercion in the violently disruptive nature of 'primitive accumulation,' necessary in early stages of capitalism to concentrate wealth while displacing peasants and transforming them into a mass proletariat with only their labor power to sell. "The parliamentary form of the robbery is that of Acts for enclosures of Commons, in other words, decrees by which the landlords grant themselves the people's land as private property, decrees of expropriation of the people" (Marx, 1992, chapter 27). Luxembourg had extended this combination to all stages of capitalism, "The relations between capitalism and the non-capitalist modes of production start making their appearance on the international stage. Its predominant methods are colonial policy, an international loan system – a policy of spheres of interest – and war. Force, fraud, oppression, looting are openly displayed without any attempt at concealment, and it requires an effort to discover within this tangle of political violence and contests of power the stern laws of the economic process" (Luxembourg, 2003, p. 396).

16. "Marxism takes its starting-point from world economy, not as a sum of national parts but as a mighty and independent reality which has been created by the international division of labour and the world market, and which in our epoch imperiously dominates the national markets" (Trotsky, 1969, p. 146).

17. "Each developing center of capital accumulation sought out systemic spatio-temporal fixes for its own surplus capital by defining territorial spheres of influence" (Harvey, 2005, p. 185-186).

18. For Akamatsu's flying geese theory, the process of exporting capital produced its own resolution. Leading countries would drag followers along, but in exporting surplus capital to them, would expand their exports to compete with the leader, who would be forced to innovate and generate further advances in productivity, generating a new round of accumulation overall (Akamatsu, 1962).

Ruy Marini, a Brazilian theorist observing the boom period of the 1970s, goes a step further with his concept of subimperialism (1973, p. 99-100). Domestically, subimperial powers depend on hyper-exploitative extraction in which wages remain even below the level of subsistence. This accumulation model constrains late development, producing highly unequal societies with limited domestic markets. As a result, surplus capital and output in middle powers seeks an outlet by taking over space in regional markets, driving subimperial behavior in the form of investment and dominance over neighboring polities, as local capitalist classes seek to manage accumulation within their region. In a geopolitical sense, subimperial powers serve a double role as "anticommunist gendarme and autonomous regional power" (Katz, 2015, p. 10), establishing regional modes of accumulation while upholding the designs of the global hegemon.[19]

The previous discussion has particular implications for advanced sectors such as aerospace industries. The international system provides occasional opportunities for developing countries to enter such sectors at the forefront of the technology frontier, but they can only pursue such advanced products with access to the capital, technology, and know-how of firms from developed countries. To acquire these resources, domestic capital requires the help of a capable state, specifically in the policies and agencies governing advanced sectors (Evans, 1995). Yet, dynamic factions of capital are not hegemonic in the power bloc within the state, and they cannot always control the institutions and policies of the state they need to sustain their dynamism.

The lack of hegemony for leading factions of capital is particularly pronounced in moments of downturn. High tech sectors such as aeronautics offer high rents, but they require years to research and significant investment to generate innovations. Those innovations that emerge generate multiyear booms, until other producers and the market catch up and profits begin to fall. In these periods of potential bust, new investments and rents have to be in the pipeline, allowing producers to surf to the next boom period. Given the tenuous relationship between factions of domestic and international capital and the lack of hegemony of the power bloc within the state, the solution to moments of bust is highly contingent and uncertain. There is no guarantee that dynamic sectors will secure the support from the state that they need. In particular, moments of bust are biased against such state activism, as it is in precisely these moments that international capital and its domestic allies press for austerity, adjustment, and structural transformations that will complicate the investments necessary for the next boom.

19. Halliday concentrated on this coercive, strategic dimension, "a) a continuing in partial strategic subordination to United States imperialism on the one hand and b) an autonomous regional role on the other" (1979, p. 283).

Observers such as Patrick Bond (2015) are particularly skeptical of the possibilities of late development under globalization, because of the rise to prominence of financial sectors. Financialization is related "to imperialism, to capitalist crisis tendencies, to regional hegemony, and to super-exploitative processes of accumulation" (Bond, 2015, p. 17-18). If the response to potential bust is increasing dominance of finance capital, there may be temporary recovery, but it will come at the cost of increased subservience to international capital. In a sector such as aeronautics, in which developing countries have only the most tenuous hold on the technology frontier, financialization implies increasing subservience to international capital, and perhaps ultimately the end of national control of the sector entirely.

3 THE DEVELOPMENTAL STATE IN BRAZILIAN HISTORY

In the aftermath of the Second World War the Brazilian economy was still primarily defined by its traditional commodity-exporting activities, although growing sectors of the national elite were also engaged in pursuing economic alternatives that could enhance the circulation and accumulation of capital. Conducive to a new historical course, the experience of the war had facilitated the dissemination of the goal of industrialization particularly among military leaders who defended the creation of national war-related industries (e.g. chemical and aeronautical), which were increasingly seen as vital components of an assertive policy of national security.

