

## Escaping the “middle income trap”: the divergent experiences of the Republic of Korea and Brazil

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### Summary

This policy brief reviews the key drivers behind the successful catch-up through a comparative analysis of Republic of Korea and Brazil. These two economies represent an interesting case in that until the 1980s, the GDP of Brazil was higher than that of Republic of Korea. Thereafter, the two economies took different paths, with Brazil becoming stuck in so-called “middle-income trap” and Republic of Korea making a significant progress. Key findings:

- The Republic of Korea has evolved into “innovative economy”, whereas Brazil seems to be far from achieving this status. Reflecting this by 2010 patents per capita for the Republic of Korea were 1,695 while the corresponding figure for Brazil is only 15.
- The fundamental difference between the economy of the Republic of Korea and the Brazilian economy is the extent of inward or outward orientation which has influenced the behaviors of various economic actors.
- Pursuing an export-led growth strategy beginning in the mid-1960s, then government consistently aimed at creating internationally competitive capabilities in the domestic economy by encouraging domestic firms to compete in the global market. In contrast, the Brazilian government did not pursue industrialization in a systematic manner. Its policy was primarily the result of external shocks rather than strategic planning to build indigenous technological capabilities.
- The Republic of Korea’s outward-oriented industrial policies followed the dictates of Ricardian comparative advantage, updated with a keen appreciation for the product cycle model. They charted a path of industrial transformation from labor-intensive industries to heavy and chemical industries (HCIs). In contrast the Brazilian

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government's inward-oriented policies had much in common with socialist central planning and were aimed at import-substitution, which resulted in locally-focused firms and industries that were not globally competitive.

- Firms in the Republic of Korea were set on the path to becoming globally competitive firms from the outset of industrialization. Brazilian firms enjoyed a sense of security within their large and protected domestic market, and thus lacked the motivation to upgrade their technological capabilities.

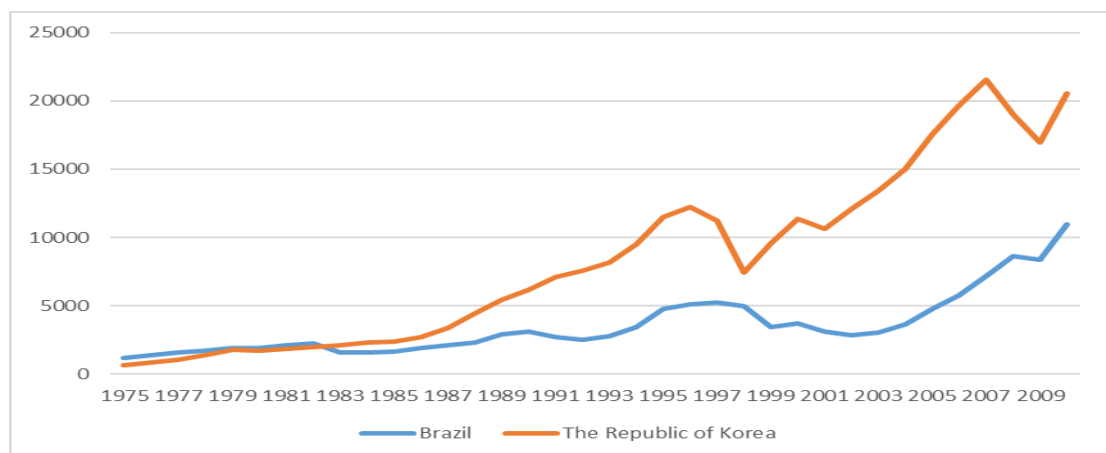
### **Introduction: why the Republic of Korea and Brazil?**

Countries with similar starting points may see vastly different economic growth patterns, owing to different cultures, economic policies, institutions or asset endowments (Azariadis and Drazen, 1990). Some of these differences can have paradoxical effects like the so-called "resource curse" (Auty, 1993, p.1), it has been observed that natural resource-rich developing economies have generally performed worse than less well-endowed countries in the decades following the end of World War II, (Auty, 1993). The Republic of Korea and Brazil provide a vivid illustration of thesis.

Up to the early 1980s, Brazil posted a strong economic growth rate, underpinned by a diversified manufacturing sector and solid export performance (Moreira, 1995). By early in the decade, it had reached a per capita income level of US\$3,000, a level considerably above that in other emerging markets of the time, such as the Republic of Korea and Taiwan Province of China (Aiyar, Duval, Puy, Wu, and Zhang, 2013). Thereafter the Brazilian growth rate fell sharply, hampered by sharp declines in output and manufacturing exports. The country has since failed to break through to higher income levels, lagging the growth of many other emerging economies. By 2013, Brazil's GDP per capita ranked 95th in the world (Elstrodt, Manyika, Remes, Ellen and Martins, 2014).

