ECONOMIC DEVELOPMENT AND GLOBAL VALUE CHAIN INSERTION:

A VIEW FROM **BRAZILIAN** AND **SOUTH KOREAN** LENSES

POLICY PAPER **4/5**

Brazil, South Korea, and Global Value Chains

A Tale of Two Countries

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BRAZIL, SOUTH KOREA, AND GLOBAL VALUE CHAINS

A TALE OF TWO COUNTRIES

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MAIN REPORT:

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A Tale of Two Countries

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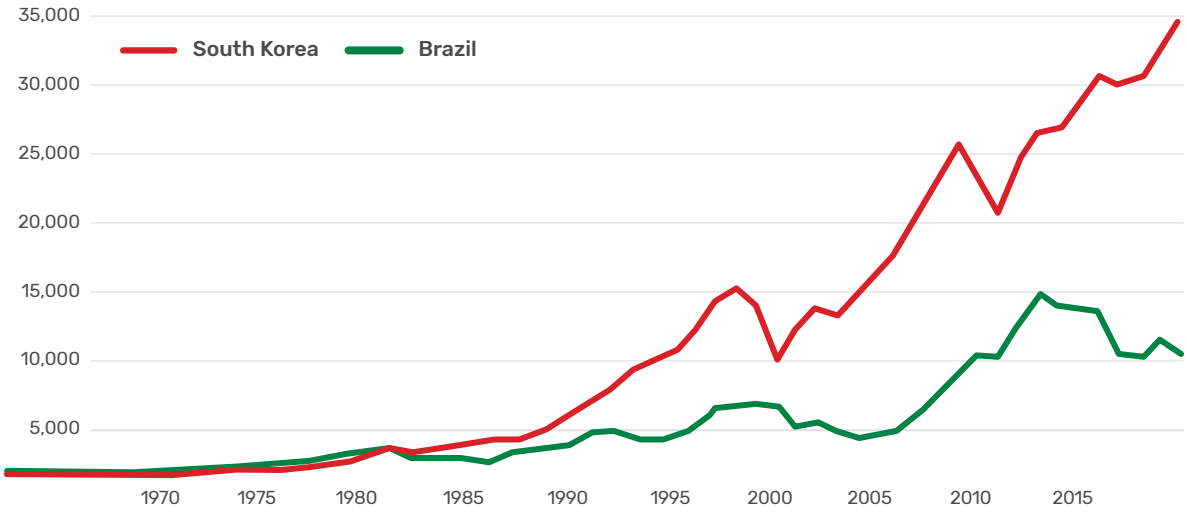
South Korea has climbed the income per capita ladder up to high levels, while Brazil may be considered a case of a "middle-income trap". Such divergence of economic growth performances can be related to their distinctive approaches to global value chains and trade globalization, as well as to domestic accumulation of technological and organizational capabilities.

1 Facing the middle-income trap: a tale of two countries

The "middle-income trap" has captured many developing countries: they succeeded in evolving from low per capita income levels, but then appeared to stall, losing momentum along the route toward the higher income levels of advanced economies (Canuto, 2019).

Such a trap may well characterize the experience of Brazil and most of Latin America since the 1980s. Conversely, South Korea maintained its pace of evolution, reaching a high-income status (Figure 1).

FIGURE 1: **GDP PER CAPITA (USD) BRAZIL VS. SOUTH KOREA COMPARISON**



Source: data from World Bank

In most cases of successful evolution from low- to middle-income status, the underlying development process is broadly similar. Typically, there is a large pool of unskilled labor that is transferred from subsistence-level occupations to more modern manufacturing or service activities that do not require much upgrading of these workers' skills, but nonetheless employ higher levels of capital and embedded technology.

The associated technology is available from richer countries and easy to adapt to local circumstances. The gross effect of such a transfer – usually occurring in tandem with urbanization – is a substantial increase in "total factor productivity", leading to GDP growth that goes beyond what can be explained by the expansion of labor, capital, and other physical factors of production.

Reaping the gains from such "low-hanging fruit" in terms of growth opportunities sooner or later faces limits, after which growth may slow, trapping the economy at middle-income levels. The turning point in this transition occurs either when the pool of transferrable unskilled labor is exhausted, or, in some cases, when the expansion of labor-absorbing modern activities peaks before the pool is empty.