In effect, the 1950s was largely shaped by the dissemination of a nationalist developmental drive that guided the actions of the country's two main political leaders of the period. The decade began with the return to power of former president Getúlio Vargas in January 1951, after having conducted what had been until then the most vibrant and geographically extensive presidential campaign in the history of the country. Vargas's new presidential mandate derived directly from his promise of deepening the path of industrialization Brazil had embarked since his first tenure in power which started with the 1930 nationalist military coup which paved the way for the modernization of the Brazilian state and economy.

As the main political figure of that process, Vargas stewarded the creation of a corporatist state which, starting in the late 1930s, brought together organized business and labor sectors under the auspices of a federal administration acting on a self-attributed role of deepening the path of import-substitutive industrialization. Back in power in the early 1950s, this time by the popular vote, Vargas was poised to implement an ambitious agenda of economic growth with some levels of social reform. Vargas' political platform was inspired in the idea that the goal of industrialization had to be strengthened amidst the challenges created by the

reconfigured international division of labor in the post-war period. In contrast to the self-contained industrial policies during world hostilities, new circumstances required a creative economic paradigm capable of moving beyond the military concerns of earlier industrial initiatives, such as the creation of the National Steel Corporation (Companhia Siderúrgica Nacional, CSN) in 1941.

This broadened developmental perspective saw industrialization as a sine qua non condition for securing economic self-sufficiency and argued that more direct involvement by the national government in a variety of economic activities was essential. Novel ideas around national development and industrialization were important outcomes of the new configuration of political forces that emerged in the process. Here was also a significant change in the role of the state which started to shift its focus from export-led agriculture and concentrated efforts on economic planning and diversification, including heavy industries and steel production. Within this general political context, throughout the 1950s the Brazilian government increasingly adopted a more aggressive role towards industrial promotion and fast economic growth. In its domestic institutional format, this new historical course was translated into the creation of the National Bank of Economic Development (BNDE), in 1952. The period was also markedly shaped by the dissemination of ideological formulas favoring fast-paced industrialization which exerted a profound ideational influence among bureaucrats working in the governmental agencies.

To be sure, mid-century Brazilian economic thought and policies manifested a pragmatic orientation, especially in light on the growing need felt by important members of national elites for pursing fast economic growth. Industrialists assembled at the National Industrial Confederation (CNI) and at the Industrial Federation of the State of São Paulo (FIESP), in particular were very receptive to these ideas and, as early as in 1950, the CNI published a special issue of its main publication, the Journal of Economic Studies, subscribing to the pro-industrial developmental theses proposed by the Economic Commission for Latin America (ECLA), since the late 1940s. The Confederation also provided the funds needed to conduct the initial meetings between representatives of the BNDE and ECLA which began taking place at the beginning of 1953, under the leadership of ECLA prominent economists such as Celso Furtado. Similarly, the most influential sectors of organized industrial labor in the core urban centers of the country consistently engaged in partaking in the rich discussion pertaining to national development. That convergence of interests actually shaped the main political contours of the period, particularly in its second half of the 1950s (Ioris, 2014).

Presenting himself as Vargas' heir but departing somewhat from his predecessor's more state-focused approach, Kubitschek sought to attract foreign investors to finance his ambitious economic agenda. One of the most assertive ways to achieve this goal involved special privileges granted to local subsidiaries of multinational corporations interested in domestically producing previously imported manufactured items. Favored treatment extended to foreign investors that had agreed to set up or expand industries in Brazil was above all carried out by the legal stipulations prescribed in the Normative Instruction #113 of the Foreign Trade and Exchange Division of the Bank of Brazil (SUMOC), which provided preferential rates of exchange to imported capital goods to supply their domestic branches. In the dearth of multilateral and inter-governmental loans available to Brazil in the international arena, Instruction #113 proved to be the most effective instrument for attracting private foreign investments in the second half of the 1950s. To illustrate this point, it should be noted that about 70 per cent of all foreign private investments coming into Brazil during the period (estimated as approximately US$ 500 million) consisted of industrial material brought into the country under the rubric of supplier's credits (i.e. credit lent by international private investors in the form of industrial components) with low interest rates and with the approval and cosigning of BNDE.

One of the main achievements of the Kubitschek administration, and clearly a quintessential expression of the developmental logic of his tenure was the creation of a 'national' (although essentially foreign-owned and controlled) industrial park in the automobile sector. Between 1956 and 1960, his administration approved thirty projects for the installation or expansion of motor vehicle industries in Brazil with technology from fourteen different companies from several different countries (such as the United States, Germany, Italy, Sweden, France, England and Japan). In addition to direct credit provided by BNDE for the construction of industrial plants, the largest portion (64 per cent) of all foreign investments arriving in the country in the years between 1956 and 1961 equally consisted of advanced credits in the form of supplier's credit provided by the headquarters of the foreign vehicle companies with the Bank's approval and underwriting. Specific measures were also implemented to promote vertical integration in certain industries and to remove production bottlenecks, particularly in more strategic areas such as the automotive, steel and aluminum, cement, cellulose, heavy machinery and chemicals industries. In addition, the federal government amended the exchange-control system and tariff legislation in order to protect domestic industries and to attract foreign investors (Ioris and Ioris, 2013, p. 133-148).

