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Industrialisation and Deindustrialisation, 1995–2019: Production Structures, Global Value Chains and Demand Constraints

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Abstract

The paper examines whether observed manufacturing contraction can be attributed primarily to changes in production organisation—domestic and international outsourcing—or whether increasingly binding domestic or foreign demand constraints provide a more general explanation. Using a growth-decomposition framework applied to production functions and output-use data from Inter-Country Input-Output tables, we document how supply- and demand-side forces have shaped the evolution of manufacturing shares over 1995–2019, then identify countries at risk of deindustrialisation. The approach provides a detailed yet globally consistent picture of structural change across countries and sectors. The results highlight a dual impact of outsourcing in developed economies, when domestic or international outsourcing often signals functional specialisation and efficiency gains, but may instead signal weakness. We note also the importance of global value chains (GVC) integration in developing countries, and the complementary role of the domestic value chain, as successful GVC−based industrialisation also requires developing a strong domestic supply chain,

particularly between high and medium technology industries.

Key words: industrialisation, global manufacturing, input−output analysis, tertiarization and servicification, regional integration

JEL codes: O14, L60, F14, C67, F16, O47

1. Introduction

After years of "happy globalisation" in the late 1990s, recent disruptions following the 2008−2009 global crisis have led to questioning the sustainability of deeply interconnected global production systems. The trade–and–deindustrialisation debate has notably taken place in developed countries, albeit it is also present in a number of developing countries. Discussions in both groups of countries share a common concern about the loss of manufacturing capacity, although their specific concerns differ. In developed economies, the focus is on supply-chain vulnerabilities and dependence on strategic inputs and technologies; in developing countries, it is on premature deindustrialisation and the middle-income trap. In both groups of countries, the social implications of deindustrialisation are a common worry.

Our contribution to the debate empirically investigates the evolution of manufacturing sectors in developed and developing economies over the 1995–2019 period through the lens of changes in their sectorial production functions. Data on the use and origin of intermediate inputs provide information on the evolution of business models for each industry and their insertion in global value chains (GVC). It reveals the extent of domestic and international outsourcing and provides invaluable information on the evolution of international trade in intermediate and final goods and services.

When analysing deindustrialisation in high and upper-middle income countries, we weight the influence of the statistical reclassification of manufacturing activities to business services due to domestic outsourcing, the effect of production relocation due to international outsourcing and the increasing demand constraints on the domestic and the export markets. While outsourcing motivated the investigation, the empirical analysis progressively relegates it to an ambiguous role while the role of the demand constraints on domestic and international markets became more prominent. Specifically, three complementary mechanisms guide our analysis.

- **Domestic outsourcing** — the subcontracting of manufacture–related functions to specialised service providers — may reduce measured manufacturing employment without reducing national value−added.

- **International outsourcing** — the fragmentation of production between different countries and the off−shoring of tasks — can indisputably shift value−added and employment abroad.

- **Effective demand** — the capacity of domestic and foreign markets to absorb industrial output — can limit industrialisation even when supply conditions are favourable.

The article builds on two publicly available background studies (Escaith, 2026a, 2026b), which provide the detailed data, indicators, and statistical analyses synthesised here. It is structured as follows. After this introduction, we review some of the relevant literature and introduce our empirical approach. The measuring framework builds on a growth-decomposition exercise based on international input-output data from 1995-2019. The paper shows that the 1995-2019 period should be split in two very different sub-periods: One of "hyper-globalisation" up to the global financial crisis of 2008-2009 and a "new normal" afterwards. The post-crisis downturn did not affect all countries uniformly, and the developed-developing countries dichotomy did not by itself determine industrial performance.

Beyond the changes in production structure, the paper investigates the interaction between effective demand and industrial performance. The analysis builds on these results to identify on a case–by–case basis industries at risk of deindustrialisation over the 1995–2019 period.

2. Global Value Chains, Industrialisation and Deindustrialisation

2.1 Literature Review

We will focus on three main strands of the literature: (i) Structural transformation and premature deindustrialisation; (ii) GVCs, outsourcing and "servicification"; and (iii) demand-side explanations. A more extensive review is available in Escaith (2026a).