Beyond this point, raising total factor productivity and maintaining rapid GDP growth depends on an economy's ability to move up on manufacturing, service, or agriculture value chains, toward activities requiring technological sophistication, high-quality human capital, and intangible assets such as design and organizational capabilities. Furthermore, an institutional setting supportive of innovation and complex chains of market transactions is essential.

Instead of mastering existing standardized technologies, the challenge becomes the creation of domestic capabilities and institutions, which cannot be simply bought or copied from abroad. Provision of education and appropriate infrastructure is a minimum condition.

Brazil saw the transfer of labor from subsistence-level employment slow well before they had exhausted their labor surpluses, as macroeconomic mismanagement and an inward-looking orientation established early limits to that labor-transfer process. Nevertheless, some enclaves have been established in high positions on global value chains (for example, Brazil's technology-intensive agriculture, sophisticated deep-sea oil-drilling capabilities, and aircraft industry).

By contrast, South Korea relied extensively on international trade to accelerate their labor transfer by inserting themselves into the labor-intensive segments of global value chains, before climbing the ladder of value and technology intensity within value chains. This was facilitated by those advances in information and communication technologies, and by decreasing transport costs and lower international trade barriers that allowed the full-fledged development of "global value chains" (Canuto, 2017).

INSTEAD OF MASTERING EXISTING STANDARDIZED TECHNOLOGIES, THE CHALLENGE BECOMES THE CREATION OF DOMESTIC CAPABILITIES AND INSTITUTIONS, WHICH CANNOT BE SIMPLY BOUGHT OR COPIED FROM ABROAD. PROVISION OF EDUCATION AND APPROPRIATE INFRASTRUCTURE IS A MINIMUM CONDITION.

The path from low to middle income per capita, and then to high-income status, corresponds to the increase in the share of the population that has moved from subsistence activities to simple modern tasks, and then to sophisticated ones. International trade has opened that path, but institutional change, high-quality education, and local creation of intangible assets are also essential for sustaining progress over the long run. South Korea is a prime example of a country that exploited these opportunities to move all the way up the income ladder. Countries trapped at middle-income levels have typically failed in undergoing appropriate changes in institutions, education, and local accumulation of intangible assets

Table 1 contains the results of the latest wealth measurement effort made by the World Bank for Brazil and South Korea. It depicts what lies behind the contrasting evolution of GDP per capita of the two countries (Figure 1). As expected, the relative natural-resource richness of Brazil appears in the value of natural capital. Produced capital (physical capital, i.e. machines and equipment, infrastructure etc.) reflects the differences in investment ratios of GDP between the countries over the years. The differential is glaring in the case of human capital, reflecting South Korea's investments in comprehensive education of its population and success in the local development and accumulation of intangible assets (technological and organizational capabilities).

TABLE 1: **BRAZIL, SOUTH KOREA - PER CAPITA WEALTH FOR 2014**

	BRAZIL	SOUTH KOREA
Total wealth	**188,883**	**424,052**
Produced capital	32,067	126,650
Human capital (reflecting education and intangible assets)	123,696	291,748
Natural capital	36,978	4,013
Net foreign assets	–3,859	1,641
Population	206,077,898	50,423,955

Note: Estimates are in 2014 U.S. dollars per capita at market exchange rates.
Source: Lange et al (2018).

It is worth highlighting four aspects of the comparative evolution of Brazil and South Korea toward what Table 1 exhibits. First, manufacturing structures in both countries evolved in tandem with the extent of local accumulation of intangible assets, with productivity and levels of upgrade in value chains reflecting such accumulation. While both countries went through similar trajectories of heavy industrialization up to the 1980s, South Korea's successful entry into higher-tech mechanical-electronic areas afterwards reflected a local intangible asset accumulation, as part of a co-evolutionary process, rather than being the consequence of any "forced", protected installation of activities. Capabilities explain sectors, not contrariwise.

Natural-resource-rich middle-income countries face a road of their own, one made wider by the upward phase of the super-cycle of commodities prices that accompanied the shifts in composition of global GDP in the new millennium. Unlike manufacturing, natural-resource use is to a large extent idiosyncratic, which creates scope for local creation of capabilities in sophisticated upstream activities, with the corresponding challenge to do so in a sustainable fashion (Vostroknutova, E., Brahmbhatt, M., and Canuto, O., 2010).