The 1950s in Brazil represented, therefore, a moment of important economic transformations particularly pertaining to the deepening of the process

of industrialization. There was an annualized economic growth for the entire period of around 7.5 per cent, while industrial growth averaged around 11 per cent a year – considering, however, that population growth throughout the 1950s was around 3 per cent annually, per capita income growth for the period was less than 5 percentage points yearly. More substantially, life expectancy rose by about 7 years, and literacy was for the first time ever above 50 per cent of the national population. These social and economic achievements notwithstanding, and even though the political leadership of the period propounded the promises of national development as way to expand economic self-reliance, the most influential economic policies carried out in the period augmented the embeddedness and rate of dependence of the domestic productive structures within the complexities of an emerging global economy.

What is more, having set the stage for the path continued path of fast-paced industrialization on the next three decades, the state-private alliance put in place the 1950s should be seen as the paradigm pursued by regimes as different as the democratic ones of those years and the military administrations of the late 60s and early 70s. To be sure, one of the most remarkable aspects of the civil-military dictatorship of the 1960s and 70s was the deepening of the process of industrialization by import substitution put in motion in the 1950s, the anti-democratic and anti-popular and repressive nature of the regime notwithstanding. Much of this process was made possible, once again, by the so-called Triple Alliance approach of JK now augmented in the autocratic context of Medici and especially Geisel (Evans, 1979).

Especially relevant, considering the staunch free-market liberal rhetoric of the main supporters of the military coup of 1964, as the military regime took a more authoritarian turn in late 1968, governmental economic activism defined much of the significant rates of economic growth, amidst growing economic inequality of the next 15 years of non-democratic rule. These steps were translated into the expansion of state bureaucratic agencies in charge of top-down developmental projects, including banking agencies mirrored after the experiences of the BNDE of Vargas, massive direct and indirect investments in infrastructure projects, legal overhaul of pro-labor mechanisms and their replacement with pro-business legal regimes, trade regulations and exchange rates controls benefiting large business exports, and land concessions to foreign large private corporations (Acker, 2017).

Moreover, arguably the most instrumental components of the pro-big business character of the military regime in Brazil, strengthened monitoring and curbing of union mobilization, associated with limited wage raises; governmental incentives to upper-end consumption of enlarged production of durable goods (e.g. automobiles) by multinationals operating in the country; a vast plethora

of tax breaks, market protections, and subsidies to large international investors interested in setting shop in the country, and associated diplomatic activism aimed enlarged consumer markets abroad to commodity and industrial products supplied by large private actors; and, perhaps, above all, the willingness to control and, if needed, eliminate most types of oppositions to the policies pursued by the dictatorial regime.

It is clear then that the industrial drive among key members of Brazilian political and economic elites has manifested a remarkable degree of continuity. Industrial policies have been displayed by very different political alliances throughout much of the 20th century, from overt conservative autocratic configurations in the late 1930s and early 1970s, to center-left populist arrangements in the mid-1950s. The incursion of state-private joint efforts in industrial promotion in the field of aeronautics was thus the materialization of preceding attempts to reconfigure the economic insertion of the country in global commodity chains in one more area of activities, its higher levels of technology and coordination notwithstanding.

Just as the creation of Petrobrás and the National Research Council (CNPQ) in the early 1950s involved the active participation of military technocrats, the founding of Embraer in 1969 also involved the active participation of military leaders and technicians. Also, similar to its involvements in the war efforts on the early 1940s, when both the then recently created Brazilian Air Force (FAB) and United States government advisory and financial aid (mostly through the Lend and Lease Act) played central roles in setting the foundation of a Brazilian-based engine production line, once again, in the 1970s, both the Brazilian military and United States technical advisers were decisive in the creation of both the Aeronautic Technological Institute (ITA) and the General Command of Science and Technology (CTA, both by their Portuguese acronyms) (Forjaz, 2005).

Much in the same way, public funds were allocated to finance these operations, especially the involvement of private business (a path gradually increased in the 1990s onwards), largely on the bases of the 1950s developmental financing institution (such as BNDE and, starting in the 1965, FINAME), once again reflecting the consistent path of private-public alliances towards the promotion of an industrial base in the country. The specific role of Embraer in advancing these goals, approaches, and especially limits insofar as being able to respond to boom and bust economic cycles occupies us next.