- Structural transformations

In the standard three-sector approach to long–term development (Lewis, 1954 and Kaldor, 1966), labour gradually moves from agriculture into manufacturing and eventually into services. This shift is mostly about productivity differences and the way demand evolves as incomes rise. In closed economies, the process unfolds slowly, so countries follow their own path more or less independently. The process accelerates when economies are open to trade, especially when trade costs are greatly reduced, as was the case after 1995.

Aleman–Castilla (2020) presents a comprehensive review of the more recent theoretical literature on trade, industrialisation and labour market outcomes. He points out that most analytical and empirical frameworks available to date have focused mainly on the effects of trade on wages, employment, skill bias, informality and gender discrimination.

Wood (1994) and Feenstra & Hanson (1996) emphasise that trade with developing countries, particularly in East Asia, has put pressure on manufacturing sectors in advanced economies by shifting production to lower−cost regions. While the catching–up process was expected to benefit developing countries, these benefits were unevenly distributed. Rodrik (2016) points out that deindustrialisation is not confined to advanced economies; developing

countries are also experiencing premature deindustrialisation at lower income levels than historically observed.

More generally, Herrendorf, Rogerson & Valentinyi (2013) review historical evidences over the 19th and 20th centuries. They confirm the generally accepted stylised facts concerning the structural transformation of agriculture, industry and services. Increases in GDP per capita have been associated with decreases in both the employment share and the nominal value−added share in agriculture, and increases in both the employment share and the nominal value−added share in services. Manufacturing evolution has followed an inverted U curve "à la Kuznets". Employment and nominal value−added shares in GDP are increasing for lower levels of development and decreasing for higher levels of development. Escaith (2026a) shows that this pattern is also present in many developing countries, albeit with specificities proper to countries and industries.

Felipe, Mehta & Rhee (2019) indicate that many developing countries now hit their manufacturing peak at lower income levels than before — the "premature industrialisation" idea. Their earlier work (2016) also points out that while individual countries may deindustrialise, the world as a whole hasn't: manufacturing jobs have simply moved from high-productivity, high-wage economies to lower-productivity ones. This spreading-out of industrial activity makes it harder for most single countries to maintain a large manufacturing base.

- Global Value Chains and outsourcing

For Grossman & Rossi−Hansberg (2006), the rise of offshoring within GVCs is reformulating the way we understand comparative advantages in international trade. Likewise, Shiozawa (2018) departs from the standard approach to international trade and highlights the central role of firms and business decisions in explaining specialisation patterns. He stresses the importance of labour costs and trade in intermediate inputs in shaping international competition among firms.

The outsourcing of manufacturing tasks is often inspired by Porter's (1985) approach to creating value and illustrated by the "Smile Curve" introduced by Stan Shih in the early 1990s. The curve shows that for a typical final good, manufacturing is at the bottom of the value–added curve. Indeed, some manufacturers (producing heavy machinery or aircraft engines, for example) make a large part of their business selling after–sales services to their clients. From this perspective, the "servicification" of manufacturing is often seen as a strategy for value up–grading (Low, 2013).

Focusing on the productivity aspects, Timmer (2017) argues that increasing fragmentation of production processes in GVCs creates new challenges for the analysts. Approaches focusing on single industries or countries should be revisited to incorporate the set of distinct activities in distinct locations, which contribute to the final output and altogether form the GVC.

After years of "happy globalisation", recent disruptions following the global crisis of 2008−2009 have led to questioning the sustainability of deeply interconnected global production systems. The perception of higher supply–chain disruption risks challenged some of the axioms of geographically–fragmented business models. Using international input–output tables, Gao, Hewings & Yang (2022) show that after 2007, re–shoring is more likely to be adopted in capital– or technology–intensive manufacturing. D'angelo, Di Berardino & Pernagallo (2025) indicate that in Germany, relocation (reshoring and nearshoring to other EU countries) is shaping a new industrial landscape. They concur with Gao et al. (2022) in observing that the reindustrialisation trend has mainly concerned high and medium technology industries.