Second, the structure of incentives – rewards for success, punishment for failure – matters for local investment in intangible assets, as they shape the risk-weighted benefit-cost calculus made

by economic agents. In this regard, an important distinction between public policies in South Korea and Brazil could already be pointed out before the 1980s (Neves, 2020). Chaebols were the outcome of an evolutionary ("Schumpeterian") process during which success in mastering technology and productivity – including contractual targets of world market share occupancy - was rewarded with additional permits and subsidized finance, whereas losers were left behind (Amsden, 1989) (Canuto, 1993). Under such market-emulating rules of "helping winners and punishing losers", industrial policy beneficiaries did not think twice before using surpluses to invest in technological capability construction.

Now compare that with the "helping winners and saving losers" of Brazil's industrial policies and finance. Under such circumstances, the temptation to use surpluses to accumulate wealth in ways to maximize frontiers of interaction with the public sector prevails against spending them with technology and productivity mastering. Brazil's long-standing high levels of trade protection and closure also favored such an option (Canuto, Fleischhaker, and Schellekens, 2015a).

Third, Brazil has remained an upper-middle income country for long because of the co-existence of islands of high-income activities and a remaining large pool of low-productivity, low-education occupancy of the population. That constitutes a still-untapped source for increases in total factor productivity via occupational change.

Fourth, as we approach in the following item, South Korea's local accumulation of intangible assets benefited from technology spillovers of globalization through trade, whereas the global fragmentation of production processes along cross-border value chains has largely bypassed Brazil (Canuto, Fleischhaker, and Schellekens, 2015b). Nevertheless, South Korea's local attributes to escalate the ladder of innovation capabilities were highly relevant to explain its appropriation of globalization's technological spillovers. Different business environments have also made a difference between Brazil and South Korea.

2 Trade, technology, and globalization: a tale of two countries

2.1. GLOBAL VALUE CHAINS WERE PART OF A REVOLUTION IN GLOBAL TRADE

In recent decades, international trade went through a revolution, with the wide extension of the organization of production in the form of cross-border value chains. This extension was a result of the reduction of tariff and non-tariff barriers, the incorporation of large swaths of workers in the global market economy in Asia and Central Europe, and technological innovations that allowed modularization and geographic distribution of production stages in a growing universe of activities. International trade grew faster than world GDP and, within the former, the sales of intermediate products rose faster than the sale of final goods (Neves, 2020).

The geography of industrial production changed dramatically, with unskilled labor-intensive sectors moving out of advanced economies rapidly. Although the "hollowing out" of such jobs in advanced economies may have been, to a greater or lesser extent, determined by biases in trends of technological progress, the transfer of unskilled labor-intensive segments of supply chains has been part of the explanation. On the other side of such transfers, low-income countries have experienced rapid economic growth processes stemming from the structural transformation that resulted from the large-scale migration of workers from subsistence to modern tradable activities.

Sharp changes in relative prices in the global economy accompanied this process. While labor prices fell – as well as prices of manufactured products, according to their labor intensiveness – prices rose for natural resource-intensive goods, following an increase in demand coming from economically-growing low-income areas. Even though the super-cycle of commodity prices has ended, in real terms they have remained higher than in the 1980-90s.

The logic of value chains was also extended to other sectors beyond manufacturing. Producers opted for less self-sufficient, in-house capacities, choosing to sub-contract activities that are not essential to their business. This is also one reason for the expansion of services in GDP accounting in recent decades. Commodity chains have increasingly relied on sophisticated services both upstream and downstream. The content of services embedded in industrial products has also increased. Additionally, technological innovations have increased the marketability of various services, as expressed in the growth of international trade in services.

The opportunities and challenges of the international industrial division of labor were reconfigured in this new world of cross-border value chains. For low-income economies, one can say that it has become relatively easier – especially for small countries – to increase their

local industrial production, since joining the market through labor-intensive segments of existing chains allows them to circumvent the limits of (a lack of) scale and sophistication in local markets. Nevertheless, such entry is volatile and can easily be undone and relocated soon after any adverse signal comes out. This process of entry – with easy exit – corresponds to a window of opportunity for local accumulation of skills and a leap forward.

For high- and middle-income economies, in turn, it has become increasingly difficult to maintain competitiveness in those segments. It should also be noted though that some technological trajectories currently in early stage – such as 3D printing – may require the substitution of qualified for unqualified labor in a wide range of segments of existing chains, partly reversing the spatial dynamics described above (Canuto, 2017).

