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The Pitfalls of Protectionism: Import Substitution vs. Export-Oriented Industrial Policy

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The Pitfalls of Protectionism: Import Substitution vs. Export-Oriented Industrial Policy

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ABSTRACT:
Industrial policies pursued in many developing countries in the 1950s-1970s largely failed while the industrial policies of the Asian Miracles succeeded. We argue that a key factor of success is industrial policy with export orientation in contrast to import substitution. Exporting encouraged competition, economies of scale, innovation, and local integration and provided market signals to policymakers. Even in a large market such as India, import substitution policies in the automotive industry failed because of micromanagement and misaligned incentives. We also analyze the risk tradeoffs involved in various industrial policy strategies and their implications on the 21st century industrial policies. While state interventions may be needed to develop some new capabilities and industries, trade protectionism is neither a necessary nor a sufficient tool and will most likely be counterproductive.

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WORKING PAPERS

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A. The Industrial Policy Debate

Since the financial crisis of 2008 with increasing attention of policymakers on income inequality, hollowing out of the middle class, and deindustrialization, the industrial policy narrative has started making a comeback, gaining ground since the COVID-19 pandemic. Ever since the 1980s as the "Washington Consensus" narrative of free market reforms, liberalization, and privatization has taken hold, the industrial policy narrative has been considered a fringe idea in policy and mainstream academic circles but has staged a return in the public debate (Cherif, Hasanov and Engher 2023, Cherif and Hasanov 2019a, 2019b). Although most countries, especially advanced ones, have always retained elements of industrial policy in certain sectors, typically under the guise of innovation or national security goals, they were often not recognized as industrial policy (Mazzucato 2013 and Tucker 2019). In academic circles, the pro-industrial policy arguments of Amsden (2004), Chang (2002), Ocampo, Taylor and Rada (2009), Rosenberg and Birdzell (1986) and Wade (1990), among many others, have not been part of economics studies, but they are no longer dismissed *a priori* as more empirical and theoretical work has emerged (e.g., Lane 2021).

The return of industrial policy culminated in an acceleration of public announcements of major industrial policy measures by the three largest economic blocks in the world, the U.S., the EU, and China. In 2015, China issued its strategic ten-year plan, "Made in China 2025," announcing massive support in ten key sectors deemed critical for the next stage of its development such as chips, artificial intelligence (AI), robotics, industrial sensors, cloud computing, and batteries.[1] The EU announced its ambitious Strategic Plan for Batteries in 2018 to achieve autonomy and global leadership across the whole battery value chain. This was followed by the EU Industrial Strategy (2020), the European Chips Act (2021), and the Net-Zero Industry Act (2023) subtitled "making the EU the home of clean technologies manufacturing and green jobs." The U.S. in turn has launched multiple programs with a combined funding on a scale not seen since the Apollo Program. The Endless Frontier Act (2021) is to fund and encourage commercialization of applied research and innovation in ten key areas (which overlap largely with the Made in China 2025 program). The CHIPS for America Act (2021), [2] leading to the CHIPS and Science Act (2022), introduced sizable incentives and financing for investment in the fabrication of advanced semiconductors in the U.S. The Inflation Reduction Act (IRA, 2022) introduced, among others, a massive effort to spur domestic innovation in and production of batteries, electric cars, and renewable technologies. The estimated public spending of the IRA over 2023-2031 in the order of 400-900 billion dollars (which would crowd in private investment of the potentially similar size) is comparable to the existing EU green policies, and in fact is only a small fraction of the U.S. or the EU annual GDP (Franco-German Council of Economics Experts 2023).

In the revived debate about the use of industrial policies to accelerate development, defend, or regain technological supremacy, the interpretation of past experiences plays a crucial role and perhaps represents the main intellectual battlefield. Those in favor of state intervention to promote certain sectors usually lean on the example of the Asian miracles such as Korea and Taiwan Province of China, which achieved high and sustained growth using activist policies, including, but not limited to, high tariffs and other protectionist policies, and managed to move from low-income status to high-income status within a generation (Cherif and Hasanov 2019b, 2019c). Others would point to the experience of many developing countries in the 1950s-

[1] The objectives of the plan and its emphasis on Industry 4.0 share similarities with Germany's High-Tech Plan, issued in 2006, and its High-Tech Strategy 2020 announced in 2010. See https://www.cfr.org/backgrounder/made-china-2025-threat-global-trade.
[2] See "The Endless Frontier Act: A New Paradigm for US Science and Innovation Policy," Congressional Research Service, June 2021.

1970s, which tried to create new industries, often beyond their capabilities, through a mix of subsidies and protectionism. For the most part, these experiments were folded in the 1980s and 1990s amid financial crises and have remained ever since the epitome of failure. In retrospect, it is not surprising that the industrial policy narrative has been associated with the failures of these policies in the past.

We argue that these two types of industrial policy experiences, and their associated strategies, rely on fundamentally different principles as to their market focus—inward-looking or Import Substitution (IS) industrialization vs. Export-Oriented (EO) industrial policies—which could help explain their diverging outcomes.[3] Cherif and Hasanov (2019b) argue that the success of the Asian miracles' version of industrial policy, defined as "True" Industrial Policy (TIP), is based on three key principles: state intervention to channel resources toward sophisticated industries (e.g., electronics); ensuring an intense competition and accountability for the support received; and export orientation. They argue that it is the vigorous implementation of these principles to help build homegrown technology by domestic firms has allowed the Asian miracles to reach high income status in a couple of generations. Although the Asian miracles used the full arsenal of state intervention tools, including high tariffs to protect domestic markets (e.g., Wade 1990 and Hauge 2020), the main priority of their strategy was to target export markets, especially advanced markets, along with moving into more sophisticated industries and enforcing competition and accountability. Studwell (2013) also strongly emphasized the importance of export discipline in the success of the Asian miracles. In contrast, the experience of industrial policy in many developing countries in the 1960s and 1970s can be better described as import substitution policies.[4] It broadly consisted in developing a set of key new industries, typically heavy industries such as steel and petrochemicals (although sophisticated industries like automotive were sometimes targeted), and focused almost exclusively on the domestic market by protecting the final product from foreign competition. Meanwhile, intermediate or capital goods were often implicitly subsidized through, for instance, an overvalued exchange rate, as technological gaps in these inputs were still substantial. In other words, the Asian miracles' policies and many IS policies overlapped in some main aspects of TIP, i.e., in terms of state intervention to develop sophisticated industries and new capabilities and even in terms of accountability, but they diverged in terms of market orientation at the onset, that is, inward-looking in IS industrialization vs. export orientation in the Asian miracles' case.

Export orientation is a critical element of a successful industrial policy. It achieves the following key objectives: (i) a market signal—it provides the state and firms with a continuous market feedback free of the distortions on the potentially protected domestic markets; (ii) fierce competition—competition on foreign markets forces domestic firms to focus on productivity gains, to keep up with the technological frontier, and to diligently innovate to survive; (iii) spillovers—it gives incentives for deeper value chain integration domestically and globally resulting in positive spillovers to and competitive and innovation pressures on other domestic firms; (iv) market size—it provides a market large enough to take advantage of economies of scale, and of economies of scope, that is, to support the introduction of a greater variety of products; and (v) accountability—it creates incentives that could potentially mitigate cronyism and corruption as firms need to compete globally to survive.

[3] The other set of policies vigorously pursued since the 1980s, which consists in liberalizing all aspects of the economy and lowering tariffs across the board, is generally referred to as "outward-looking" policies or "Washington Consensus." Despite being described as outward oriented, the lack of an explicit state intervention to promote sophisticated industries has mostly resulted in countries remaining locked in their initial export structure, trapped in the middle-income trap at best (Cherif and Hasanov 2019c).
[4] Irwin (2020) gives an account of the early arguments in favor of IS policies, and the subsequent disenchantment of some of the proponents of IS policies, including Prebisch (1950) and Hirschman (1969).

In contrast, IS policies, because of their focus on the domestic market, would not be able to take advantage of many of these important features. In particular, these policies are deprived of the proper market feedback, akin to an airplane flying without navigation instruments. They may not encourage sufficient investment in innovation or produce large productivity gains. The IS policies also often create continuous reliance on imported critical inputs (or domestic inputs with mediocre quality), often implicitly subsidized by an overvalued exchange rate. In the absence of accountability, the state support could be highjacked by a few connected individuals or firms. Essentially, these firms could only survive under protection against both foreign and domestic competition. At some point, the economy could be hit by an external or domestic shock, typically the collapse in the price of its main export commodity, resulting in a crisis deep enough to force a reckoning, resulting in bankruptcies of these firms. Deprived of the state support due to large fiscal deficits as economic conditions deteriorate, often losing access to an overvalued exchange rate to import critical inputs (as depreciation pressures mount), and unable to compete with more productive and innovative foreign firms, domestic producers quickly go bankrupt, and most of the learning and human capital accumulated is lost.

In this paper, we provide empirical evidence and different mechanisms that explain why export orientation could be the "secret" ingredient of a successful industrial policy. We show novel cross-country empirical evidence that developing countries largely went through two main periods: a golden age of IS over 1965-1980, characterized by a rapid growth in manufacturing output, followed by its collapse over 1980-2010. We also show that very few developing countries pursued export orientation in the 1960s and 1970s, while, in stark contrast, the Asian miracles pursued aggressively the development of their exports. Subsequently, the Asian miracles were among the very few economies that managed to sustain a rapid growth in their manufacturing output over 1980–2010. Manufacturing dominated world trade, and more particularly the Asian miracles' exports, over the period covered. It is natural that our study focuses on manufacturing, but we do not rule out a role for tradable and sophisticated services in the future, especially for smaller economies (see Cherif and Hasanov 2019b).

We also give an account of India's attempt to develop an automotive industry in the 1950s and 1960s, showing that a large domestic market, which provides the economies of scale, may not be sufficient to avoid the pitfalls of IS policies. We argue that although tariffs were used by many industrialized countries while catching up with the frontier, including the U.S. in the 19th century until the World War II, this was a single tool among a wide array of state interventions, some of which continue to this day. Finally, we analyze the tradeoffs of the strategies in the context of the race to the top with the new wave of industrial policies of the 21st century, and how IP relates to facing the climate change challenge. We argue that although protectionism and high tariffs were used in the past, they may not be necessary as there are alternative state interventions to develop new capabilities and industries, and most likely they will be counterproductive even for large economies.

B. Industrial Policy Always Failed in the Past…Because a "True" One Was Barely Tried

A standard argument against any sort of state intervention to spur the growth of new industries lies in the fact that there have been many failures in the past. A casual observation suggests that most developing countries somehow attempted to develop new industries and acquire new technologies using some sort of

state intervention. The policy tools used were diverse and ranged from subsidies and protection through tariffs all the way to price controls and the use of state enterprise monopolies.

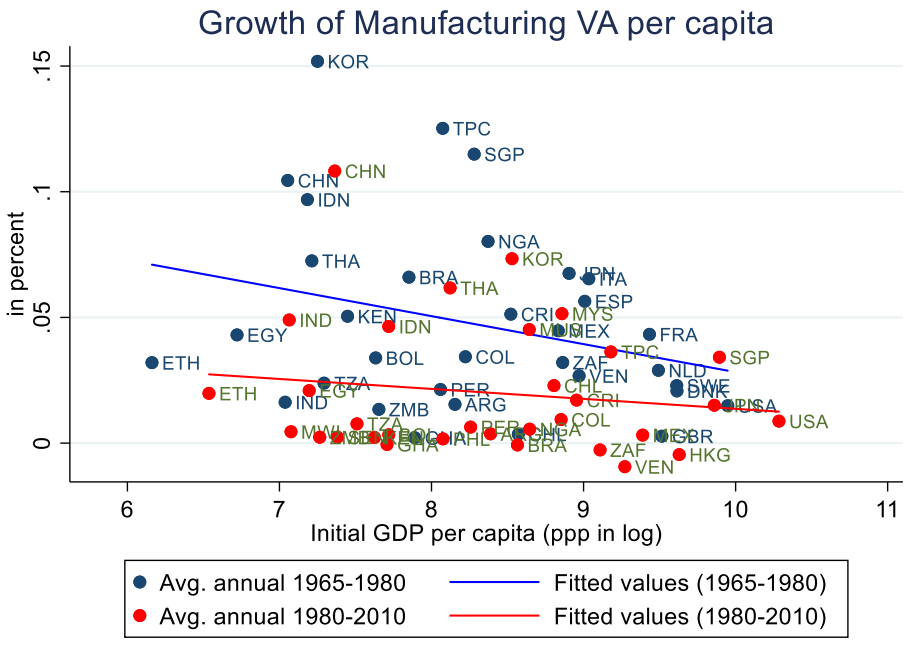
Many public enterprises created in the great wave of industrial policies of the 1960s and 1970s ended up in financial disarray, eating up huge amounts of resources. The widespread view among economists and policymakers is that industrial policy leads to inefficient enterprises, which would perpetually live on state handouts, mainly benefiting cronies. It is also usually believed that the bad financial situation of many developing economies in the 1980s and 1990s was the direct result of the resource misallocation and inefficiency resulting from these industrial policies. If this were the case, how could it be that IP was behind the spectacular success of the Asian miracles and how can one draw from it any useful lessons?

We argue that there are very few examples of "true" IP, or TIP, in the past, according to our definition. One of the pillars of the Asian miracles' policies was export orientation in technologically sophisticated industries. In other words, transportation such as airline companies, energy production such as power companies, telecommunication networks, or tourism do not qualify as part of TIP. Most are nontradable nonsophisticated services. Although these services are important for the functioning of the economy, they may not require a strong state intervention to be developed. That still leaves a great number of attempts in manufacturing industries such as heavy industries such as metals and cement, the automobile industry, and electronics. There are a few examples where state intervention had an explicit objective to export from the outset. Indeed, the pattern of the industrial policies of the 1960s and 1970s was to create productive capacities, mostly in heavy industries, which were mainly inward-looking, i.e., import substitution industrialization.