As seen in figure 1, the Republic of Korea's GDP per capita at the onset of industrialization in 1961 was \$91.48, compared to \$203.19 for Brazil and the latter country maintained a higher level until 1983. However, despite this later start in economic development, the Republic of Korea progressed rapidly, surpassing Brazil's per capita income in the mid-1980s and eventually gaining admission to the OECD by 1996 (Mahon and McBride, 2008). The Republic of Korea is considered one of the best-known examples of a developing economy that successfully achieved the living standards of the developed world, one of only 13 countries that were able to make this transition since the 1960s (Agénor, Canuto, and Jelenic, 2012).

**Figure 1: The number of patent applications in Brazil and the Republic of Korea from 1975 to 2005**

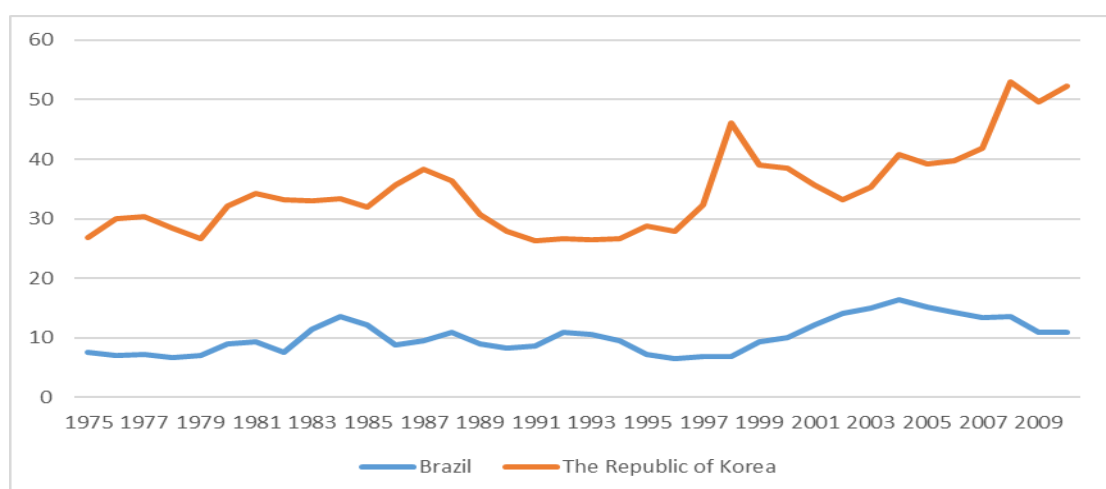


Source: Authors' analysis of U.S. Patent and Trademark Office data

### Key factors behind the successful catch-up of the Republic of Korea

Our analysis of the economy of the Republic of Korea and the Brazilian economies reveals the most fundamental element underpinning successful economic development is maintaining an outward-oriented economy. This is the overarching long-term difference between two countries (Moreira, 1995). A key indicator of the extent of inward or outward orientation is the extent to which a country engages in global trade through exports. The Republic of Korea's export as a percentage of GDP has been consistently higher than that of Brazil, rising to 52.6% of GDP by 2010 (figure 2).

**Figure 2: The flow of export as a percentage of GDP in Brazil and the Republic of Korea from 1975 to 2009**



Source: World Bank. World Development Indicators

We identify three specific main factors behind the Republic of Korea's outward orientation: 1) well-planned and consistent government policy, 2) technological specialization of a national production and innovation system, and 3) encouragement of selected large local firms that demonstrate the wherewithal to compete and succeed in global markets. It is difficult to identify the separate contributions or causal relationships amongst these three factors. However, we argue that the interplay of all these three factors can provide the foundation for economic development that is rapid enough to result in successful catch-up.

### **Government Policy**

As early as 1965, Republic of Korea's President Park had already begun to talk about global competitiveness, emphasizing that competing with others in the international export race is not a choice, but a compulsion (Amsden, 1989). From its earliest days of export-led development in the mid-1960s, government policy was aimed at creating internationally competitive capabilities in the domestic economy. This export-led growth strategy was executed at two levels – strategic and tactical. At the strategic level, the government identified appropriate industries using sophisticated product cycle logic (Vernon, 1966). At the tactical level, it devised and implemented a comprehensive system that linked import-control with various means to promote exports such as export credits, taxation benefits, and duty drawbacks (Mah, 2007).