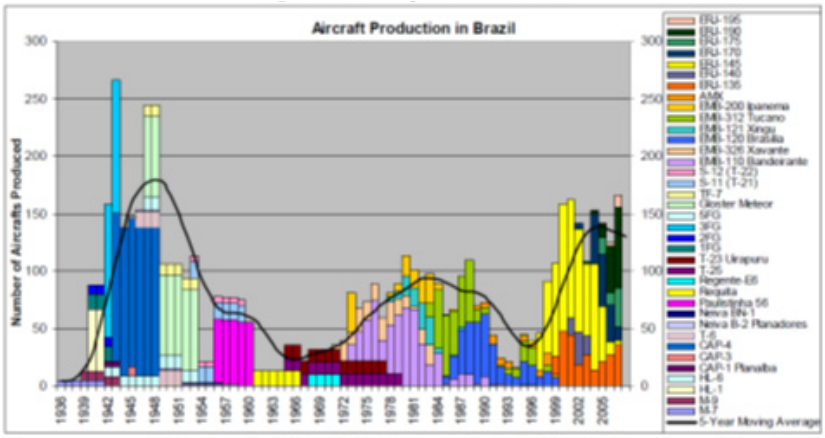
4 EMBRAER: BOOM AND BUST CYCLE OVER TIME

Aeronautics production in Brazil traces the contours of these broader trajectories. Periods of boom are followed by bust, and new rounds of expansion require new

combinations of domestic capital, state guidance and support, and international collaboration. The boom-bust cycle is exacerbated by certain particularities of the aeronautics sector.

First, aircraft require constantly advancing technology and know-how, as well as frequent infusions of large sums of capital. Successful design and production of a new model requires years of investment, development, and testing. If these initial costs can be borne, there is a period of extremely high rent, as competing firms take time to catch up to the technological advances. Yet, these rents quickly dissipate once additional producers enter the market, and entire sectors can disappear if a new pipeline of investment, development, and testing are not already undertaken. The sector acquires an internal business-cycle, and the payoff of boom periods have to be quickly recycled into the next product line to surf to the next boom, before the onset of bust.[20]

FIGURE 2
Aircraft production in Brazil



Source: own compilation based on Cabral (1987); Cassiolato *et al* (2002), Embraer Annual Reports, The *Airlinerlist* database <http://www.airlinerlist.com> (downloaded 2009 Feb); *Flight International*, various issues.

Note: When exact annual production data are lacking before 1969, we divided the total number produced by the years of production.; Embraer Legacy executive jets are included in the ERJ-135 series; figures after 1970 exclude general aviation aircraft, including license-produced Pipers and the upgraded versions of the Ipanema (EMB-201 and 202).

Source: Vertesy and Szirmai, 2010, p. 23.

20. Describing the cycle in aeronautics, a BNDES study notes "it is necessary to understand the 'product cycle' the types of aircraft that a business conceives, projects, constructs, and commercializes – in the existing state of the art – and will have a phase of sales growth, followed by stabilization, and, ultimately, decline. The sustainability of the business in the longer run can only be verified if, before even reaching the peak of sales, the area of market intelligence and en gineering of the firm are already involved in conceiving the next state of the art aircraft" (Gomes, 2012, p. 149). See McKelvey and Holmén (2006) for a discussion of the flexibility necessary to respond to downturns in demand.

Interestingly, Brazil lays claim to the first person (or one of the first, depending on who you ask) in flight, Santos Dumont.[21] Airplane manufacture began at industrial scale in the 1940s in Brazil, at least in part as a result of United States efforts to diversify sites of aircraft assembly as a security measure during World War II. The number of airplanes produced in Brazil spiked at over 250 in 1943, but output had practically disappeared by 1954, falling below 30 airplanes produced and all four local aircraft factories from the 1940s were out of business.

Convinced that airpower had been critical to Allied victory in World War II and recognizing the economic benefits of aeronautic production, the Brazilian government in 1950 began efforts to establish a viable sector. With the help of technicians from MIT and German aeronautical engineers, they established the General Command of Science and Technology (CTA by its Portuguese acronym) under the air force, along with subordinate institutes, the Aeronautic Technological Institute (ITA by its Portuguese acronym) and the Institute of Research and Development (IPD by its Portuguese acronym). The first craft designed were the 1954 Beija Flor helicopter and Heliconair propeller plane, followed in 1964 by the IPD 65/04 Bandeirante. The decision to commercialize the Bandeirante spurred the formation of Embraer in 1969, absorbing technology from CTA and the department of airplanes, except the role of certification and training.

By 1970, the successful production of the EMB-110 Bandeirante and EMB-326 demonstrated Embraer's capacity to develop, certify, and produce aircraft. In 1976, Brazilian certification was recognized by the United States, demonstrating state agency coherence and capacity, a critical requirement for Embraer to export and compete internationally. More than 500 EMB-110 were produced, with over half exported, and other models for export included the EMB-200 Ipanema (>100 planes), EMB-312 Tucano (650 planes),[22] the EMB-121 Xingu (~100 planes, 50% exported), and the EMB-120 Brasilia (350 planes, mostly exported). Among the additional government programs to support Embraer were subsidies, tax incentives, guaranteed purchases, tariffs, and non-compete rules that barred the import of similar products.