The first observation is that the golden age of import substitution did yield a sizable increase in manufacturing production although it did not match those of the Asian miracles. We use the Groningen Growth and Development Centre (GGDC) 10-Sector database, which provides comparable data on sectoral productivity performance for 10 broad sectors from 1950 onward for many countries.[5] Figure 1 shows the average annual growth rate of value added (VA) in manufacturing (in real terms per capita) over two different periods, i.e., 1965–1980 and 1980–2010. Over the first period, during the height of industrial policies, many developing economies achieved relatively high growth rates in manufacturing spurred by IS policies. Among the best performers, manufacturing value added per capita grew at an average annual rate of about 10 percent in Indonesia, 7 percent in Nigeria, and 6 percent in Brazil over 1965–1980. Yet, these performances were still dwarfed by that of the Asian miracles. Korea, which started at a level of income per capita comparable to that of Indonesia, saw its manufacturing VA per capita grow at an annual rate of 15 percent, while those of Taiwan Province of China and Singapore grew by around 12 percent.

[5] See Timmer et. al. (2015).

Figure 1. The Rise and Fall of IS-Led Growth



Source: GGDC 10-Sector Database (Timmer, de Vries, and de Vries 2015) and Penn World Tables 9.0.

During the later period, 1980–2010, when import substitution policies were rolled back in most developing economies, the average growth rates of manufacturing production dropped significantly, and manufacturing stagnated in many economies.[6] Meanwhile, manufacturing VA in the Asian miracles kept growing at relatively high rates, especially when controlling for initial income per capita.

We provide empirical evidence that among developing economies, very few pursued an export-oriented industrialization policy on a large scale as it was the case in the Asian miracles.[7] Inward-looking or outward-looking policies could be proxied by the strength of the short-term relationship between the growth of manufacturing value-added and the growth of manufacturing exports. By strength, we mean whether these growth rates are correlated in a significant way and how large the elasticity of exports to domestic production is. For example, if the relationship is significant and the elasticity is close to or greater than one, then one could say that such a country is export-oriented. This measure of export orientation is outcome-based, which is more relevant for performance.

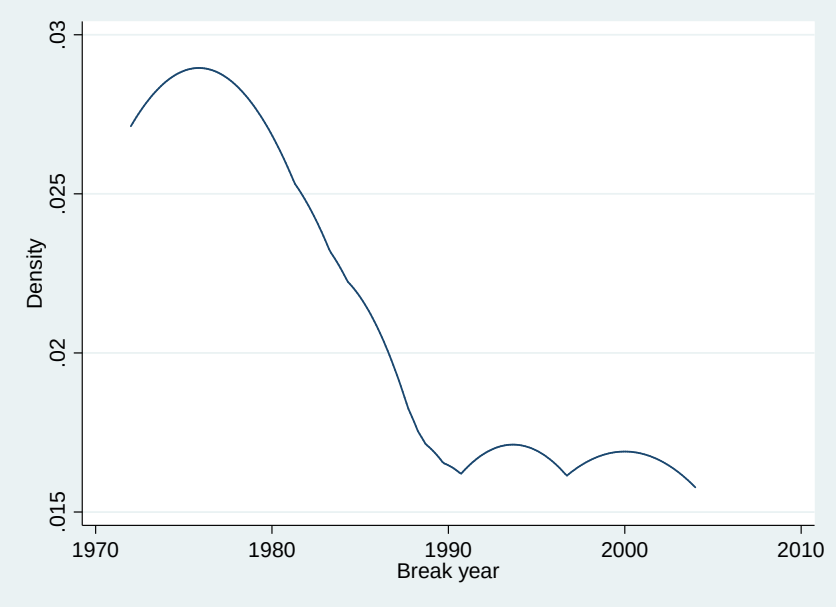
We also use a structural break test to determine whether a break in the relationship between production and exports occurred, and if so, the year of the break.[8] The kernel distribution of the break years (when the null hypothesis that there was no structural break is rejected at a 5 percent level) shows that the distribution

[6] As shown by the decline in the slope and intercept of the fitted line.
[7] In practice, countries may have mixed export orientation with little state intervention in some sectors with import substitution policies in others. This was the case in Malaysia, for example, which pursued import substitution in the automotive industry while being export-oriented in electronics, heavily relying on multinational corporations, MNCs (see Cherif and Hasanov 2019c).
[8] The regression model is (where all the variables are in real terms): Δlog (manufacturing exports) =c+αΔlog (manufacturing value added)+ε.

has a mode in the mid- to late-1970s (Figure 2). Most countries that changed their short-term export/import orientation had already done so by 1990.[9]

Studying the strength of the short-term relationship (elasticity and R-squared), the Asian miracles are clearly outliers over the 1970-1990 period. Korea, for instance, is among the very few countries with a high R-squared and an elasticity that is both significant and positive (Figure 3). Over 1990–2010, many countries would see the strength of the short-term relationship between exports and manufacturing output increase (see Appendix Figure 1).

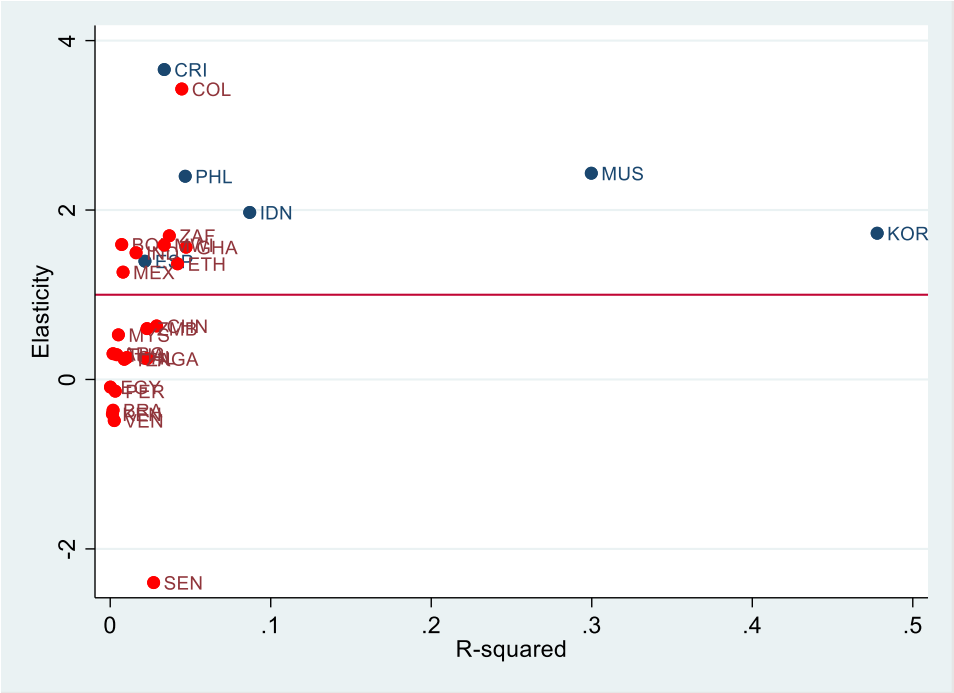
Figure 2. Kernel Distribution of Structural Break Years



Sources: GGDC and WDI.

[9] There was a substantial change in growth policy in the mid- to late-1980s (Cherif, Hasanov, and Engher 2023).

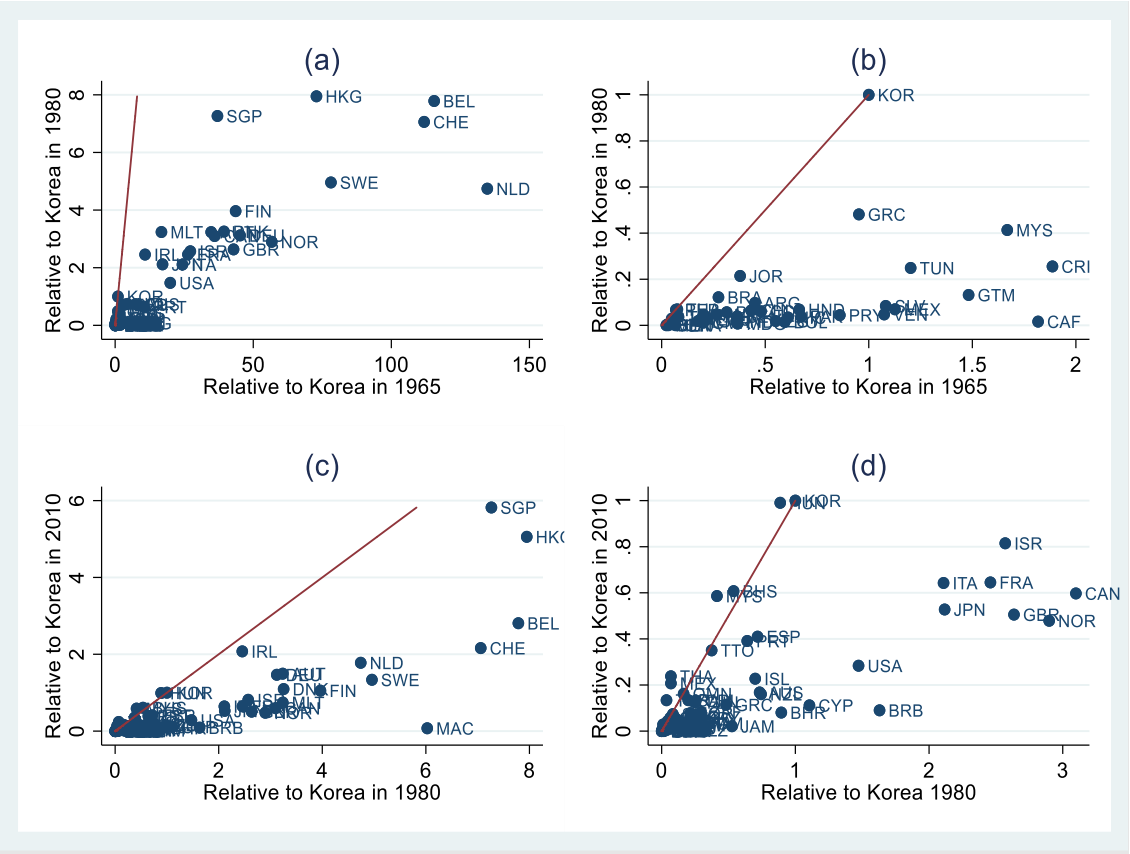
Figure 3. Short-term Relationship Between Manufacturing Exports and Output, 1970–1990



Sources: GGDC and WDI.

The difference between the Asian miracles and other developing economies is even starker in terms of export performance. Figure 4 shows the ratios of manufacturing exports per capita relative to Korea in a large set of countries (Korea is marked at 1). While most advanced economies were exporting between 25 and 150 times as much as Korea in 1965, the ratios shrank by an order of magnitude to between twice to 8 times Korea's exports per capita by 1980 (Figure 4a). Figure 4b covers the same period zooming in on countries that started at less than twice Korea's level of exports in manufacturing, encompassing most of the available developing economies in the sample. Korea stands out starkly as no country has even remotely kept pace with it in terms of manufacturing exports. At best, countries like Malaysia and Tunisia, which exported more manufactured goods per capita than Korea in 1965, represented about 40 percent and 20 percent of Korea's exports by 1980. Figure 4c and 4d show that Korea kept catching up with advanced economies, especially those with a comparable population size, while most developing economies kept falling behind (or at best their ratios stagnated at a fraction of Korea's).

Figure 4. Export Performance (Korea vs. the World)



Source: WDI.

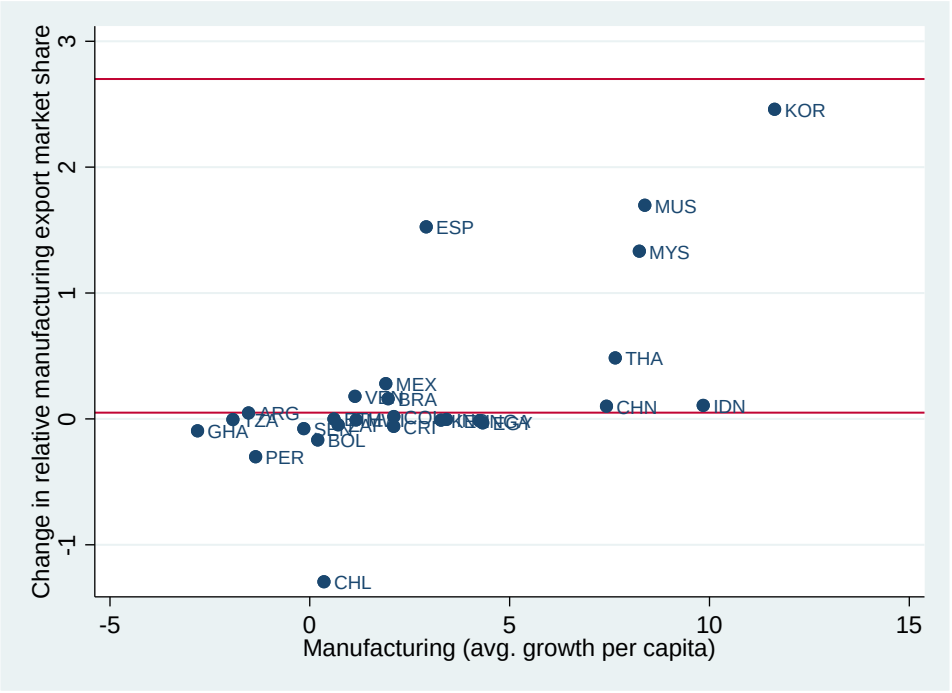
Although most developing economies had tried some sort of industrial policy in the 1960s–1980s, there are very few countries that had achieved sustained growth in their production of manufacturing, especially beyond the 1980s and had a clear export orientation view that was comparable to Korea's (and to that of other Asian miracles). In fact, our conjecture is that it is precisely because of its export orientation that Korea managed to sustain its growth in manufacturing output. In addition, Cherif, Hasanov, and Wang (2018), using cross-country growth regressions and neighbor-country instruments, find that export sophistication measures such as EXPY (Hausmann, Hwang, and Rodrik 2007), a manufacturing exports share, and manufacturing exports per capita, are all robust determinants of long-run growth.