It is also important to recognize that the Republic of Korea commenced heavy investments in its physical infrastructure and educational system right after the end of the Korean War in the early 1950s. It set education as a strategic priority and facilitated access to secondary and tertiary education, creating a large pool of skilled workers and engineers. In contrast, the Brazilian government adopted an import-substitution policy, incenting domestic firms to serve the local market through the mid-1990s (Figueiredo, 2008). Its policy had a second objective, namely the avoidance of a balance of payments crisis (Moreira, 1995). Exporting in Brazil was associated with backwardness due to centuries of colonial history when raw material exports served foreign interests (Moreira, 1995). As a consequence, the Brazilian government focused on protecting domestic industry rather than exposing them to competition in global market.

There is also a stark difference in terms of the manner in which each government implemented its policy. The government of the Republic of Korea maintained a consistent and pro-active policy regime over a period of five decades and its ultimate goal had always been increasing international competitiveness through indigenous technological efforts. In contrast, the Brazilian government did not implement industrial policy in a systematic manner. Brazil's policy was driven, in the main, by external shocks, so that it was more emergent and reactive rather than the result of strategic planning.

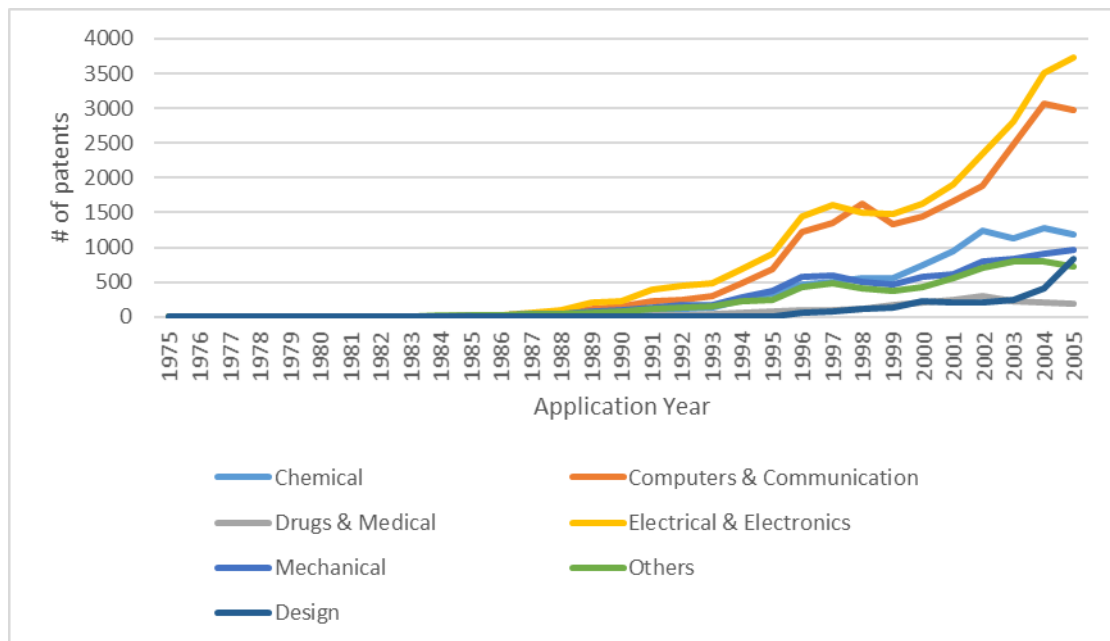
### ***National Technological Focus***

The government of the Republic of Korea was actively involved in shaping the domestic industrial structure towards more efficient configurations and remedying weak financial and education systems (Amsden, 1989). Its industrial policies followed the dictates of Ricardian comparative advantage, updated with a keen appreciation for the product cycle model. The policy of the Republic of Korea charted a path of industrial transformation from labor-intensive industries to heavy and chemical industries (HCIs), with the aim of building an internationally competitive economy.

To achieve such a successful industrial shift, the Republic of Korea government came up with the series of Five-Year Plans or the "Big Push" which set specific investment and export targets for each of the selected industries within the heavy and chemical industrialization policy (Moreira, 1995; Galbraith and Kim, 1998).