State support, a coherent and competent regulatory regime, and the growing innovative capacity of Embraer allowed the company to survive a short downturn towards the end of the 1970s. The company had already entered into a major international partnership with US-based Piper Aircraft in 1974, securing important technology advances, and in 1979 Embraer entered into a partnership for the AMX military aircraft with Aeromacchi of Italy. This project achieved

21. His 1906 officially recorded flight predates the first officially recorded flight of the Wright brothers in 1908, though they had unofficially been flying since at least 1903.

22. Of which over 500 were either exported or produced under licensing in the United Kingdom and Egypt. The EMB-312 achieved renown as a training plane for both military and civilian uses.

NATO requirements for state-of-the-art technology, including supersonic aerodynamics, integrated navigation and attack systems, fly-by-wire systems, complex mechanical designs, CAD-CAM systems and composite materials (Bartels, 2009).

The technological improvements and new inflows of capital sustained a new boom cycle in the 1980s, though the debt crisis, the decade-end global downturn, and a bad bet on a partnership with an international producer produced serious financial problems starting in the 1990s. The CBA-123 Vector was to be a partnership with Argentine FMA (Military Airplane Manufacturer for its acronym in Spanish), and was financed with an $85mi debenture issue by Embraer. The plane was behind schedule and ultimately failed to be useable in its sector, as other companies had already moved ahead technologically. The financing from the Argentine side collapsed along with the Argentine economy, and the downturn in demand around the first Iraq war depressed new plane orders. The period 1990 to 1994 was among the lowest in Embraer's productivity. As an indicator of the downturn, Vertesy and Szirmai cite the precipitous drop in foreign patenting activity in Brazil, suggesting a virtual halt in "technology flows and technological learning in the innovation system" (2010, p. 27).

In response to the crisis, Embraer was privatized; government absorbed $700mi in debt and rolled-over $350mi, along with an infusion of US$500 mi in cash, as well as ongoing government support to research and development and exports.[23] While government retained a golden share, a combination of North American (Wasserstein Perella) and Brazilian (Bozano Simonsen) investors bought the rest of the voting shares. The layoffs promoted as part of the privatization program had the impact of creating an ecosystem of spin-off enterprises led by former Embraer engineers and employees, along with flexibility to form new kinds of risk-sharing partnerships. In the process, Embraer went from producer of aircraft to aircraft designer, system assembler, and coordinator of the many smaller enterprises that made up its ecosystem (Vertesy and Szirmai, 2010, p. 28; Gomes, 2012).

Even more explicitly, privatization changed the goals of the company – "from excellence in products to focus on results through financial and production restructuring," and "client satisfaction," as cited in annual reports. A quotation from President Mauricio Botelho indicates the increasing role of finance in the direction of the company, "We have to view finance as an instrument of our development" and created various subsidiaries, some of which were simply financial arms, such as Embraer Finance Ltd. (Moraes, 2017, p. 17). By the 2000s, the rising importance of financial interests in the direction of the company

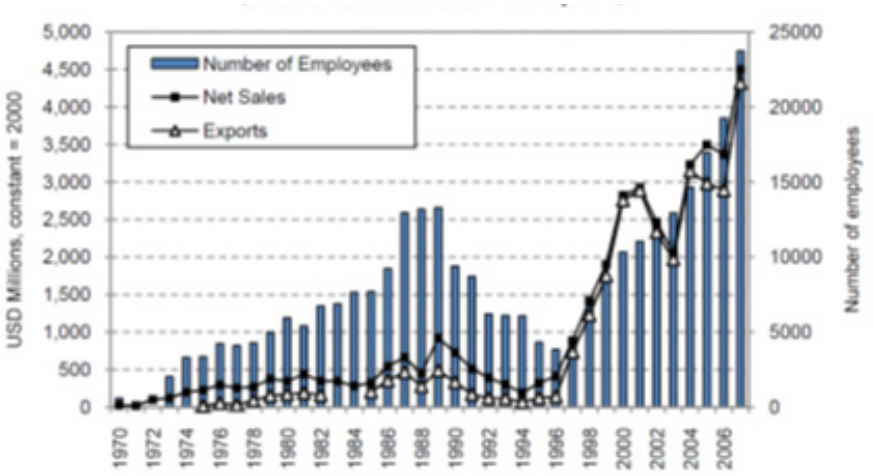
23. Export support through the PROEX program provoked a WTO trade dispute with Canada, forcing a modification in the program though it was allowed to continue.

would become even more pronounced. One indicator was in the organizational structure of the company, which privileged "marketing, communication, and the inculcation of new values" (Moraes, 2017, p. 18).