To illustrate the importance of export orientation, we measure the level of "manufacturing export intensity" (MEI) of a country by its market share in world manufacturing export (that is, a country's exports of manufacturing divided by the world's total exports of manufacturing) normalized by its share in the world population. For example, in 2010, Switzerland's weight in the world population was about 0.11 percent and its manufacturing export market share was 1.7 percent, producing the level of manufacturing export intensity of about 150 percent, which was 250 times greater than India's (India represented close to 18 percent of the world population at the time). In contrast to the growth rate of exports of manufacturing, which can be misleading if, for example, a big country in terms of population starts exporting with almost no initial manufacturing base, a sizable change in this measure captures adequately whether a country is making a

serious foray into the world markets in relation to its population size over longer periods. The differences between low and middle-income countries and high-income countries, according to this variable, are stark. In 1970, the median manufacturing export intensity in low and middle-income economies was 5 percent compared to 270 percent in high-income economies. In 2014, it was 8 percent in low and middle-income economies and 370 percent in high-income economies. The gap between poor and rich countries in terms of manufacturing intensity was immense, and it has widened further.

Figure 5 shows the average growth of manufacturing value added per capita (in real terms) in relation to the change in manufacturing export intensity over 1970–1990 in a sample of developing economies (as of the 1970s).[10] As noted above, these countries started at a very low level of manufacturing export intensity (with a median close to 0.05), and most have not increased it much over the period. Countries such as Korea, and to less extent Malaysia and Thailand, managed to simultaneously grow fast both in terms of manufacturing output and manufacturing export intensity. In fact, by 1990, Korea jumped close to the initial level of export intensity of the median high-income country. Countries such as China and Indonesia achieved particularly high growth rates in manufacturing output (7–10 percent on average in per capita terms) without changing much their manufacturing export intensity. This provides compelling evidence of import substitution policies that were still largely in place until the late 1980s.

Figure 5. Manufacturing Export Market Share Change, 1970–1990



Sources: GGDC and WDI.

[10] The data are taken from Timmer, de Vries, and de Vries (2015). Appendix Figure 2 uses U.N. statistics data and covers more countries, but the overall picture is similar.

Other countries known for their import substitution policies in the 1970s and 1980s, such as Egypt, Nigeria, and India, follow the same pattern of relatively high growth of manufacturing output and a negative change in their manufacturing export intensity. The rest of the countries had both small growth rates in manufacturing output and small or negative changes in manufacturing export intensity. Chile is a clear outlier as its laissez-faire policy led to an anemic growth in manufacturing output and a collapse in its manufacturing export intensity. In other words, besides Korea and a few other countries, developing economies did not pursue simultaneously a rapid industrialization and an export-oriented policy.

C. The Mid-20th Century Import Substitution Policies in India: The State as a Micromanager

Although important, economies of scale are not necessarily the only reason behind the failure of IS policies. The lack of export orientation leads to a lack of productivity improvements, innovation, and dynamism while IS policies are usually accompanied by distortions and perverse incentives. India, with its large market, which controls for the lack of economies of scale in the failure of IS policies, represents a good case to understand the industrial policy failures in the past.[11]

India led a particularly ambitious import substitution policy in the wake of its independence in 1947 and until the late 1970s. Its objective was to produce domestically a high proportion of its consumption of most manufactured goods. By 1970, this goal was achieved to a considerable extent (Krueger 1975 and Ranawat and Tiwari 2009). Meanwhile, despite its huge domestic market and relative fast growth in manufacturing output, during this period, India suffered regularly from hard currency shortages and its growth rate in per capita terms was nonetheless anemic. It is worth studying the policy tools and incentives and disincentives put in place at the time and how they distorted economic decisions.

The import substitution goal was achieved through an intricate web of rules and regulations at the center of which was the licensing system. Domestic producers were completely shielded from international competition through restrictions on imports and sometimes import bans. Moreover, domestic firms enjoyed extensive monopoly rents as domestic competition was heavily curtailed (Monaco 2014).[12] In parallel, cumbersome regulations were a constant burden on firms. To be able to produce a certain good (finished or intermediate), an industrialist needed to apply for several licenses including a capacity license allowing to produce a specific good and setting total capacity and yearly production[13] as well as the number of shifts (and sometimes at the level of specific models in the case of the car industry). To import inputs and machinery, a separate license was needed to secure the foreign exchange needed. Even the technical support associated with some machinery purchase had to be licensed separately as "foreign collaboration" license (see Krueger 1975).

[11] India embarked on a path of economic reforms in 1991, recognizing the limitations of the earlier approach. India's liberalization of the 1990s got rid of a lot of business restrictions and increased competition, substantially increasing growth in the decades that followed. Export orientation was key to sustained growth, but the full potential of exporting has not been achieved yet by the 2020s. In contrast, the growth policies of the late 2010s-early 2020s became inward-looking, thus potentially bringing back the pitfalls of protectionism of the past (Chatterjee and Subramanian 2020a, 2020b).

[12] The first generation of industrial policy resolutions led to a situation where "the market was dominated by a few national companies producing a limited number of models" (Monaco 2014).

[13] The anecdote of a firm in the automotive industry reaching its production limit before end-year and asking its entire staff to work on building a garden, illustrates the limits of the type of state micromanagement associated with import substitution policies (Krueger 1975).

Price controls were also applied in many industries, and the delays to get licenses approved could be several years.

These policies resulted in a situation where profits depended more on the ability to secure adequate licenses than on competition through improved productivity or innovation.[14] The inability to produce continuously (as a result of power shortage, unavailable spare parts or raw materials, and other administrative hurdles to import intermediate goods) also influenced the type of technology adopted, which did not entail economies of scale and was less conducive to learning-by-doing or research and development (R&D). For example, the automotive industry in 1970 produced models produced in other countries in the early 1950s (Krueger 1975). The policies pursued were also detrimental to many firms that were prevented from integrating vertically and had to rely on inefficient and often expensive suppliers. Some indigenous materials and local machinery brands were banned from imports, leading to prices up to tenfold of the international prices.

Despite rules that forced firms to export some of their production in some industries or to generate enough exports to cover their initial investment in machinery (e.g., firms producing for more than 5 years had to export 5 percent of their output in the automotive industry), exports generated rarely exceeded the minimum requirements, which were small from the outset. Among the reasons cited, the heavy paperwork burden, the costly expansion of capacity, the difficulty to meet continuously the stringent delivery deadlines and volumes in a context of recurrent disruptions[15], and above all profit margins that were too low compared to the domestic market, substantially discouraged exports.

India's import substitution policy, which is representative of the policies pursued by developing economies in the 1960s and 1970s, contradicts the key principles of TIP except for the intervention to create domestic capabilities, which it did with relative success. Krueger (1975) argues that many of the firms supported by IS policies could compete globally if they had access to raw materials and intermediate inputs, which were heavily restricted (e.g., licensing requirements). She concludes that "By that criterion, import-substitution policies have been highly successful" (Krueger 1975, p. 111).[16] However, pushing domestic firms to compete on international or domestic markets was far from a priority. On the contrary, monopoly rents on the huge domestic market ensured that firms had no serious interest in the difficult and risky export markets. More important, achieving self-sufficiency in most tradable final goods did not prevent India from suffering from hard currency shortages as it still relied on key imported inputs such as raw materials and machinery. In other words, import substitution gives an illusion of self-sufficiency while the country essentially remains vulnerable to external shocks.

D. Export Orientation, not Tariffs, is the Secret Ingredient

Export orientation has been a critical ingredient of the Asian miracles' "True" Industrial Policy. It represented a major departure from the IS policies adopted in most developing economies in the 1960s–1980s. On the surface, these two types of policies, those of the Asian miracles vs. the typical IS industrialization that

[14] For example, some firms would strategically aim at over-capacity and the associated oversized rights to intermediate goods imports, to drive out competitors.

[15] A great source of uncertainty for potential exporters was that an input could be added to the list of banned imports, provided a domestic firm justified that it could *ex ante* meet local demand. However, firms could still fail to meet the demand quantity and quality standards, costing the exporter several months of disruption while it tried to lift the import ban.

[16] In the same vein, Khan (2009) argues that protectionism allowed for the accumulation of capabilities, which were critical for the subsequent growth of the industry (in Monaco 2014).

failed in the past, were similar. Both relied on tariffs to protect their domestic markets and used subsidies to support domestic champions in selected strategic sectors (see Wade 1990, Chang 2002, and Woo 1991). However, these similarities, which are usually downplayed or simply ignored as they do not fit the standard recipe, hide fundamental differences in the approaches taken.

In the typical developing economy, tariffs and other barriers to entry were meant to limit competition in the domestic market, and in some cases, protect a public monopoly, and there was no specific incentive to export and compete in international markets. This model can still lead to increased production and improved capabilities. This is consistent with the evidence shown for the 1970s–80s. However, over time, the lack of competition would mean little investment in R&D and innovation and quasi-complete dependence on imported intermediate goods, especially critical technologies. In relatively small economies, the protected firms would have to put in place relatively small-scale production units and would not take advantage of economies of scale. In large economies such as India, IS policies would lead to sizable misallocation of factors of production and resources, where inefficient firms would perpetually survive, and efficient ones prevented from growing because of different constraints such as access to imported inputs or other restrictions (see Krueger 1975 and Hsieh and Klenow 2009 for a more recent study).

Even if protected firms were well-managed and were not captured by well-connected individuals, they would perpetually depend on being shielded from international and domestic competition and on receiving state subsidies. In this context, domestic firms would be extremely vulnerable to a combination of devaluation and the elimination of tariffs as they would see the cost of their inputs increase without an improvement in their competitiveness in the absence of exports. Although textbook economics would predict a pick-up in exports following a depreciation, in practice, firms cannot start exporting overnight. When eventually these protections and support are lifted, typically in a phase of fiscal consolidation or a currency or debt crisis, the IS industrialization model becomes suddenly unsustainable. This industrial policy is ultimately doomed to be a failed experiment.[17]

In contrast, in the case of the Asian miracles, export promotion was the main objective at the onset and tariffs were only a tool, among many, to ensure a minimum rent for domestic producers while competition was fierce both at home and abroad. The Asian miracles used a wide array of tools available,[18] including production and investment subsidies, cheap financing, including financing licenses for technology transfers, support from public research institutes, government procurement, and tax incentives, to ensure as much revenue as possible to the whole sector, but not necessarily to specific firms. They managed to get away with it in the context of the Cold War, from which they also benefited in terms of export markets, skill upgrading, and technology transfer (Hansson, Hewison, and Glassman 2020).[19] More important, firms receiving support were expected to export and were subject to strict accountability, including export quotas in Korea (see Woo 1991) or preferred credit and tariff conditions in Taiwan Province of China (see Wade 1990). Firms had to invest heavily in R&D and innovate to compete in international markets. They also had to set large production capacities, much larger than if they were limited only by the domestic market, to reap the benefits of economies of scale. An ever-increasing level of integration was sought to increase profitability and take

[17] These firms could even be profitable without subsidies as long as they can import inputs at a favorable exchange rate and sell them on a domestic market with a high markup.

[18] See Wade (1990) and Cherif and Hasanov (2019c) for an example of the wide set of policy tools used to develop new industries.

[19] Negotiating for the access to markets, upgrading, and technology transfers was deliberately pursued.

advantage of lower wages domestically, which was often the result of state intervention.[20] Exporting firms would either integrate vertically or help create a network of suppliers by sending teams of engineers to train their workers (see Wade 1990 and Chang 2002). Given enough time, and under a strict accountability framework and intense competition in foreign markets, exporting firms would become immune to lifting trade barriers and would even benefit from a devaluation as their primary market was outside the home country. The focus on and the objective of export orientation differentiated East Asian firms from those in other regions (e.g., Latin America and the Middle East). Although there were overlaps in the tools used, the outcomes were different because export orientation (or export discipline in the words of Joe Studwell) acted as an organizing framework for all state policies and the extent of support (especially exchange rate policy) with clear market signals as feedback.[21]

The state gave strong incentives to export in specific sectors and provided support, but ultimately private firms were in the lead, including in innovation, international partnerships, and marketing of their products. The Asian miracles embarked on developing their electronics sectors in the 1970s, and a comparison of their experiences shows strong commonalities (Cherif, Hasanov, and Xie 2021). The public sector set the goal of leapfrogging into the technological frontier and creating internationally competitive privately owned national champions. While a lot of support was given, the firms were ensured sufficient autonomy to shield them from undue interference or abrupt policy changes. The support was given conditionally on clear market signals from export markets. Over the years, the firms displayed a lot of flexibility to adapt to a changing domestic and international environment as well as evolving technology, emphasizing the importance of ensuring sufficient autonomy in the state-firm relations.

Export orientation prevents policymakers from falling into the illusion of economic "independence" and tariffs are neither necessary nor sufficient to succeed at growing industries. The contrast between IS and EO industrial policies can be illustrated by the different paths followed by Korea's Hyundai and Malaysia's Proton.[22] While Hyundai became a global brand and a highly successful and innovative car maker, providing demand for a dense network of suppliers, Proton was a less integrated automaker, relying on critical imported inputs (e.g., Mitsubishi's engine) with insignificant exports and only a domestic market, which was nonetheless challenged by foreign automakers despite tariffs and subsidies for Proton.