Middle-income economies are also facing a new landscape in other aspects. On the one hand, technological spillovers, productivity increases, and wider market access are now facilitated via entry at points that require intermediate sophistication levels within existing value chains. On the other, the consolidation of existing value chains raises the stakes in terms of the competition for core positions. For consolidated and mature branches, creating new chains and challenging established ones is the only alternative.

2.2. **SOUTH KOREA USED GLOBALIZATION AND GLOBAL VALUE CHAINS TO ACCUMULATE TECHNOLOGICAL CAPABILITIES**

South Korea's drive into mechanic-electronic manufacturing in the 1980s already benefited from what at the time was called "regional networks of production", engaging with Japanese and U.S. firms (Canuto, 1994). Climbing up the income per capita ladder happened as the availability of educated labor, infrastructure, and a friendly business environment allowed country's firms to climb up the value ladder within global value chains.

Globalization helped knowledge from technology leaders spread faster than before. Cross-border technological diffusion not only contributed to rising domestic productivity levels in advanced and emerging economies, but also facilitated a partial reshaping of the technological innovation landscape, with some recipients – like South Korea - becoming new significant sources of research and development (R&D) and patents (Canuto, 2018a).

Higher trade, foreign direct investment and international use of patents more intensively disseminated knowledge and technology across borders. A double dividend could potentially be derived from such a feature: as technology is typically "non-rival" in its use, its diffusion may lead to increases of average outputs at relatively low costs; furthermore, its multiple use may generate positive network effects through cross-pollination. Knowledge flows from abroad can have impact both on productivity, through the adoption of foreign technologies in the production process, and – combined with domestic R&D – on local innovation.

Chapter 4 of the IMF's "World Economic Outlook (2018)" presented estimates that in emerging market economies, "from 2004 to 2014, foreign knowledge accounted for about 0.7 percentage point of labor productivity growth a year, or 40 percent of observed sectoral productivity growth, compared with 0.4 percentage point annual growth during 1995–2003". According to the report, these results remain robust even when China is excluded, which indicates that productivity effects were broad among emerging market economies.

Furthermore, the IMF report depicted a picture of a changing international constellation of sources of technological innovation, as R&D expenditures skyrocketed in China and stocks of international patents piled up in South Korea. These countries have joined traditional leaders in sectors like electrical and optical equipment and, especially Korea, in machinery equipment.

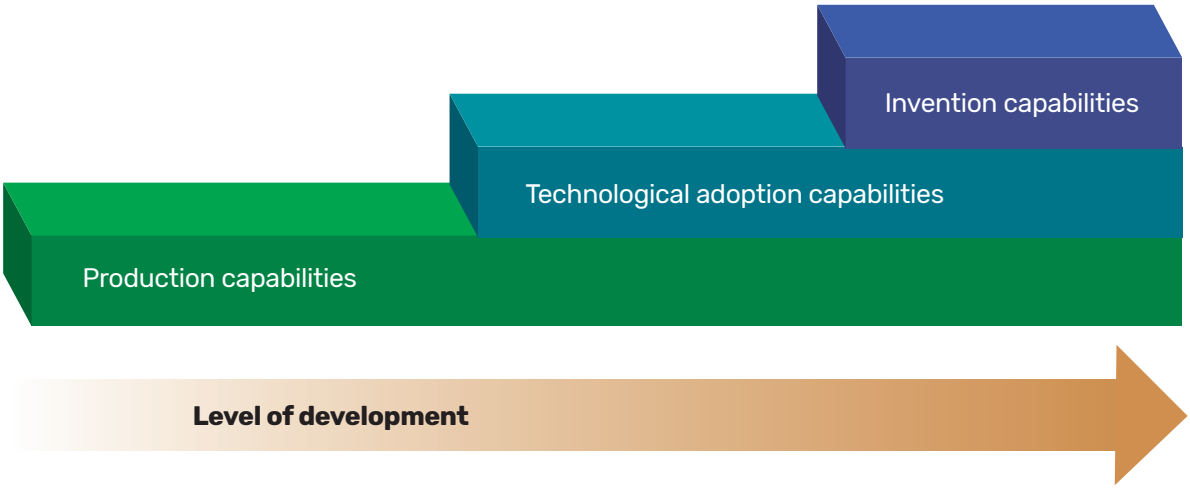
This has happened even as, since the early 2000s, traditional frontier economies have gone through a slowdown in the increase of labor and total factor productivities, together with slower growth in patenting and, to some extent, lower R&D investment. Competing explanations have been offered for the foregoing, either as a time gap in the transition between the third and fourth industrial revolutions or as a secular decline in opportunities to push productivity forward. In any case, as I pointed out back in 2010, prevailing technological convergence gaps and the non-rivalry in the use of existing technologies have offered emerging market economies the opportunity to keep advancing even if the rhythm decelerated at the frontier (Canuto, 2010).