There can be little dispute that the restructuring occurring in the 1990s worked to resuscitate the company and the sector, producing an extended boom in which Brazilian aeronautics industries rose to the top three in the world, with a particular specialization on regional jets. Embraer's production profile could not challenge the jumbo jets of Boeing and Airbus, but the technologies developed for mid-size jets were leaders in the sector, matched only by Bombardier of Canada. The cycle of innovations came exactly as the airline industry in the United States and Europe turned to a hub and spokes model of jumbo jets (Boeing and Airbus) serving regional hubs, and regional jets (Embraer and Bombardier) distributing passengers to medium and small airports. The highly successful ERJ series (135/140/145) earned approximately $55bi with more than 2000 jets produced, mostly for export markets. The graph below shows the sharp increase in sales, exports, and employees occurring after 1994, reversing what appeared to be sharp declines from 1990-1994.

FIGURE 3

Historical evolution of Embraer' sales, employment and exports
(Million USD at constant – 2000 prices)



Source: Vertesy and Szirmai, 2010, p. 22.

The significant profits and the prestige of leading a sector with few international rivals demonstrated the successful navigation of the crisis of the early 1990s. In comparing Embraer to the much larger Canadian firm, Bombardier,

observers noted "the minnow has recently been more profitable than the giant" (Goldstein and Blanc, 2003, p. 16). Yet, there were warning signs that success depended on a tenuous restructuring. While privatization-induced layoffs had both increased labor productivity and encouraged an ecosystem of local producers, most Brazilian small and medium enterprises were weak, and the ecosystem was far less dense than the small and medium sized companies in the supply chain for Embraer's competitors. In a comparison of the cluster surrounding Embraer in São José dos Campos to the cluster surrounding Bombardier in Montreal, Goldstein and Blanc (2003) found Embraer much weaker, with only 30 firms as compared to 250, and 13,000 total employees as compared to 40,000.

The Brazilian government sought to bring foreign firms to São José dos Campos with the Program for Brazilian Aerospace Industry Expansion (PEIAB for the Portuguese abbreviation), but Embraer was increasingly forced to use imported foreign content in its assembly, with 98% of first-tier suppliers located abroad. No more than 2 percent of final value corresponded to the contribution of local SMEs, with foreign firms accounting for 55% and Embraer itself accounting for the other 53% (Goldstein, 2002).

To pay for the next larger line of regional jets, ERJ 170/190, Embraer needed $1bi by 2003, and developed financial innovations that further enhanced the power of finance within the sector. In 2000 and 2001, Embraer sold shares simultaneously in New York and São Paulo, including preferential shares (with priority payment in the case of selling the company or distribution of dividends).[24] In 2000, stock sales increased these freefloat shares from 18.6 to 47.4% and raised $244mi. In 2001, they raised $300mi through the BNDES in ADS (American Depositary Shares), increasing freefloat of preferential shares from 37.6 to 59% (Moraes, 2017, p. 21).

The sale of shares generated necessary revenues but increasingly oriented company goals towards shareholder interest. Annual reports came to emphasize the returns to shareholders as a central goal of the company. In 2002, the annual report included the characterization, "In client satisfaction is the origin of results for Embraer, and the subsequent generation of value for its shareholders" (Moraes, 2017, p. 22), and the 2008 annual report noted, "The business of Embraer is to generate value for its shareholders through the complete satisfaction of clients in the global aeronautics market. By generating value, it is understood to be maximizing the value of the business and guarantee of its survival, with integrity of behavior and social and environmental conscience."[25]

24. Embraer had originally floated shares on the São Paulo stock exchange in 1989.

25. With each issue of shares, the value of the company increased, 37.2% of ordinary shares and 123.3% for preferential shares, including a leap of 115% in 2000.

In 2006, a new financial strategy pulverized ownership by swapping old shares for shares in "New Embraer," and assigning additional external controls and incentives to satisfy shareholder interests. The swap earned "investment grade" evaluations from Moody's and Standard and Poors (Moraes, 2017, p. 24), and raised the value of shares by 22.5%.[26] Embraer also responded to the 2009 crisis with diversification into military, executive, and services, as well as financial strategies including derivatives markets and government bonds (Moraes, 2017, p. 27). The new resources, along with continued government support, allowed Embraer to produce the next line of commercial jets.[27] The EMB-170/175/190/195 reached the size of 120 passengers, towards the lower bound of jets competing with the larger jets produced by Boeing and Airbus. At the same time, Embraer was diversifying, developing its smaller jets into executive jet models, the Phenom 100 and SIVAM EMB-145 AEW&C.