In both Korea and Malaysia, strong state intervention led to the creation of new capabilities in the 1970s in the automotive industry. A mix of subsidies, tariffs to protect the domestic market as well as joint-ventures and licensing agreements with the Japanese and U.S. automakers helped establish the first car makers in both countries. However, there were key differences in terms of policies followed.

Proton never experienced the kind of strong push for exports and competition that Hyundai faced in Korea. The Korean conglomerate targeted aggressively foreign markets since the beginning, following a strategy described as "move first, then learn and adjust". One of the first Hyundai's factories built in the mid-80s had an annual capacity of 300,000, surpassing the country's total annual domestic demand of 250,000, and was solely dedicated to the U.S. market. It also built early on its own network of car dealerships and advertisement

[20] See Wade (1990) for the case of Taiwan Province of China.
[21] Many observers assign a lot of weight to the Cold War context to explain, for example, the facilitation of technology transfers to Japan and Korea. However, we argue that many other countries were in a similar position but decided to negotiate political support instead of technology transfer because export orientation was not their priority.
[22] See Cherif and Hasanov (2019c) for more details and references.

in the U.S. In contrast, Proton remained inward oriented with a modest production capacity compared to global players. When Proton was trying to export to the U.S. market, it relied on local dealerships and could not build a strong brand. It is reported that dealers would use the cheap Proton cars as a bait and try to sell aggressively other more expensive brands.[23] In terms of local content, Proton relied on a license from Mitsubishi to produce its engine while Hyundai leapfrogged technologically in the 1980s and managed to design and produce its own engine. Finally, Hyundai is one of the few survivors from several domestic competitors, other Korean chaebols that attempted to become global automotive players.

We argue that what matters is export orientation in a broad sense. This includes Vertical Specialization Industrialization (VSI), focused on exporting intermediate goods and linkages with Global Value Chains (GVCs) and regional networks, and a more traditional export orientation focused on final goods in advanced markets. The rise of Global Value Chains (GVCs) has opened new opportunities for developing countries to specialize in selected niches of value chains, often involving assembly and/or low value-added tasks (Milberg et al. 2014). The new model of industrialization could involve upgrading within existing value chains or shifting toward related and more technologically advanced ones (Humphrey and Schmitz 2002). In contrast, Korea and Japan before it relied on developing final products and marketing them directly to consumers in advanced markets. This was done mostly by conglomerates as opposed to relatively smaller firms in the VSI context.[24] This was the case in the industries that became later their main exports (e.g., automotive and electronics), but not necessarily in light manufacturing such as textiles in the early stages of their development (Hauge 2020). In both cases, VSI and more traditional export-oriented industrial policy, the domestic market is not the primary target of firms (and policies), and firms have to face both domestic and international competition. More important, in both cases, policies restricting the imports of intermediate goods would be detrimental to domestic firms. As argued by Milberg eat al. (2014), the exact formulation of an industrial policy in a world of vertical specialization could differ from the one followed by the Asian miracles. The goal of state support could be to help domestic firms enter a wider section of GVCs, through lead firms, or target regional markets instead of advanced ones. However, the principles of "true" industrial policy remain the same, that is, the need for state intervention to encourage technological upgrading, continuously acquiring new capabilities while encouraging competition on the global stage, including in the VSI approach (Hauge 2020).

E. The Limits of Laissez-Faire

The pursuit of unfettered free market policies, similar to that of ISI, could produce an undesirable outcome. Perhaps the best description of "pure" free market policies is embodied in the "Washington Consensus" policies of liberalization, privatization, and structural reforms, which were widely adopted in the developing world in the mid-1980s-1990s (Cherif, Engher, and Hasanov 2023). Yet the average growth rate (per capita) of developing countries in the 1980s-1990s was much lower than that in the 1960s-1970s, and many countries diverged (Johnson and Papageorgiou 2020). Interestingly, the East Asian average growth rate remained at 3-4 percent throughout the decades while in Latin America, Middle East, and Sub-Saharan Africa, it was negative in the 1980s (and stayed negative in Africa in the 1990s). The policy switch from import substitution toward laissez faire did not tackle market failures in sophisticated products as market forces

[23] This asymmetry in incentives for car dealerships could explain why Tesla, which relies on its own network, has been more successful than other firms in selling fully electric cars (see de Rubens et. al. 2018).

[24] The development of Taiwan Province of China is more akin to a VSI approach as it specialized in producing intermediate goods (e.g., microchips) and integrating into the GVCs of multinationals of consumer electronics (Cherif and Hasanov 2019c).

steered the resources toward mostly commodities, low-skilled, and nontradable sectors, resulting in low or stagnant productivity growth (Cherif and Hasanov 2019b, Cherif and Hasanov 2024).

In contrast to most developing economies at the time, Chile, as an illustrative case, followed a literal version of "laissez-faire" policy until the early 1980s with disappointing results. Among others, it ruled out import substitution policies (e.g., it lifted tariffs unilaterally) and avoided sectoral policies altogether, founding its strategy on the expectation that comparative advantage sectors would naturally emerge in the absence of state intervention. It provided a relatively favorable business environment, and major government failures, like heavy regulation, were addressed although political and institutional constraints remained. As shown in Figure 5, this strategy made Chile an outlier in terms of the change in export market share. Over 1970–90, it witnessed a sizable loss in terms of market share in manufacturing exports although it started from a relatively high position compared to other developing economies. For example, in 1970, Chile's manufacturing export intensity was about 200 percent compared to a median of 5 percent in developing economies and much greater than Malaysia's, which was about 80 percent. In 1990, the situation was reversed where Chile's MEI was about 70 percent and Malaysia's was 210 percent. More striking, while most developing economies managed to achieve relatively high growth rates in their manufacturing output, Chile's manufacturing per capita grew at a meagre annual rate of 0.35 percent compared to more than 8 percent in Malaysia.

The 1982 crisis triggered a roll back of Chile's laissez-faire experiment when it raised its tariff on imports and re-introduced some state intervention to spur export growth, albeit through indirect tools, favoring what it considered comparative advantage sectors such as agroindustry. Over 1985–2003, the "reintegro simplificado" (simplified reintegration) program provided an export subsidy to help firms export in non-traditional sectors (Varas 2012). Later, in the 1990s and early 2000s, the Chilean Economic Development Agency (CORFO), which focused on SMEs, helped facilitate funding and technical assistance while Fundación Chile, which was based on a private-public partnership, supported the creation of start-up companies and technology transfers. After Fundación Chile helped adopt Norwegian and Japanese technology in its nascent salmon industry, the industry took off and remained its most successful project. Yet overall, Chile still pursued the free market approach to growing industries, which indirectly translated to less interventionist policies for Fundación Chile (Varas 2012). Interestingly, the main successes of Chile in non-mineral exports such as salmon and blueberries can be attributed to its state interventions by these agencies. More important, copper extraction represents the backbone of the Chilean economy since the 1980s, fueling most of its growth and more than half of its exports, and has been dominated by a State-Owned Enterprise.

Despite these successes and Chile's relatively steady real GDP growth and macroeconomic stability, its productivity growth has lagged its peers. Chile's GDP per capita relative to that of the U.S. fluctuated in the range of about 20–30 percent since the early 1960s until mid-2000s. This could be explained by its focus on natural resources and low sophistication sectors such as agroindustry in contrast to other natural resource producers such as Malaysia, Mexico, and Indonesia.[25] They have outpaced Chile by a large margin in terms of export sophistication for the past two decades. More striking, Chile's total factor productivity has stagnated since 1970 (see Cherif and Hasanov 2019c).

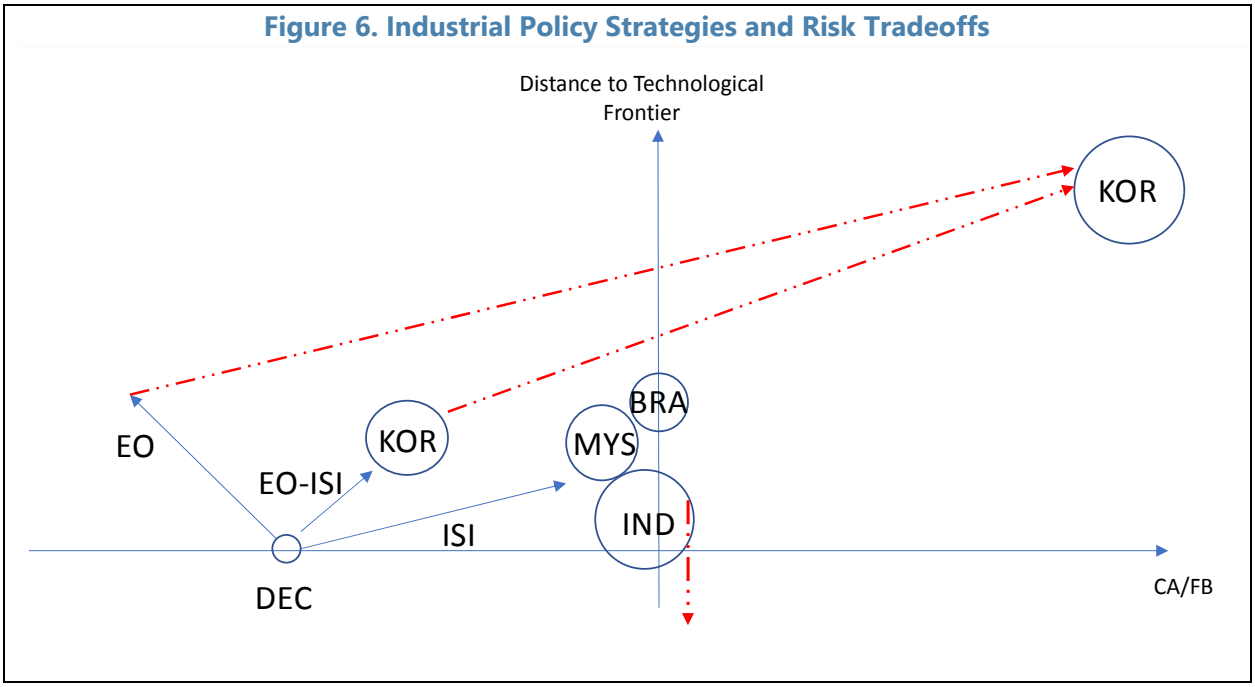
[25] Salinas (2021) argues that Chile's horizontal policies (e.g., education, infrastructure, and regulatory environment) resulted in higher complexity of its non-mineral exports. However, non-mineral complex exports are a very small fraction of the country's overall export basket.

F. Risk Tradeoffs in Industrial Policy Strategies

In this section, we draw a sketch of the tradeoffs of risks associated with different industrial policy strategies based on the experiences described above. The main considerations for the development of a new industry are the distance to the technological frontier of local production; the level of domestic ownership; and the macroeconomic costs in terms of the current account deficit and potentially fiscal deficits (Figure 6). We focus on the trade balance in the sector of interest and illustrate the key issues using the case of the automotive industry in a typical mid-size developing economy (labeled DEC).[26] Assume that initially this economy imports all its cars, leading to a sizable current account deficit given that there is no local production or exports. The distance to the frontier is maximal and local ownership is inexistent (beyond local dealerships usually extracting large rents because of a monopolistic position).

The country (DEC) decides to follow a more activist policy and is faced with a choice among three broad types of strategies: (1) Import Substitution Industrialization (ISI); (2) a mix of ISI and Export Orientation (ISI-EO); or (3) pure Export-Oriented (EO) IP. We discuss the potential risks of each strategy type.

Figure 6. Industrial Policy Strategies and Risk Tradeoffs



Import Substitution Industrialization: Hidden Risks of Unsustainability

The ISI strategy relies on the belief that by closing the domestic market to foreign competition, the sector would become "self-sufficient." It is usually associated with a mindset of ignorance of the potential of international markets, with the idea that autarky (or radical self-sufficiency as described in Hirschman 1969) is achievable and beneficial, or with a sort of fatalism, that is, local producers could never compete on

[26] The trade balance in the automotive industry would be the difference between auto exports and imports, including finished products, intermediate inputs, equipment, and related services.

international markets. More important, policymakers believe that protectionism, justified by "infant industry" arguments, would help acquire capabilities and build a world-class industry. ISI can be done at varying degrees of local ownership and partnership with foreign firms.

We suggest three broad categories of ISI:

- The first category consists in a quasi-autarky, where local producers dominate the market, fully own the firms protected by high tariffs and other trade restrictions. This is similar to India's experience over the 1950s-1970s, as discussed above, where firms had very little contact or partnerships with foreign firms or incentives to export (Figure 6, label "IND"). Given minimal imports of inputs and no exports, the trade deficit was minor while large rents accrued to producers. However, over time, this strategy led to stagnation of the industry and a large technological divergence vis-à-vis the technological frontier as well as high costs to the consumer.

- The second broad category resembles Malaysia's strategy. While retaining full ownership domestically, it relied relatively more on extensive foreign partnerships compared to India's more "old fashioned" ISI. Proton, the major Malaysian auto manufacturer, imported its engine from Japan, the most critical input, for decades (Cherif and Hasanov 2019c). While Malaysia produced its own car with a better quality, it ran automotive trade "deficit" (Figure 6, label "MYS"). This deficit is naturally smaller than a country that does not follow any ISI strategy, importing all its cars and car parts from abroad. In addition, there is also a sizable cost to the consumer, forced to purchase cars they did not want at a relatively high price while having little choice of variety and quality.