There are, however, local requisites to escalate the ladder of innovation capabilities. Notwithstanding the enhancement of cross-border knowledge flows by globalization, simple interconnectedness does not automatically spark productivity increases and local innovation. Any application of technology embodies a "tacit" and locally specific – idiosyncratic – content that cannot be acquired or transferred by means of handbooks or any other codifiable forms of knowledge transmission. That knowledge cannot be made "explicit" as in blueprints and thus cannot be perfectly diffused as either public information or private property. It must be locally developed (Canuto, 1995).

One may expect rising requirements in terms of tacit-and-idiosyncratic knowledge and development of local capabilities as one thinks of production, technology adoption and invention. One may also find as typical for latecomers an evolution often starting from production and technology adoption before invention. That has exactly been the case of Korea and China, which have strived to develop innovation capabilities after intense learning by using and adapting existing technologies.

Success in stepping on and ascending the capabilities escalator – Figure 2 - depends on the presence of a broad set of complementarities, in the absence of which, returns from investing in the development of capabilities are hardly accruable. Access to finance, infrastructure, skilled labor, and managerial and organizational practices matters. Solutions to market failures that generate disincentives to the accumulation of knowledge must also be present. Furthermore, transaction costs associated with the business environment – trading across borders, hiring, enforcing contracts etc. – cannot be too high (Canuto, Dutz & Reis, 2010).

FIGURE 2: **THE CAPABILITIES ESCALATOR**



Source: Cirera & Maloney (2017)

As the presence of such complementarities is not widespread, one may understand why the international innovation landscape change has been limited. It also explains what Cirera & Maloney (2017) have called an "innovation paradox": levels of innovation-related investment in developing economies not commensurate with high returns thought to accompany technological adoption and catch-up. Globalization may spread knowledge, but it does not necessarily come with what it takes to fully profit from it.

2.3. **BRAZIL REMAINED DELINKED FROM NEW GLOBAL VALUE CHAINS**

While international trade underwent the radical transformation in the past decades as production processes fragmented along cross-border value chains, the Brazilian economy remained on the fringes of this production revolution, maintaining an extremely high density of local supply chains. Opportunity costs incurred by such option taken by the country were accordingly high.

The factors behind Brazil's bypassing are multiple. They include precarious logistics and high transaction costs related to international trade, as well as deliberate policy decisions to favor local content over international integration. Brazil's trade figures contrast with those of its peers and reflect the fact that the country's economy remained relatively segmented from the deep transformation that took place in the global economic geography in the last decades.

The Brazilian economy pays a price in terms of productivity foregone because of its lack of trade openness. A trade opening process would bring an adjustment impact that could nonetheless

be mitigated with public policies that facilitate labor mobility and job migration. Benefits from trade opening would also hinge on policy improvements in complementary areas, such as infrastructure investments, business environment and others.

The Brazilian economy is commercially closed, even when taking into account its size and location (Canuto, Fleischhaker and Schellekens, 2015a). Consider, for example, tariffs on imports. Weighted by import shares, the average was 8.3% in 2015, the highest among comparable emerging and advanced economies. Such tariff protection in Brazil is accompanied by the use of non-tariff barriers and local content rules that are also even more intense than in those comparable countries (Canuto, 2018c). The number and depth of free trade agreements to which Brazil is a signatory are also limited.

Not surprisingly, Brazil maintains a degree of density in its domestic industrial production chains above what one should expect from its level of income and development. By abdicating more advanced and externally available inputs, equipment and technologies, such integrated chains operate at lower levels of productivity and quality than would have been the case if they had access to said inputs. Leaner and outward integrated producer chains would have greater capacity to export and to provide domestically better and cheaper products, while at the same time, their expansion could outweigh the lower domestic density.