As part of its diversification, Embraer also opened offices and activities across the globe. For the purpose of servicing customers more directly, Embraer opened service, maintenance, and training facilities in the United States, Europe, and China. In some cases, such as the Oficinas Gerais de Manutenção de Portugal, Embraer simply purchased local competitors and incorporated them into their network of suppliers and service providers. In other cases, such as in Harbin, China, Embraer opened production facilities, though Chinese production closed after a little over a decade, as a Chinese company entered the market for virtually the same category as Embraer.[28]

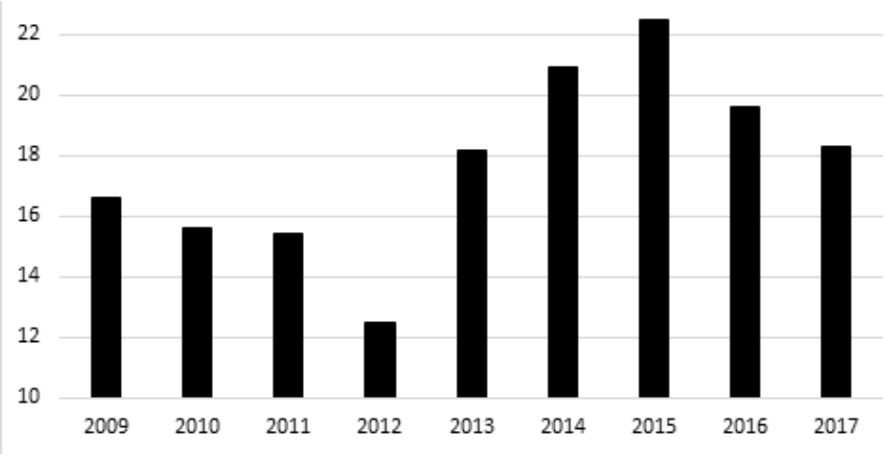
By opening to financial and foreign interests, Embraer was able to overcome the crisis of the early 1990s and pursue successful strategies of adaptation in the 2000s. The 2008-9 financial crisis exposed certain vulnerabilities, however. New orders fell, especially for the high-end executive jets that Embraer had bet on mid-decade. While Embraer seemed well positioned to capitalize on the highly unequal recovery that followed, the Brazilian government was increasingly constrained in its ability to sustain the research and development, subsidies, and incentives to export that it had offered in the past. By 2015, the financial value of the company began to falter, and orders and backlog began to decline. The graph below shows the uptick from 2012 to 2015, but the reversal since then.

26. The stock restructuring set new rules more amenable to financial interests, including external controls, transparent acts, and the emission from then forward only of voting shares (DIEESE, 2018).

27. From 2001-2016 Embraer received the second largest infusion of funds from the BNDES, after only Petrobras.

28. Available in: <https://airway.uol.com.br/embraer-encerra-producao-do-legacy-na-china/>.

FIGURE 4
Backlog of Embraer orders
($ Bi)



Source: Author compiled from various sources.[29]

The market began to question Embraer's reversal, and by 2014 Embraer shares were falling significantly, a particularly dangerous situation with so much of Embraer's strategy locked into the financial sector. A look at the fluctuations in the NASDAQ price of Embraer shares shows that they rose steadily after 2009, but by 2014 had begun to decline and would decline steadily to 2017. Other indicators of the weakening of the company can be found in corporate earnings, which fell 30% from 2012 to 2017. As seen in the table below, year on year growth in revenue, profit, earnings before interest, tax, depreciation, amortization fluctuated but were all down by 2017. By late December 2017, reports were surfacing of the impending sale of Embraer to Boeing, and on July 5th, 2018 Boeing took control of 80% of Embraer shares, pending final approval from the Brazilian government.

29. 2009 from https://www.benzinga.com/pressreleases/n181566/embraer-releases-4th-quarter-and-fiscal-year-2009-results-in-us-gaap; 2010 from https://www.prnewswire.com/news-releases/embraer-releases-4th-quarter-and-fiscal-year-2010-results-in-ifrs-118623014.html; 2011 from https://www.reuters.com/article/us-embraer/embraer-2011-deliveries-down-e-jet-backlog-steady-idUSTRE80A0WZ20120111; 2012 to 2016 from Embraer Investor Relations - March 2017; 2017 from https://markets.businessinsider.com/news/interestrates/embraer-company-ends-2017-with-us-18-3-billion-backlog-down-6-6-1013137653

BOX 1
Embraer Chief Financial Indicators
(In %)

Total revenue	11.9	9.5	35.9	5.6	(12.7)
Gross profit	5.1	(4.4)	27.0	13.7	(19.9)
EBITDA	34.6	(11.0)	18.7	(9.7)	(5.8)
EBITA	38.9	(17.9)	14.0	(21.8)	(5.2)
EBIT	38.7	(17.8)	14.0	(21.8)	(5.4)

Source: S&P Capital IQ, Ratios. Disponível em: <http://www.capitaliq.com>.