- The third category involves FDI and extensive foreign partnerships and joint ventures. Countries can negotiate access to their protected local market in exchange for FDI to produce locally. It can also involve a forced technology transfer aimed at acquiring capabilities and jobs in exchange for a captive domestic, usually large, market. Brazil, for example, restricted car sales to only those produced locally until the late 1980s, essentially forcing MNCs to bring FDI.[27] However, the experience of Brazil and other countries that followed this strategy, shows that in most cases the local industry would produce cars at a lower quality and/or higher prices compared to the international markets (given various trade and regulatory restrictions). Although the trade deficit is minimal given local production and supply chains and low imports, the strategy most likely would not help the industry reach the technological frontier (Figure 6, label "BRA"). More important, in most countries except perhaps for a few very large economies such as India or China, this strategy would be even doomed at the onset in terms of international competitiveness. Indeed, factories serving only the local or even a regional market would not reach a sufficient scale to compete internationally. Even in China, the internal combustion engine (ICE) auto industry dominated by joint ventures, is geared toward exports and global markets.

We argue that the use of protectionism may have helped jumpstart the industry, especially during the initial "easy stages," as described by Hirschman (1969). Indeed, in the cases described above, and in most Latin American economies in the 1950s-1970s, output, employment, and investment increased substantially because of ISI. This impact was certainly growth positive, and some learning was happening. However, the

[27] Quantitative and licensing restrictions were in place since the late 1940s and were lifted in the 1990s although tariffs were used thereafter (Lima Chagas et al. 2017).

strategy was not sustainable in the long run. Learning was not occurring fast enough, and innovation was lacking to make the industry sustainable. Firms were not competitive enough as they were both protected from international competition and were typically supported by an overvalued exchange rate and state subsidies. Protectionism essentially redirected income from consumers to producers and minimized fiscal outlays, providing financing to support the industry in the early stages, but in the longer run, it created risks to learning and innovation, jeopardizing the long-run sustainability of the industry.

Each of the strategies described above entails risks to the learning and innovation process and sustainability. We describe below the main risks associated with each "variant" of ISI:

- The autarky, or radical self-sufficiency, by minimizing the links with MNCs, hinders the transfer of technologies, resulting in outdated and low-quality products, barely changing with time. Given no incentives to innovate and compete while selling to a captive market, the industry stays well below the technological frontier (Figure 6). In theory, the sector could become efficient and truly self-sufficient, if not innovative, which would support the current account as long as ISI is sustained. The welfare cost to the consumer is not small even if the trade deficit and fiscal support are minimal. However, without reaching the technological frontier, the structure of the economy would not be truly changed while productivity growth would be lacking.[28] In case of an opening of the economy, the sector would be doomed as foreign producers would gain access to the domestic market. Indeed, neither domestic consumers nor the international market participants would be interested in a vintage technology of the local producers. What happened to the car industry of the former Soviet Union is indicative of this pattern. The market share fell substantially, and the domestic industry barely survived, mainly with state handouts. Although the consumer benefitted from the trade openness, the cost to the domestic industry was substantial. Eventually, growth and inequality implications on domestic economy could be large as well. Even if this strategy seems to be successful in the short to medium run, reducing the risk of running large current account or fiscal deficit, it might not be sustainable in the long run as learning and innovation fall behind, eventually raising the risk of losing the whole industry and defeating the whole purpose of ISI in the first place.

- Reliance on MNCs in the automotive industry, whether fully as in Brazil or partially as in Malaysia, which are shielded from international competition in the domestic market, increases the risk of the appearance of an industry that is more technologically advanced than autarky but nevertheless is still relatively far from the frontier in addition to having an internationally uncompetitive cost structure (Figure 6). Studies on auto plants in Latin America during the ISI period showed that on average the cost of production was between 60 to 150 percent higher than the international norm (Baranson 1969). This happened despite the stringent local content requirement in most countries, which was "achieved" but to the detriment of cost and/or quality. The lack of competitiveness came from a combination of factors, including: (i) the difficulty of achieving economies of scale given the limited market size, often compounded by an atomistic supply;[29] (ii) resistance by MNCs and domestic firms to increase local content or exports[30] (Thorpe 1992); and (iii) in many countries, an overvalued exchange rate,

[28] In a model of imperfect competition, Garg and Saxena (2013) show that a mix of tariffs and subsidies could be optimal to achieve a large share of domestic production. Yet tariff benefits could disappear if one considers incentives to innovate and retaliation.
[29] In some countries, the average yearly production of auto producers did not exceed 6000 cars.
[30] In some cases, initial contracts with MNCs explicitly prevented exports.

specifically giving access to a preferential exchange rate for the imports of intermediate goods and equipment.

ISI is often unsustainable, sacrificing the welfare of consumers by restricting their choice and making them often pay higher prices without developing an internationally competitive industry. The stated goal is for the industry, benefitting from the state protection, to eventually learn enough to become self-sufficient or even export and innovate. While it is difficult to assess the extent of the firms learning in the absence of reliable market signals like exports, the macroeconomic costs increase over time if ISI is sustained. More important, ISI in the long run, as the practice shows, is generally unsustainable because of the lack of competitiveness and innovation. In addition, the access of firms to large rents from the captive domestic markets creates political economy risks, whereby firms would lobby the government to avoid accountability or competition, increasing macroeconomic and political costs. The protectionist environment does not bode well for aligning incentives to create a competitive, efficient, and innovative industry. The benefit of minimizing the trade or fiscal deficit may be illusory as the risk of not reaching the technological frontier, opening up the market to foreign competition, and eventually incurring higher macroeconomic costs, is relatively large. In fact, ISI is a very risky bet on success defined as sustainability of the industry, generating innovation, efficiency, and productivity gains and improving the productive structure of the economy.

Export-Oriented Mindset: Surviving the "Race to the Swift"

The strategies of the Asian Miracles such as Korea, and Japan before them, combined elements of protectionism and export orientation. While they succeeded at developing competitive firms in sophisticated industries, they managed both the macroeconomic and political economy risks. More important, they used a plethora of support measures and incentives beyond trade protection to ensure the sector was developing. For instance, in the automotive industry in Japan more than a dozen measures were in place like subsidies, cheap loans, tax incentives, government procurement, and governance support like industry committees, besides tariffs and restrictions on FDI (Atkinson et al. 1984). Moreover, there were various measures in place such as lower tariffs and procurement support on imported intermediate goods, incentives for overseas investments, and diplomacy to minimize damage from protectionism (Atkinson et al. 1984). The array of tools used suggests that protectionism was not sufficient, and it is not certain that it was necessary, and [31]although there is no counterfactual in the strategies of the Asian Miracles, we argue that the multifaceted support to firms to make them competitive and innovative on the global stage, regardless of the tools used, was the key to learning and firm growth.[32]

The focus on export orientation dwarfed any protectionist policies. Trade barriers were put in place to provide rents to domestic producers at the expense of consumers while minimizing fiscal support to firms. It was a policy choice to support firms via a captive market, higher prices, and redistribution from consumers to producers. However, as described above, these policies carry substantial risks, and export orientation minimized them. In the early stages, while far from the technological frontier, domestic industry required a lot of

[31] In the automotive industry more than a dozen measures were in place, including tariffs and restrictions on FDI (Atkinson et al. 1984).

[32] A theory of infant-industry protection with learning externalities suggests that production subsidies could be preferred to tariffs since they do not distort consumption decisions although in the presence of fiscal constraints and the need to reduce subsidies and tariffs as learning increases, quotas could be the most optimal instrument (Melitz 2005). In general, this result suggests that other measures besides tariffs or quotas could achieve the same objective of supporting the industry in its early stages.

intermediate goods to be imported, resulting in larger trade deficits, but over time, as exports started rising, the trade and fiscal deficits turned into surpluses (Figure 6, label "KOR"). Moreover, exporting and competing on the global markets improved quality and reduced costs, allowing firms to reach the technological frontier (Figure 6). The short-run tradeoff between supporting current and fiscal accounts due to ISI and running a larger deficit initially without ISI as the industry is being built becomes irrelevant in the long run as export orientation dominates the eventual outcome (Figure 6). In fact, providing incentives for domestic firms to compete at the onset internationally without a domestic captive market to fall back on makes firms to take the state support seriously and do their best. This drive to be the best that export orientation and world competition provide puts firms onto the path toward the technological frontier.

While an IS approach entails hidden risks of unsustainability in the medium to long run, an EO approach requires a much stronger coordination of policy tools and the availability of long-term financing. In the absence of protectionism, newly created firms would have to generate cash flow and become competitive much faster in a context of fierce competition at the onset. This would require the coordination of policies (including macroeconomic ones) and the swift provision of a wide set of purpose-specific public (or quasi-public) goods such as skills and specific infrastructure to jumpstart the targeted sophisticated industry (Chang 2007, Cherif and Hasanov 2019b). More important, patient private financing should be available to help firms cross the "valley of death," entailing incentives and public funding acting as a catalyst.[33] From a macroeconomic perspective, and given the specific context of the Cold War, the Asian miracles may have pursued an "optimal" IS-EO combination to mitigate the macroeconomic cost of their industrial policy, especially in terms of trade deficit. However, this strategy still required sizable support as shown in Woo (1991), and it entails its own risk of sliding back into a traditional IS strategy. All-in-all, although there are risk tradeoffs in the short run, in the long run, it is the EO component that is key to the long-run success (Figure 5).

In a globalized world, dominated by GVCs, a combination of IS and EO may be neither feasible nor desirable. During the cold war, the Asian miracles were allowed to penetrate advanced markets while protecting their own markets. Following a similar IS-EO approach would require strong incentives such as export quotas and incur high monitoring costs. Monopoly rents created by protectionism could be used by the firms protected to evade pressures to compete and innovate on global markets. Learning in the IS-EO approach may take longer as monopoly rents and less pressure to compete internationally reduce firms' incentives to become more productive and innovative. In addition, successive waves of trade liberalization since the 1990s have made such a strategy difficult to implement. As argued above, the rise of GVCs offers an alternative development strategy geared toward vertically specialized industrialization. In this context, IS is not an option as often there is no domestic market to protect. More generally, joining a global production network is inconsistent with closing one's market.

The objective of an industrial policy should be to create sustainable, innovative, and efficient industries in sophisticated products, the development of which tends to be riddled with market failures. Given the ubiquitous market failures, state intervention focused on these sophisticated industries but without rigid priors on which specific firms, technologies, or geographical markets would bring success, is necessary to achieve this

[33] See Part 3 "Finance: The Merits of a Short Leash" in Studwell (2013) for an account of the incentives to finance new export industries in the Asian miracles. See also Mazzucato (2013).

goal.[34] The key question is what type of intervention is the most effective given the risk tradeoffs at play. Measures such as tariffs and local content requirement are only means to an end, and we argue that they are not sufficient and most likely are counterproductive to achieve this goal. Indeed, achieving a competitive cost structure is a complex and dynamic process, involving many factors.

We argue that an export-oriented industrial policy, or TIP, is flexible enough to mitigate the risks in the context of the 21st century. This approach would consist in providing different types of support and incentives to firms producing locally while encouraging them to export, and without imposing local content requirements or a specific production structure or technology by decree. Tariffs or trade restrictions open the door for retaliation, which the Asian Miracles did not have to worry about in the context of the Cold War in the mid to late 20th century. For small economies this would be fatal as firms would not be able to reach sufficient economies of scale. But even for the largest economies, EO would be still necessary to mitigate the macroeconomic and political economy risks.

Several factors warrant the focus on the EO part of the strategy. First, the complexity of production is far greater than in the 1960s and 1970s when the Asian Miracles started catching up. This means that allowing firms to build relations and partnerships with the most advanced firms is critical (Cherif et al. 2023). Tariffs and restrictions would make establishing partnerships more difficult, and more important, it would change their objectives. Companies would partner to extract the greatest rent possible from the protection instead of collaborating to gain international market shares by increasing productivity or innovating. Being part of the global value chains or pursuing a VSI strategy is going to be harder as well. Second, EO policy's key advantage of reliable market signals from exports markets such as global market shares or patent issuance mitigates the risks of capture and avoids the illusion of self-sufficiency by helping different stakeholders and investors to realize when the need to restructure firms arises. Third, the incentive to export combined with the adequate support (e.g., financing) and adapted institutions—that is, where the different agencies in charge of firm support work closely with the firms without being captured—would provide the flexibility and incentives to achieve a competitive cost structure while encouraging innovation.

An export-oriented industrial policy could achieve better results at increasing local content and value added without imposing the requirement a priori. Indeed, local content requirement is another form of ISI, protecting intermediate inputs instead of finished products. However, as noted above, the historical experience of many countries, including Brazil in the automotive industry, shows that after decades of support, it did not achieve cost competitiveness at a sizable cost in terms of consumer welfare and fiscal expenditure. In contrast, in the context of an export-oriented industrial policy, incentives and support could lead to the creation of backward linkages if, and when, they make economic sense. The "import replacement" experience of Taiwan Province of China in the 1960s and 1970s, as described by Wade (1990), is illustrative of this approach. In his detailed study, Wade shows the process by which Taiwan Province of China had an ingenuous system of *de jure* and *de facto* tariffs. Its business development agency worked closely with firms to help them upgrade their production to meet the quality requirements of *exporting* MNCs. The *de jure* tariffs on inputs were prohibitive but they were waved until a domestic firm could produce the input at comparable quality and within 10 percent difference of the imported input price. While the change in tariffs was used to give an incentive to exporting

[34] Initial choices were made in terms of firms to support, but the lack of performance led to the industry's restructuring. For example, most of the chaebols in Korea had an automotive subsidiary at some point during Korea's development but were closed, restructured, or sold when they became uncompetitive with other domestic firms.

firms to switch providers rapidly, the key element of "import replacement" policy was that these providers were already competitive when the tariff was turned on to encourage the switch to the domestic providers. In contrast to the ISI in Latin America in the 1950s-1970s, this policy in Taiwan Province of China to develop local content was geared toward exporting firms. In other words, there was already a focus on export orientation, and the institutional system helped domestic firms latch onto the value chain of exports.