The Brazilian government's policy efforts significantly differed from the approach adopted in the Republic of Korea along two important dimensions. First, it bore greater resemblance to communist and socialist inward-facing central planning and was aimed at import-substitution rather than export promotion. Second, it lacked consistency and continuity so that its emphases tended to vary from government to government. The so-called 'Targets Plan' aimed at developing heavy industry was neither specified in detail nor accompanied by significant institutional changes (Moreira, 1995). It was little more than a collection of five-year targets for output and investment in heavy industry, without a specification of how these targets were to be achieved. Further, the functional intervention to provide the public goods to support the development of heavy industry such as transportation, energy, and education was very limited (Moreira, 1995).

**Figure 3: The number of patent applications in various sectors in the Republic of Korea from 1975 to 2005**



Source: Authors' analysis of U.S. Patent and Trademark Office data

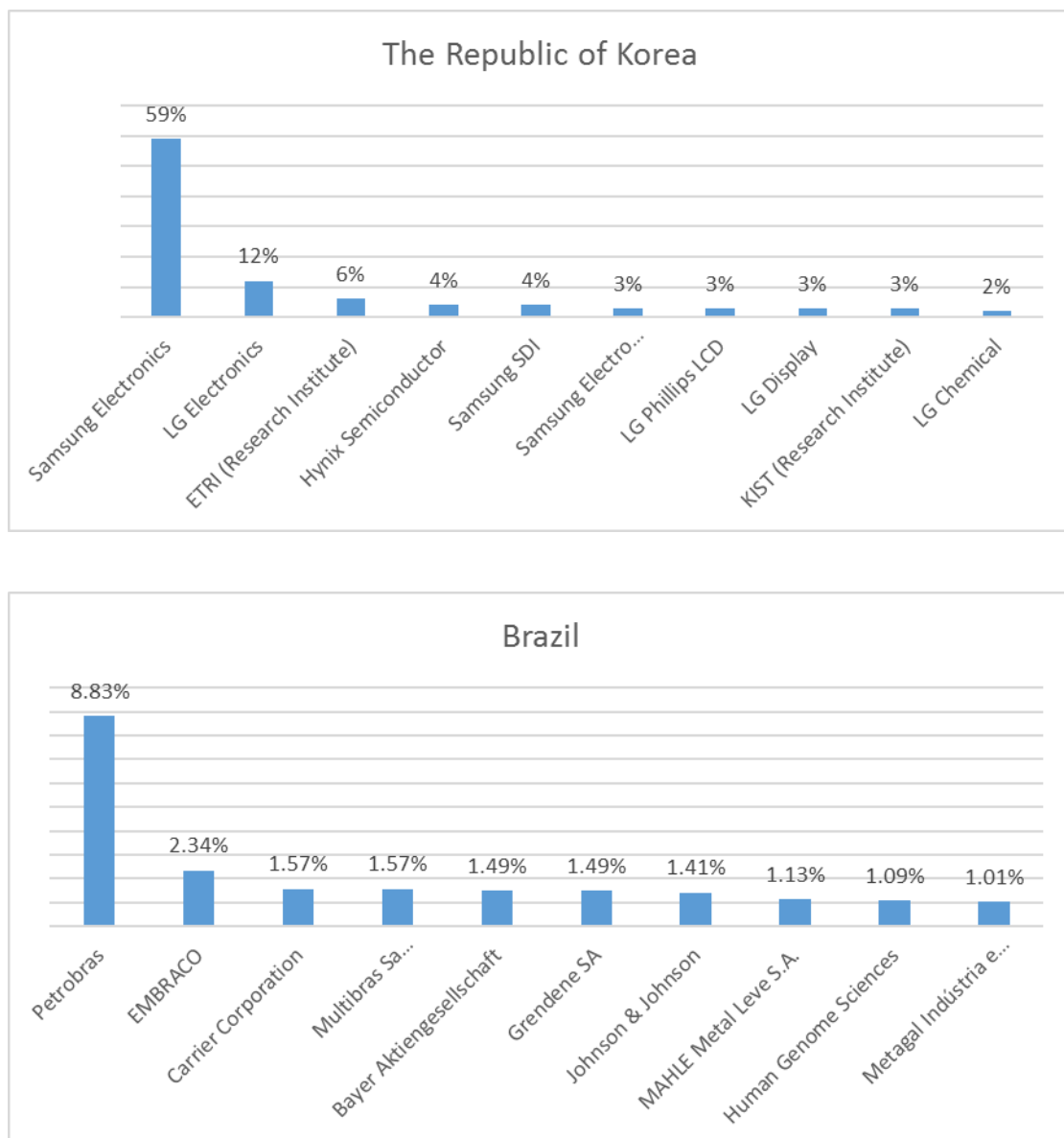
As seen in figure 3, a very high percentage of the innovative activities of the Republic of Korea are concentrated in a limited set of industries such as electrical and electronics and computers and telecommunications where Firms from the Republic of Korea have now established world-leading market shares (Mundy, 2013). By contrast, Brazil has not established a world leading market share in any industry. Its innovative output is rather dispersed across a wide range of industries and is negligible in every one of them.