NOT SURPRISINGLY, BRAZIL MAINTAINS A DEGREE OF DENSITY IN ITS DOMESTIC INDUSTRIAL PRODUCTION CHAINS ABOVE WHAT ONE SHOULD EXPECT FROM ITS LEVEL OF INCOME AND DEVELOPMENT.

It is also not by chance that, in 2015, while in Norway there was one exporting company for every 250 Norwegians, in Brazil the proportion was one for every 10,000 Brazilians (Canuto, Fleischhaker and Schellekens, 2015b). Restrictions on imports function as export taxes, preventing the accrual of economies of scale in the foreign market.

Embraer, Petrobras (before being subjected to heavy commitments of local content after the discovery of pre-salt layers of deep-sea oil) and agriculture are examples of Brazilian successes that constitute exceptions confirming the rule above. The fear of loss of local production segments with high technological content must be countered by the fact that their domestic survival due to protection steroids does not necessarily mean local technological dominance, and tends to be done while imposing a burden on others (Canuto, Cavallari and Reis, 2013). A cheapening of the basket of goods may well mean lower wages and intermediary costs for those areas where the country can develop local capacity for value added generation.

Therefore, the Brazilian economy suffers from high costs because of its trade closure. What the country produces could be done with greater productivity and competitiveness, even if it abdicated to do internally what it would import if it could have access to the best and most advanced equipment and technology. Incidentally, recent historical experience shows that countries that are not at the technological frontier and those that are both have better results in terms of local technological innovation when they can benefit from access to external sources of knowledge, including via imports of goods and services, as we approached before.

3 Challenges ahead

Current technological developments in manufacturing are likely to lead to a partial reversal of the wave of fragmentation and global value chains that was at the core of the rise of North-South trade from 1990 onwards (Canuto, 2017, 2018c). Such a trend, together with protectionism, tends to be exacerbated by the coronavirus crisis (Canuto, 2020a).

At the same time, China – the main hub of the global-growth-cum-structural-change of that period - may attempt to extend the previous wave through its "One Belt, One Road" initiative. The major challenge faced by South Korea will be to overcome what Lee et al (2019) have called a "middle innovation trap", while navigating in a global environment of trade and technology wars.

Challenges to achieve simultaneously employment of unskilled workers and substantial increases of productivity are becoming taller. Furthermore, those horizontal productivity and competitiveness factors - including local accumulation of capabilities, low transaction costs, infrastructure improvement, etc. - that were crucial for a broad and deep manufacturing-led development are now extended to services. There is more complementarity than substitutability between productivity and competitiveness factors supporting manufacturing and services. There is no alternative but to raise the bar domestically if a developing country wants to enjoy any of these as engines of growth.

As for Brazil, following the protectionist mood triggered by recent trade wars and the coronavirus crisis - Canuto (2020a) - wouldn't it be more convenient to have a closed economy in the current global context of trade wars? It should be emphasized that the burden of lost productivity and quality falls on the Brazilian economy itself. In addition to direct import and export channels, trade closure contributes to the low intensity of competition in many domestic markets, which in turn helps to explain why the survival of less efficient firms is proportionally larger in Brazil than again in comparable economies.

In most sectors, Brazil presents high degrees of heterogeneity in the productivity of companies, with the survival of less efficient companies higher than in many other countries. Goods and services available in the country are more expensive and of lower quality than they could be, as avenues for innovation and productivity increases remain narrow. The average productivity is lower than what would prevail if market slices and resources could be absorbed by the most efficient companies. Brazilian commercial closure thus has a deleterious effect by reducing the strength of competition between firms and hence allowing capital and human resources to remain in inefficient firms. Average productivity would be greater if they were reallocated to better companies.

It is worth emphasizing the key role of Brazilian domestic reforms in order to improve the broad set of complementarities to knowledge and technology from abroad, as it happened in South Korea. Brazil's lack of competition and poor productivity performance have domestic reasons that go beyond external trade closure: low investment in infrastructure; unfriendly business environment; distortions in long-term financing; quality of public spending on education; etc. Changes in these areas would be a precondition for benefits of greater trade integration to be fully realized - but these improvements are already necessary by themselves (Canuto, 2020b). Instead of corporate supportive policies to compensate for competitive disadvantages resulting from the burden of those aspects and other goals, it would be necessary to adopt policies aimed at raising productivity and smoothing worker relocation processes.

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