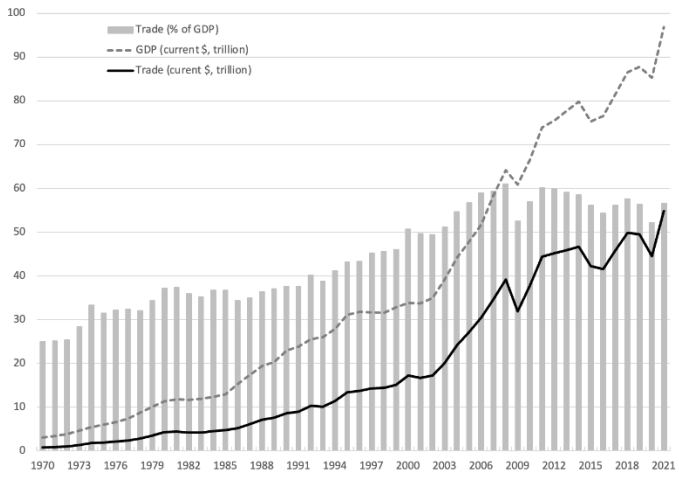
In the post-pandemic world of the early 2020s, with technological competition between the U.S. and China, national security and economic resilience concerns among the advanced economies, and the potential slide toward the fragmentation of the world trade system, is export orientation policy viable? Comparing the Cold War episode of the mid-20th century to the world of the early 2020s ("Cold War II"), Gopinath (2023) raises the question if it is any different this time. Although she warns of large costs of geoeconomic fragmentation if trade and investment flows between blocs fall substantially, barring this extreme scenario, non-aligned countries, having a larger role in the world economy now than in the past, could potentially benefit from proximity to large countries in each bloc and/or by trading with all blocs (Gopinath 2023 and Aiyar, Presbitero, and Ruta 2023). In fact, there is some trade diversion from China to Vietnam and Mexico from the late 2010s (see Gopinath 2023). However, available empirical evidence does not show huge dislocations in the world trade patterns (Canuto 2022 and Cevik 2023). Total trade (sum of exports and imports of goods and services) as a share of the world GDP declined somewhat after the 2008 financial crisis, but it has hovered around 55 percent of GDP (Figure 7). Even in the mid-20th century, at the height of the Cold War, trade has been rising, and although as a share of GDP, it cannot rise indefinitely, it has not fallen substantially from its peak of a little over 60 percent of GDP. There is also a potential in increased trade in services (around 10 percent of GDP in the past decade) while manufacturing, despite automation and a lower share in global GDP of 16 percent in 2022 than that of about 20 percent in the late 1990s,[35] continues to hold the keys to tradability, sectoral linkages, product sophistication, and productivity gains as the physical world has not yet been replaced with the virtual reality. Moreover, demographic trends and the establishment of large regional trade areas imply that new opportunities for regional trade will emerge, especially in Africa.

Although there are risks to export orientation in times of geopolitical competition, the world is more integrated than in the past, and with a much freer flow of information and ideas due to digital technologies, these gains may not be easily reversed. Although supply chain adjustments may happen, trade diversion is a more likely scenario in the short to medium run until some geographic diversification is achieved, potentially a better outcome for the world trade system (Qiu, Shin, and Zhang 2023). Moreover, many countries are still catching up with advanced economies both in terms of income and capabilities (Malaysia, Vietnam, Romania, and other emerging and developing countries), suggesting that more trade is not out of the question going forward as countries get richer. And as countries get richer, it is not only exports but also imports that grow, providing benefits for other exporting economies. Strong competition on the world stage for diversification, resilience, and development is again a better outcome promoting economic dynamism that results in high and sustained inclusive growth (Cherif, Hasanov, and Aghion 2023). Global competition does not imply a zero-sum game that assumes a fixed economic pie. On the contrary, aggregate income can grow, providing opportunities for all the economies to participate in the global production and trade, in which the scope economies are important—different brands, qualities, and varieties produced and traded for the benefit of the global consumer. For many developing countries, export orientation as a key policy objective may imply a flexible implementation of policy and potentially leverage non-alignment to pursue global markets if

[35] World Bank, World Development Indicators.

geoeconomic fragmentation worsens. Large economies, even in their pursuit of national security and resilience objectives, will benefit from less protectionism and more competition on the world market. International cooperation to set mutually beneficial rules of the game would be optimal for all.

Figure 7. World Trade, 1970–2021



Source: WDI.

G. The Chips Must Flow: Is Protectionism Back?

In the 19th century, the advanced countries of today such as the U.S., the U.K., and Germany used the state intervention—tariffs to a large extent—to steer their economies toward manufacturing industries (Chang 2002). We argue that, although protectionism played a role (Juhász 2018), it was not the only factor in their success, and drawing parallels with IS strategies in the 20th and 21st centuries could be misleading. First, although they all relied on protectionism, it was only one tool among an array of direct and indirect policy interventions. Second, these countries quickly became exporters of manufacturing goods; and finally, the distance to the technological frontier was much shorter then than it is in the 21st century. Since the distance to the frontier was relatively short, the production of manufacturing goods was achieved by relatively small firms using rudimentary technologies while backward linkages were formed at an early stage of the countries' development. Moreover, the extent of the Dutch Disease, because of the exports of commodities prevalent in these countries in the 19th century, was less acute given the shorter distance to the technological frontier (Cherif 2013).

Alexander Hamilton, the first secretary of the Treasury of the United States, proposed an industrial policy to promote manufacturing to catch up with Britain (Hamilton 1791). Chang (2002) and Cohen and De Long (2016) argue that the economic dominance of the U.S. was the result of a stream of visionary market-distorting state interventions, which started with Alexander Hamilton. Among the policies they cite,

protectionism and intervention to promote research and innovation appear to have played a prominent role to develop infant industries.

At the time of Hamilton, high tariffs were the norm among industrializing nations (Lind 2013). However, protection of nascent manufacturing industries had remained a landmark of the U.S. economic policy until the Second World War. In contrast, some economies were under the clout of unequal treaties such as Japan after the Meiji restoration (Chang 2002) while others neglected manufacturing exports altogether, relying instead on commodities. At the turn of the 20th century, when Argentina and the U.S. had similar levels of income per capita, tariffs on manufactured goods were about 45 percent in the U.S. and about 5 percent in Argentina, the highest and the lowest among the advanced countries at the time.

More important, tariffs were but one tool among a wide array of policy support such as loans and state directed research and development to acquire new technologies. This was the case in Hamilton's strategy and, although it has changed in its form, the tradition has continued to the present. One would see the same pattern in the development of Germany and Japan (Chang 2002).[36]

Protectionist policies started fading away slowly after the Second World War until they began resurging again in the aftermath of the 2008 financial crisis. By the early to mid-1980s, free trade and liberalization became the key policy priorities believed to support development and growth, which became to be known as the Washington Consensus (Cherif, Engher, and Hasanov 2023). Tariffs fell substantially, and trade barriers were largely dismantled. However, after the financial crisis of 2008 and a jobless recovery in the U.S., coupled with the loss of manufacturing jobs and stagnation of median real wages, policies to support domestic industries were being resurrected. In addition, "Made in China 2025" program China adopted in 2015 focused on high-tech industries, which advanced countries were dominating, and was in direct competition with advanced countries' industries. Lastly, the COVID-19 pandemic of 2020, which resulted in the shortage of protection equipment as well as required a fast development and huge production of vaccines, drew further attention to the revitalization of the domestic manufacturing. Resilience and good-paying jobs became as important as efficiency and profits had been since the early days of the Washington Consensus.

During the 2010s and early 2020s, a revival of interest in reconsidering the Washington Consensus policies went beyond the goal of economic development, but its rationale to support the growth of domestic industries remains the same. The major economic blocs, including the most advanced nations, announced packages of policies to control the production of advanced microchips and key technologies in renewable energy and transportation. The announced goals mostly evolved ensuring resilience, national security (e.g., microchips), and climate change mitigation and adaptation (e.g., batteries). However, at its heart, the economic justification is the same as for any other type of industrial policy for growth and development. It entails the use of government intervention to acquire new industrial capabilities in a sustainable way, which would otherwise not take place because of market failures. These are in fact market-correcting rather than

[36] To this day, there are still strong elements of industrial policy in advanced economies, albeit in a quite indirect form. Mazzucato (2013) shows that many components of the Apple iPhone, including the path-breaking touch screen technology, were originally developed thanks to government subsidies, and in particular, defense programs. O'Mara (2004) shows that the origins of Silicon Valley's rise are strongly related to the prodigious defense and space programs during the Cold War, in particular through state procurement policies. Similarly, the German development bank KfW played a major role in supporting sophisticated tools and machinery industries in Germany's reconstruction while in the recent past, undertook most of the risky investment in renewables, financing close to all the projects in renewable energy between 2007 and 2009 in the early stages of the "Energiewende" drive (Naqvi, Henow, and Chang 2018).

market-distorting (or distorting toward more efficient outcomes) interventions. These market failures stem from coordination and informational problems, lack of financing of risky enterprises, negative externalities from carbon emissions, or positive externalities such as knowledge spillovers and agglomeration effects.

The arguments we put forth above shed light on the chances of success and risks of the recent wave of announced industrial policy packages, notably in the U.S. No major economy has fallen back explicitly to the IS recipe to develop chips or renewables, but most countries have included some elements of local content requirement (LCR) and other "hard" industrial policy tools to achieve resilience, which could morph into radical self-sufficiency.[37] These policies amount to indirect restrictions on competition and trade, and as we argued above, do not necessarily strike the right balance in terms of risk tradeoffs.

As an illustration of the arguments laid out in this paper, we examine key provisions of the IRA that have attracted a lot of attention. The essence of the IRA policy package can be summarized as a long-term commitment to a subsidized financing program to build a green infrastructure while ensuring the payment of adequate wages by firms receiving support. The main tool used consists in tax credits for investment (as a sizable percentage of the initial investment) and production (e.g., $ per kWh) of clean electricity and energy storage, representing about a third of the total estimated fiscal cost (Bistline et al. 2023). The tax credits are structured such that additional amounts could be claimed if firms comply with a combination of labor, domestic content, or location requirements. While there has been lot of attention given to the local content requirement, the incentives are largely dominated by the labor requirement intended to ensure "good-paying jobs."[38] The latter represents about 2.5 and 9 times the additional incentive granted to fulfilling the local content requirements (Bistline et al. 2023). The tax credit for the purchase of EVs by households can be described as more "inward-looking" and represents a fraction of the tax credits as projected by the Congressional Budget Office and others. It is conditional on the final assembly in North America, local content requirements for the production of batteries (with restrictions increasing over time to accommodate the adjustment while including potential waivers), in North America as well, and the sourcing of minerals covering countries with trade agreements with the U.S.

The IRA differs from the ISI policies of the past in several important aspects. The object of an ISI policy is a tradable product, the demand for which already exists. Its main goal, through tariffs and other types of trade protections, is to replace imported goods with locally produced ones. In contrast, the IRA's main component, i.e., financing a green infrastructure, does not attempt at "substituting" suppliers of an existing tradable product; rather, it aims at creating the supply chain of a new non-tradable product, that is, clean power. The import content of the inputs needed to build and maintain this supply chain is capped at about 60 percent. Since a wide array of inputs are largely tradable (e.g., wind turbines and photovoltaic panels), there is a protectionist streak in the IRA to support domestic production. However, at the same time, both domestic and foreign firms, producing inputs domestically to build the infrastructure, will have new market opportunities, competing over a large range of products.[39] Moreover, eventually the world would benefit from additional production capacity lowering the costs of inputs for a green infrastructure.

[37] In the case of the IRA, despite the strong initial reaction by many observers, the Act itself contained a relatively small share of local content clauses.
[38] This entails paying "prevailing" wages during construction and repair and meeting a quota of employed apprentices. A prevailing wage is determined by the Secretary of Labor, depending on the location and other features.
[39] The 100 percent sourcing of steel to qualify for the local content bonus is, in contrast, clearly a protectionist policy, precluding competition from abroad.

The IRA's effort to build a green infrastructure follows in the footsteps of Roosevelt's successful infrastructure push during the New Deal in the 1930s, and more recently Germany's "green revolution" in the 2000s and 2010s. While the IRA relies on tax credits, the former programs used development banks such as the Reconstruction Finance Corporation and KfW, respectively. KfW extended 126 billion dollars (in 2012 prices)[40] of subsidized loans to develop renewable technologies (solar and wind). Together with other non-profit financial institutions, it accounted for most of the funding for more than a decade and a half. In 2007-09, for example, KfW financed 100 percent of Germany's investment in photovoltaics (Griffith-Jones 2018). The result was a glaring success in terms of green electrification. The share of renewables in electricity generation went from 6 percent in 2000 to more than 40 percent in 2017.

Unlike the financing schemes for green infrastructure, the EV subsidy, accelerating the transition to EVs (in support of climate change mitigation), is closer to an ISI policy, but a similar argument could be applied to this instrument as well. The object of the tax credit is a tradable product, providing incentives to produce in North America and precluding an unfettered competition with imported EVs and batteries. However, one can also argue that the incentive is creating a new demand, especially in the large market such as the U.S., and inviting both domestic firm investment and FDI. This incentive results in the creation of new opportunities to eventually export battery components and minerals to the U.S. Although reviving domestic manufacturing through LCRs could result in higher prices and/or potentially lower quality of EVs produced, subsidies should attenuate a price hike while essentially transferring some of the consumer surplus to domestic producers, reminiscent of the Korean strategy. What is important, however, is to make sure competition and innovation among domestic producers stay high and exports are encouraged, mitigating the risk of this policy. Since subsidies are temporary, it should provide an incentive for domestic producers to look further into the future and invest accordingly rather than become complacent with protectionist barriers in place. Working with the firms to help them innovate and export may determine the final success of this program.