### ***Corporate Champions***

The economic development of the Republic of Korea was heavily based on the efforts of large business groups. The emergence of large conglomerates during the industrialization was an efficient institutional response to the institutional voids and market failures that typically characterize an economy during its underdevelopment phase (Levy and Kuo, 1991; Khanna and Palepu, 2000).

There were also internal factors that led firms from the Republic of Korea also develop world-class capabilities. Their mindset to become globally competitive firms also played a pivotal role. Since their domestic market is relatively small, companies based in the Republic of Korea had limited scope to expand domestically. Unlike Brazilian firms that could generate comfortable performance based solely on their large domestic market, firms from the Republic of Korea had to be outward-focused merely to survive in the face of domestic competition. Having a large domestic market may have given Brazilian firms a sense of security. As a consequence, unlike the Republic of Korea, we observe few global corporate champions in the Brazilian economy (figure 4).

**Figure 4: Top-ten assignees in both the Republic of Korea and Brazil**

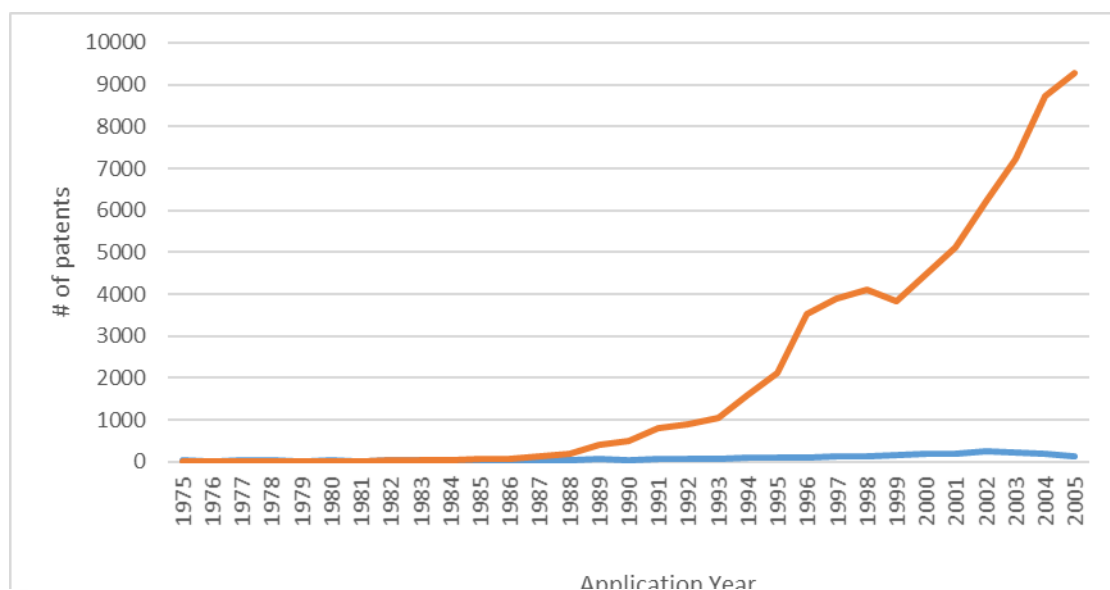


Source: Authors' analysis of U.S. Patent and Trademark Office data

## The Republic of Korea and Brazil today and moving forward

The dramatic differences in level of innovation capacity between the Republic of Korea and Brazil are reflective of the two countries' divergent economic performances (figure 5). While patenting in both countries rose in the 1990s, growth in the Republic of Korea far surpassed that of Brazil. Specifically, the number of patents assigned to the Republic of Korea entities has risen sharply, with a cumulative total of 84,751 by 2010, whereas the corresponding figure for Brazil is only 3,034. Further, differences in innovative capacity between two economies become even more severe if we compare patents per capita: the figure for the Republic of Korea is 1,695.02, while the corresponding figure for Brazil is only 15.26. The 2014 Global Innovation Index comprised of a wide variety of technological indicators such as knowledge and skills reveals that Brazil's score (36.3) are much lower than Korea's (55.3) (Dutta et al., 2014).

**Figure 5: The number of patents assigned in both Brazil and the Republic of Korea from 1975 to 2005**



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