When asked whether the sale threatened a loss of jobs or production in Brazil, executives from Embraer were confident. "We are good at what we do. Why would they want to take these activities back to the United States or somewhere else?"[30] Pragmatic observers of the sector suggested that Embraer had little choice. Its main rival, Bombardier, had been bought by European Airbus, threatening to outcompete Embraer with the capital and technology on hand from the much larger European producer. Without an alliance with Boeing, Embraer would be overwhelmed. For the main observer of Embraer in the BNDES, the manager who had signed off on Embraer's $900mi infusion of funds for export support in the 1990s, his conclusion was the complacent, "Embraer is no longer a maker of planes anyway. It designs, markets, and coordinates a production process, but where that production happens matters not."[31] Embraer shares had increased by 5% overnight and steadily climbed by an additional 20% by the time the sale was officially announced. One analyst offered an observation fitting for the financial sector, "Money is money."[32]

Yet, it is worth questioning exactly this assumption. While the world of finance may view money as money, development requires a closer look at the details of the deal struck by Embraer and Boeing. Boeing purchased 80% of the commercial arm of Embraer for $3.8bi. Over ten years, the companies will operate a joint venture, after which Boeing guarantees the purchase of the remaining 20%. The golden share previously held by the government passes to Embraer.

A contrast with the deal struck between Bombardier and Airbus is instructive. Whereas Embraer promised the sale of its entire commercial aviation production over a decade, Bombardier sold only one of its three major lines, preserving control over existing installations and guaranteeing Bombardier a future in commercial regional jets. In addition, Bombardier stipulated the

30. Anonymous interview at Embraer headquarters in São Paulo, Brazil.
31. Interview with BNDES executive in the aerospace sector (6 Oct. 18).
32. Interview with analyst of the aeronautics sector for Itaú bank (6 Nov. 18).

preservation of 2200 workers in Canada and the creation of new jobs in Alabama, while Embraer included no stipulations on employment. As observed by the Interunion Department of Statistics and Socioeconomic Studies (DIEESE for its Portuguese acronym), "in close to 10 years, when the new family of E2 jets has been surpassed by the intense competition that exists, will replacement occur in a project in which Embraer is involved from design to flight or will it be the end of Brazilian commercial aviation?". Further, by splitting commercial jet production from defense and executive jet production, "forces the question of whether the rest of Embraer will survive" (Dieese, 2018, p. 8). After all, in 2017 commercial jet production accounted for 58% of revenues, while executive jets accounted for 26% and defense accounted for 16%.[33]

The Embraer trajectory exposes several aspects of late development. A Brazilian producer could indeed break through into the most advanced sector of the international economy and carve out a niche. Such a success required strategic maneuvering between national capital, the state, and international capital, and it was put to the test during each bust period following a boom. The company found a way to overcome the bust of the early 1990s, and the strategy pursued to generate the next boom included an increasingly powerful financial sector. As the next bust approached, options appeared constrained, and Embraer would appear to have been subsumed under Boeing.

5 CONCLUSION

Brazil's successful insertion into the most advanced sector of aerospace production represented a fifty-year endeavor to reach the front of the technology frontier and capture the rents available for such leadership in the international economy. The subsequent purchase of Embraer by Boeing calls for analysis not only of the conditions of bust that allowed Boeing in, but also the cycles of boom and bust that had positioned Embraer as a global leader at the same time as it made Embraer vulnerable to take-over.

Aerospace industries in Brazil had in fact experienced several booms and busts over time. Each period of boom was the result of interaction between government, the leading firm (Embraer), and international partners. In particular, it was the response to the 1990-1994 bust period that both saved the company and set it up for take-over 25 years later. To overcome the 1990s downturn, Embraer privatized, placing increasing control in the hands of financial actors, and ultimately international financial actors and their domestic Brazilian counterparts. The infusion of funds and ongoing government support allowed the company to survive and even thrive in the 1990s and 2000s, but the crisis of 2008-2009 and the downturn that hit in the mid-2010s

33. Author calculation from S&P IQ, EMBRAER, SA. Financials > Segments.

exposed the vulnerability of the company. Financial interests were perfectly happy to sell to Boeing, preferring to be owners of newly profitable Boeing-Embraer shares than to be directly responsible for production and employment in Brazil.

This winding yet continued path of industrial promotion in Brazil exposes nonetheless a more general trait of the difficulties involved in late development promotion in general. As seen here, it is only with significant, consistent and continued state support that developing country producers can move to the edge of the technological frontier, but their ability to advance depends critically on their relationship to international capital. So long as the developing country state is willing and capable to defend the interests of domestic producers, some portion of international surplus can be controlled domestically and developing countries can manifest impressive boom periods. If the fractions of the domestic bourgeoisie subservient to international capital come to control local firms, they will no longer support state efforts to protect dynamic factions of local capital. When moments of bust approach, state incapacity or unwillingness to navigate to the next boom can cost emerging powers whatever gains they had achieved.

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