We further argue that the structure of the investment and production tax credit for clean energy allows for both domestic and international competition but risks of protectionist measures that could reduce innovation cannot be ignored. Foreign firms are eligible to obtain the tax credits (both investment and production). Some firms may still be competitive without seeking to qualify for the domestic content bonus if the cost differential between U.S. and imported inputs (e.g., steel) is too great. There is, however, a non-negligeable risk that a combination of high demand and low competition for certain low-tech inputs, in particular steel, would substantially reduce the effort to create technology and new capabilities. Indeed, if the prices are artificially increased, with a little incentive to innovate, the local content requirement, which is expressed in terms of relative cost to the total cost (40 percent), could be attained without the domestic firm entry into the more high-tech products. If this policy is not accompanied by a set of appropriate policies to develop domestic capabilities—the key to success—it may lead to an uncompetitive cost structure, subpar technology, or both. This risk is even more present in the EV market, where one cannot rule out an outcome similar to what happened in the auto industries in Brazil or India in the past. They followed strong ISI policies to create an automotive industry with mixed results despite the large size of their respective markets as low competition and innovation and complacency became the norm.

[40] https://www.reuters.com/article/germany-energy-kfw/germanys-kfw-to-lend-100-bln-euros-for-switch-to-renewables-idUKL6E8J8DJI20120808.

In the absence of an explicit export orientation, we argue that for the IRA to maximize its long-term benefits for the U.S. economy, it will be critical to: (i) coordinate with the Science Act to ensure that industrial capabilities are developed around green technologies. The latter envisages funding for consortiums (including universities and firms) involved in applied research projects in a predetermined list of industries, several of which are related to clean energy;[41] (ii) resolve administrative, legal, and regulatory hurdles to expedite projects and implementation; (iii) improve the workings and instruments of the innovation ecosystem; and (ii) enforce antitrust regulation to guarantee the highest level of competition, especially in the *de facto* protected products.

A common key factor in the success of LCRs on local industrial development in renewable technologies such as wind turbine and solar PVs, is the existence of initial capabilities in related industries before their introduction (e.g., Hansen et al. 2020 and Scheifele et al. 2022). China, for example, managed its breakthrough in large-scale production because it already possessed advanced capabilities in electronics, which is closely related to the production of solar PVs (Pisano and Shih 2012). The fact that very few countries among those who tried LCRs, such as China and Spain, managed to create sizable export capacities in wind and solar energy components, is an indication that LCRs may not be sufficient to help industries become cost competitive and that first developing capabilities is key.

In the design of industrial policy packages like the IRA and the EU Green Deal, policies to develop local capabilities are much more important than protectionist measures. Developing capabilities and helping firms grow, export, and build innovative industries can be achieved through many other tools such as financing, training, and procurement that allow the state to monitor the progress, ensuring accountability, and keep firms focused on improving efficiency and producing innovation. In fact, the strategy of Taiwan Province of China to first develop capabilities before plugging these firms into the value chains of multinationals was successful. The technological and political economy risks of imposing local content requirements or tariffs need to be assessed against the potential short-run benefit of higher local employment, lower initial fiscal outlays, and stronger resilience. However, these risks, along with macroeconomic risks, are most likely going to increase over time, negating the short-run benefits. An alternative strategy to protectionism that develops capabilities and pushes firms to compete both domestically and internationally would increase the chances of success.

H. Conclusion

We argue in this paper that a key difference between the success of the industrial policies of the Asian miracles, or "true" industrial policies, TIP in our formulation, and the failure of the IS policies in many developing countries in the 1960s and 1970s lies in the lack of export orientation of IS-pursuing countries. The fact that the Asian miracles combined export orientation with protectionist measures is not inconsistent with our argument. Indeed, their main goal in protecting domestic markets, for example, the automotive industry in Korea or Japan, was to use all the available tools to ensure a stable source of revenues for their firms while they were conquering foreign markets. It was also a crude way to manage their current account balance in the absence of sizable endowments of natural resources. Ultimately, their priority remained to capture market shares in international markets, especially in advanced economies and in many instances, export targets were

[41] One example of a possible coordination would be for the NSF, which manages the fund, to put more weight on sectors (renewables, EVs, etc.) and locations that are relevant for the IRA incentives.

explicitly set by the state (Wade 1990, Chang 2002). This could explain why Korea's Hyundai succeeded while Malaysia's Proton failed (Cherif and Hasanov 2019c).

Many suggest that the Asian miracles succeeded because they were exceptional for a host of reasons, including the support of the Western allies during the Cold War, culture, and enlightened leaders. One way they were exceptional, which is consistent with our argument, is that they could simultaneously pursue protectionist measures and export orientation without retaliation. The same would apply to the mercantilist states of the 19th century due to unequal treaties, such as with Japan following the arrival of Admiral Perry, or China following the Opium Wars (Chang 2002). In the context of the 21st century, the vast majority of developing countries would have to pick one or the other, protectionism or export orientation, and we argue that export orientation should be the absolute priority.

IS policies could create the illusion of long-lasting success. As we have shown, IS policies can and did achieve progress in terms of growth in the production of manufacturing and the associated accumulation of new capabilities over time. However, in the absence of export orientation, these policies alone may not give the necessary incentives to speed up productivity gains and innovation as well as create a dense network of domestic competitive and productive suppliers. Instead of creating the sense of urgency imposed by export orientation, IS policies are conducive to creating the illusion of self-sufficiency, as these countries consume domestically produced goods. In reality, these industries remain dependent on the imports of critical inputs and capital goods or domestic inputs with subpar quality, and are uncompetitive and unproductive. Eventually, this dynamic creates "unsustainable" industries, unable to thrive without state support, even after decades of receiving such support. The cascade of failures in the 1980s and 1990s led to the widespread blanket condemnation of all types of industrial policies as inefficient, wasteful, and conducive to corruption. It would also be a mistake to assume that at the other extreme, pure laissez-faire policies would necessarily achieve better results. We argue that following the principles of a "true" industrial policy, or TIP, would potentially result in high sustained growth as the example of the Asian miracles illustrates. Indeed, this is a cautionary tale for many developing countries today, including many natural resource producers attempting to diversify their economies away from oil and other commodities, that going down the road of IS or pure laisse-faire policies would not necessarily produce high sustained growth.

The race for microchips and renewable technologies such as batteries in the 2010s and 2020s is bringing back the protectionist temptation, but the alternative path is preferred. We argue that, for success, a race to the top is possible, bringing technology costs down and benefiting all countries. The energy transition requires substantial investment and innovation, and as discussed above, the economic pie is not fixed and must grow. The emphasis of each country should be on using the full spectrum of "soft" industrial policy tools, including the type of institutions exhibiting "embedded autonomy" (Evans 1995), and relying on market signals such as exports to enforce accountability and competition. All countries can and should attempt to export without stifling the international competition, and many should enter the race for chips and renewable technologies or their value chains. Both domestic and international competition is key to provide opportunities for all firms while international cooperation on the rules of the game would benefit all countries. In particular, developing countries could benefit substantially from technology transfers, especially to support green transition.

The pursuit of industrial policy on a global level is not a zero-sum game. European countries did not become poorer because the U.S. developed its industry in the 19th century, and Western countries did not become poorer because Japan and Korea developed in the 20th century. Most of the global trade takes place

among industrialized nations and most of this trade happens intra-industry. This is a reason to assume that there is scope for large volumes of international trade in microchips and batteries thanks to an ever-increasing differentiation and more complex value chains.[42]

[42] Chips will be a key component in the energy transition as they enter in the production of EVs and renewables, among others.

References

Aiyar, Shekhar, Andrea Presbitero, and Michele Ruta. 2023b. *Geoeconomic Fragmentation: The Economic Risks From a Fractured World Economy*. CEPR Press.

Amsden, Alice H. 2004. *The Rise of "The Rest": Challenges to the West from Late-Industrializing Economies*. Oxford University Press.

Atkinson, Thomas, Suzan Ezrati, and James Flynn. 1984. "The Experience of the Automotive Industry in Industrial Policies of Selected Governments." *Michigan Journal of International Law* 6(1): 265–301.

Baranson. J. 1969. "Automotive Industries in Developing Countries." International Bank for Reconstruction and Development. World Bank Staff Occasional Papers, number 8. Baltimore, Maryland, The Johns Hopkins Press, XIII p. 106, Recherches économiques de Louvain.

Bistline, John, Neil Mehrotra, and Catherine Wolfram. 2023. "Economic Implications of the Climate Provisions of the Inflation Reduction Act." NBER Working Papers 31267, National Bureau of Economic Research, Inc.

Canuto, Otaviano. 2022. "Slowbalization, Newbalization, Not Deglobalization." Policy Center for the New South, June 1.

Cevik, Serhan. 2023. "Long Live Globalization: Geopolitical Shocks and International Trade." IMF Working Paper 23/225.

Chang, Ha-Joon. 2002. *Kicking Away the Ladder: Development Strategy in Historical Perspective*. London: Anthem Press.

Chang, Ha-Joon. 2007. "State-Owned Enterprise Reform." Policy Notes, United Nations, Department of Economics and Social Affairs.

Chatterjee, Shoumitro and Arvind Subramanian. 2020a. "India's Export-Led Growth: Exemplar and Exception." Ashoka Center for Economic Policy Working Paper No. 01, October 5.
Available: https://ssrn.com/abstract=3713234.

Chatterjee, Shoumitro and Arvind Subramanian. 2020b. "India's Inward (Re)Turn: Is it Warranted? Will it Work?" Ashoka Center for Economic Policy, Policy Paper No. 01, October 16.
Available: https://ssrn.com/abstract=3713253.

Cherif, Reda. 2013. "The Dutch Disease and the Technological Gap." *Journal of Development Economics* 101(C): 248–255.

Cherif, Reda, Fuad Hasanov, and Lichen Wang. 2018. "Sharp Instrument: A Stab at Identifying the Causes of Economic Growth." IMF Working Paper WP/18/117.

Cherif, Reda and Fuad Hasanov. 2019a. "Return of the Policy That Shall Not Be Named: Principles of Industrial Policy." IMF Working Paper 19/74.

Cherif, Reda and Fuad Hasanov. 2019b. "Principles of True Industrial Policy." *Journal of Globalization and Development* 10(1), June: 1–22.

Cherif, Reda and Fuad Hasanov. 2019c. "The Leap of the Tiger: Escaping the Middle-income Trap to the Technological Frontier." *Global Policy* 10(4), November: 497–511.

Cherif, Reda, Fuad Hasanov, and Gary Xie. 2021. "The Making of East Asia's Electronics Champions." *Journal of World Economy* 59. Available: https://doi.org/10.33776/rem.v0i59.5181

Cherif, Reda, Marc Engher, and Fuad Hasanov. 2023. "Crouching Beliefs, Hidden Biases: The Rise and Fall of Growth Narratives." *World Development*, forthcoming.

Cherif, Reda, Fuad Hasanov, and Philippe Aghion. 2023. "Fair and Inclusive Markets: Why Dynamism Matters." *Global Policy*, forthcoming.

Cherif, Reda and Fuad Hasanov. 2024. "When Tolstoy Meets Leontief: Luck, Policies, and Learning from Miracles." *Structural Change and Economic Dynamics* 68, March: 86–97.

Cherif, Reda, Christoph Grimpe, Fuad Hasanov, and Wolfgang Sofka. 2023. "Promoting Innovation: The Differential Impact of R&D Subsidies." *Journal of Industry, Competition and Trade* 23(3/4): 187-241.

Cohen, Stephen and Bradford DeLong. 2016. *Concrete Economics: The Hamilton Approach to Economic Growth and Policy*. Harvard Business Review Press.

De Rubens, G. Z., L. Noel, and B. K. Savacool. 2018. "Dismissive and Deceptive Car Dealerships Create Barriers to Electric Vehicle Adoption at the Point of Sale," *Nature Energy* 3: 501–07.

Evans, Peter. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.

Franco-German Council of Economic Experts. 2023. "The Inflation Reduction Act: How Should the EU React?" Joint Statement, September. Available: https://www.sachverstaendigenrat-wirtschaft.de/fileadmin/dateiablage/Publikationen/FGCEE/CAE-SVG_Joint_statement_IRA_2309.pdf.

Garg, Shresth and Sagar Saxena. 2023. "Industrial Policy under Imperfect Competition: Evidence from Utility-Scale Solar in India." Working paper, Harvard University.

Gopinath, Gita. 2023. "Cold War II? Preserving Economic Cooperation Amid Geoeconomic Fragmentation." Plenary speech at the 20th World Congress of the International Economic Association, Colombia, December 11. Available: https://www.imf.org/en/News/Articles/2023/12/11/sp121123-cold-war-ii-preserving-economic-cooperation-amid-geoeconomic-fragmentation.

Griffith-Jones, Stephanie. 2018. "National Development Banks and Sustainable Infrastructure: the case of KfW." In *The Future of National Development Banks*. Stephany Griffith-Jones (ed.), José Antonio Ocampo (ed.). Oxford University Press.

Hamilton, Alexander. 1791. *Report on the Subject of Manufactures*. Presented to Congress on December 5.

Hansson, Eva, Kewon Hewison, and Jim Glassman. 2020. "Legacies of the Cold War in East and Southeast Asia: An Introduction." *Journal of Contemporary Asia* 50(4): 493–510.

Hauge, Jostein. 2020. "Industrial Policy in the Era of Global Value Chains: Towards a Developmentalist Framework Drawing on the Industrialisation Experiences of South Korea and Taiwan." *The World Economy* 43(8), August: 2070–2092.

Hausmann, Ricardo, Jason Hwang, and Dani Rodrik. 2007. "What You Export Matters." *Journal of Economic Growth* 12(1), March: 1–25.

Hirschman, Albert O. 1969. *National Power and the Structure of Foreign Trade*. University of California Press: Berkeley, California.

Humphrey, J., and H. Schmitz. 2002. "How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters?" *Regional Studies* 36(9): 1017–1027.

Hsieh, Chang-Tai and Peter Klenow. 2009. "Misallocation and Manufacturing TFP in China and India." *The Quarterly Journal of Economics* 124(4): 1403–48.

Irwin, Douglas A. 2020. "The Rise and Fall of Import Substitution," NBER Working Papers 27919, National Bureau of Economic Research, Inc.

Johnson, Paul and Chris Papageorgiou. 2020. "What Remains of Cross-Country Convergence?" *Journal of Economic Literature* 58(1), March: 129–175.

Juhász, Réka. 2018. "Temporary Protection and Technology Adoption: Evidence from the Napoleonic Blockade." *American Economic Review* 108 (11): 3339–76.

Khan M. 2009. "Learning, Technology Acquisition and Governance Challenges in Developing Countries." DFID report.

Krueger, Anne. 1975. *The Benefits and Costs of Import Substitution in India*. St. Paul, MN: University of Minnesota Press.

Lane, Nathan. 2021. "Manufacturing Revolutions: Industrial Policy and Industrialization in South Korea." CSAE Working Paper, University of Oxford.

Lima Chagas, Leonardo, Tomothy J. Sturgeon, and Justin Barnes. 2017. "Inovar auto: Evaluating Brazil's automotive industrial policy to meet the challenges of global value chains." Washington, D.C.: World Bank Group.

Lind, Michael. 2013. *Land of Promise: An Economic History of the United States*. New York, NY: HarperCollins Publishers.

Mazzucato, Mariana, 2013. *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*. New York: Public Affairs.

Melitz, Marc. 2005. "When and How Should Infant Industries Be Protected?" *Journal of International Economics* 66: 177–196.

Milberg, William, Xiao Jiang and Gary Gereffi. 2014. "Industrial Policy in the Era of Vertically Specialized Industrialization," in Irmgard Nubler, José Manuel Salazar-Xirinachs, and Richard Kozul-Wright (eds.), *Industrial Policy for Economic Development: Lessons from Country Experiences*, Geneva: ILO-UNCTAD.

Monaco, Lorenaz. 2014. "Industrial Policy and the Auto Sector in India: Developments and Challenges Ahead." L'industria, Società editrice il Mulino, issue 3: 461–488.

Naqvi, Natalya, Anne Henow, and Ha-Joon Chang. 2018. "Kicking Away the Financial Ladder: German Development Banking under Economic Globalisation." *Review of International Political Economy*.

Ocampo, Jose Antonio, Lance Taylor, and Codrina Rada. 2009. *Growth and Policy in Developing Countries: A Structuralist Approach*. New York: Columbia University Press.

O'Mara, Margaret. 2004. *Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley*. Princeton, NJ: Princeton University Press.

Pisano, Gary P. and Willy Shih. 2012. *Producing Prosperity: Why America Needs a Manufacturing Renaissance*. Boston, MA: Harvard Business Review Press.

Prebisch, R. 1950. "The Economic Development of Latin America and Its Principal Problems." United Nations Department of Economic Affairs, Economic Commission for Latin America (ECLA), New York. Available: http://archivo.cepal.org/pdfs/cdPrebisch/002.pdf

Qiu, Han, Hyun Song Shin, and Leanne Si Ying Zhang. 2023. "Mapping the Realignment of Global Value Chains." BIS Bulletin No. 78, October 3.

Ranawat, M., and R. Tiwari.2009. "Influence of Government Policies on Industry Development: The Case of India's Automotive Industry," Institute of Technology and Innovation Management, Hamburg University of Technology, Hamburg, Working Paper, 57. Available: http://www.tuhh.de/tim/downloads/arbeitspapiere/Working_Paper_57.pdf.

Rosenberg, Nathan and L.E. Birdzell. 1986. *How the West Grew Rich: The Economic Transformation of the Industrial World*. London: I.B. Tauris & Co. Ltd.

Salinas, Gonzalo. 2021. "Chile: A Role Model for Export Diversification Policies?" IMF Working Paper 21/148.

Scheifele, F., M. Bräuning, and B. Probst. 2022. "The Impact of Local Content Requirements on the Development of Export Competitiveness in Solar and Wind Technologies." *Renewable and Sustainable Energy Reviews* 168, 112831.

Studwell, Joe. 2013. *How Asia Works: Success and Failure in the World's Most Dynamic Region*. Grove Press: New York, NY.

Thorp, Rosemary. 1992. "A Reappraisal of the Origins of Import-Substituting Industrialization, 1930-1950." *Journal of Latin American Studies* 24: 181–195.

Tucker, Todd. 2019. "Industrial Policy and Planning: What It Is and How to Do It Better," Roosevelt Institute, July 30.

Timmer, M. P., G. J. de Vries, and K. de Vries. 2015. "Patterns of Structural Change in Developing Countries." In J. Weiss and M. Tribe (Eds.), *Routledge Handbook of Industry and Development*, Routledge: 65–83.

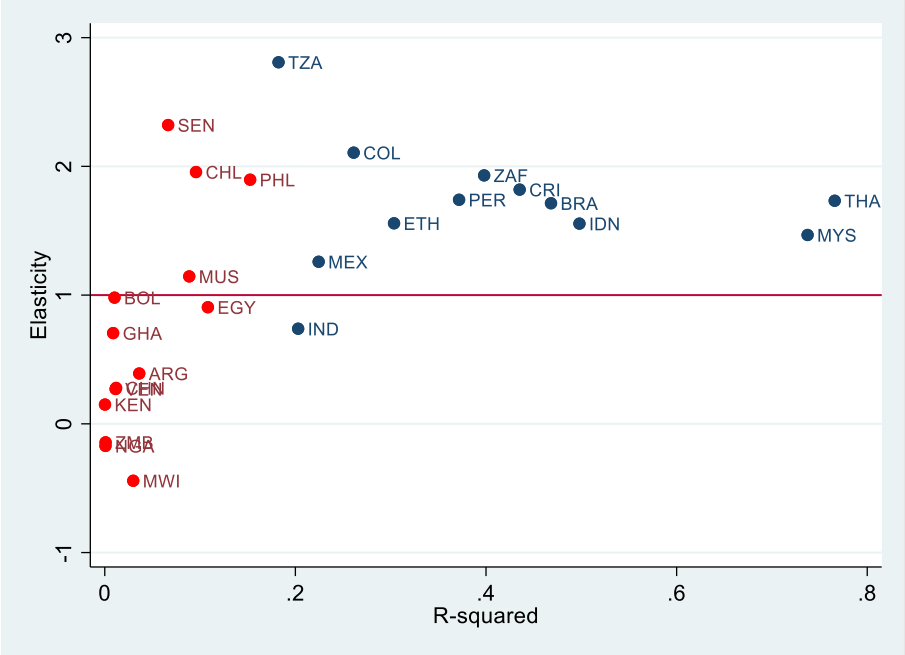
Varas, Maria Elena. 2012. "Economic Diversification: The Case of Chile," Revenue Watch Institute.

Wade, Robert. 1990. *Governing the Market*. Princeton, NJ: Princeton University Press.

Woo, Meredith. 1991. *Race to the Swift: State and Finance in Korean Industrialization*. New York: Columbia University Press.

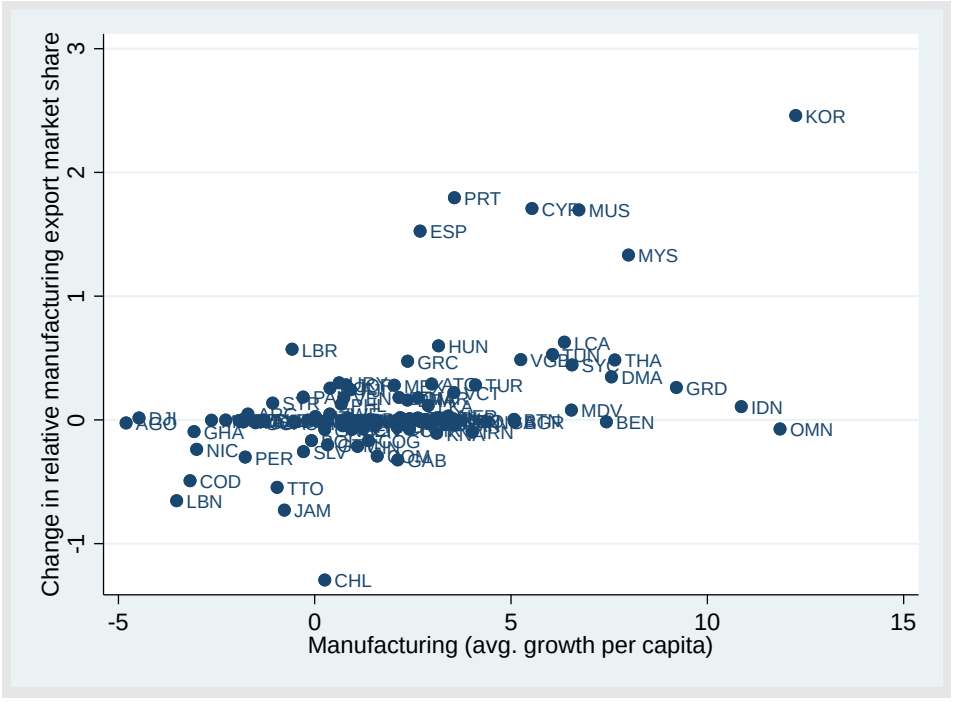
Appendix Figures

Figure 1: Short-term Relationship Between Manufacturing Exports and Output, 1990–2010



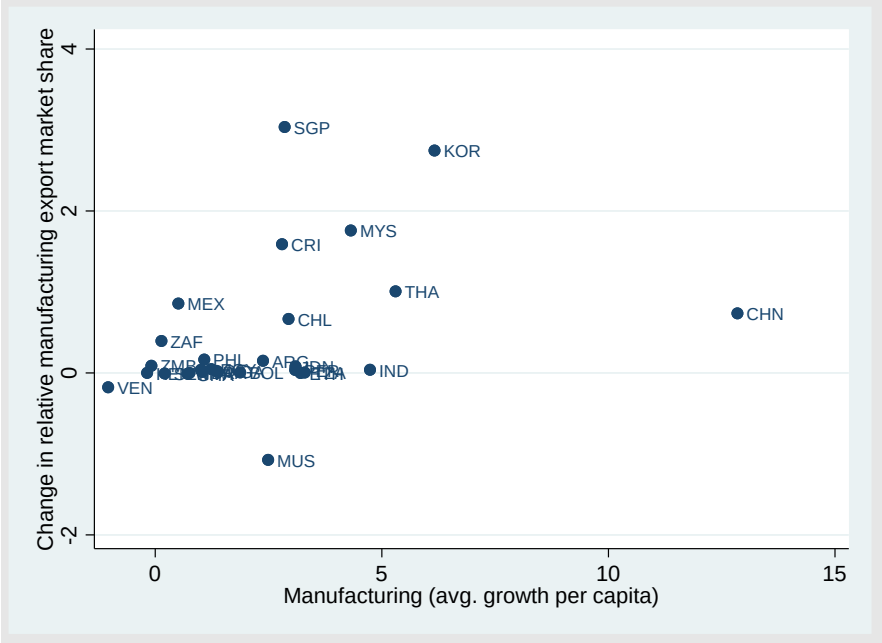
Source: GGDC and WDI.

Figure 2. Manufacturing Export Market Share Change, 1970–1990



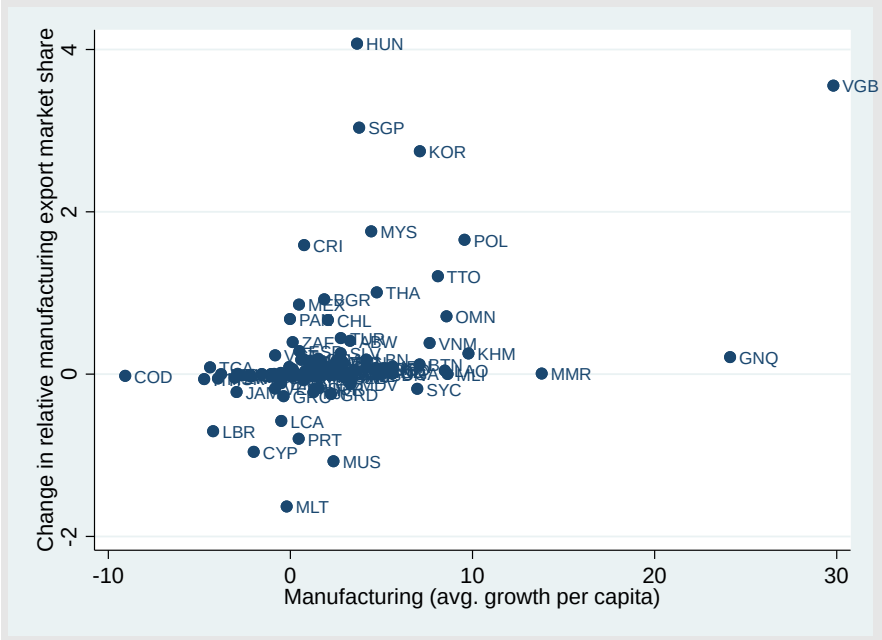
Source: UN and WDI.

Figure 3. Manufacturing Export Market Share Change, 1990–2010



Source: GGDC and WDI.

Figure 4. Manufacturing Export Market Share Change, 1990–2010



Source: UN and WDI.

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