- Demand–Side Perspective

Demand is also considered as one of the main drivers of this structural process in middle to upper income economies. Rowthorn & Wells (1987) argue that deindustrialisation is a natural consequence of economic development, as demand shifts toward services once basic material needs are met. However, Alderson (1999) and Palley (2002) propose more nuanced "hybrid" frameworks, suggesting that deindustrialisation is driven not only by consumer preferences but also by technological change, trade liberalisation, and globalisation. They formalise these stylised facts using a two−sector model that allows them to test for various scenarios, extending it to incorporate international trade and labour mobility. In the process, they offer an interesting review of the related literature.

The Felipe et al. (2016) hypothesis suggests also that demand for manufactured goods in emerging countries has not grown enough to sustain higher global levels of manufacturing. These countries experienced rising income levels, but their demand for manufactured goods still fell short. In that sense, the success of export-led development models in some countries may have contributed to deindustrialisation in others.

2.2 Measuring Outsourcing and Deindustrialisation from the Domestic and International Value Chain Perspectives

Outsourcing often takes the form of sub−contracting non−core tasks to firms specialised in providing specific inputs to the industry. These inputs can be factory-made parts and components or business services. In the latter case, jobs that were previously classified as manufacturing employment, move to services. For domestic outsourcing, the shift is merely qualitative, as the value−added stays at home. The case of international outsourcing is different. The outsourced inputs are now made abroad, then imported back to produce an output. The proximate effect is a drop in both gross value−added and employment per unit of output in the home economy.

Outsourcing production to developing countries has often been identified as one of the causes of deindustrialisation in developed economies (Wood, 1994). The distinction between *domestic* and *international* outsourcing is therefore central: the first alters measurement, the

second alters reality.

- Statistical Deindustrialisation

An optimistic interpretation professes that deindustrialisation may only be a statistical artefact caused by a reclassification of industrial employees' jobs to business services while preserving (or even increasing) value from a broader "integrated industrial" perspective. All in all, the traditional manufacturing vs. services boundary is blurred. At the extreme, some factory–less companies stopped entirely to fabricate products and concentrate on R&D, branding and marketing.

Statistical deindustrialisation is merely associated with domestic outsourcing. D'Angelo, Di Berardino & Pernagallo (2025) distinguish "insourcing" —outsourcing within the same manufacturing sub−system of the same country— and "inter sectorial outsourcing", the outsourcing of tasks and inputs outside the sub−sector but within the domestic economy. Outsourcing of ancillary tasks to independent service providers (the "tertiarization" of industrial tasks) is often seen as a specific driver of statistical deindustrialisation. Many functions that were once part of manufacturing are now provided by companies in the service sector (Majzlíková, 2024).

Deindustrialisation is *apparent* as value−added remains in the country. It has been documented in OECD countries (Montresor & Vittucci−Marzetti 2011). D'angelo et al. (2025) calculate that in 2020, 45% of total employment integrated into manufacturing subsystems in Germany were services jobs. The highest percentage was found for high−tech industries (52%).

- International Outsourcing and Real Relocation

International outsourcing fragments production across countries under the coordination of a Lead Firm. Some inputs are sub–contracted to foreign firms and the final product may be assembled in a country that is not where the HQs of the Lead Firm is located. As a result of international outsourcing, manufactured products are less and less "Made in any single country" and increasingly "Made in the World".

International outsourcing, especially through offshoring,[1] enabled the sharing of advanced industrialised know−how with developing countries. Sophisticated industrial products could now be produced and exported by low−wage/labour−abundant countries. This mutation in the nature of comparative advantages — Grossman & Rossi−Hansberg (2006) advanced the term "paradigm shift" — had a series of consequences on the way business managers and economists understood the role and logic of international trade.

[1] International outsourcing can take two forms. The first one is through arms–length contractual arrangements of the lead–firm with local producers of the foreign country; the second is offshoring, through direct investment of the lead–firm in the foreign country.

For Ahn & Choi (2016), the increase of the share of imported intermediate inputs is often associated with an increase in firms' productivity. They identify several channels for such an effect: learning from the superior foreign technology embodied in the inputs, quality−ladder effects from higher quality imports, or variety effects from an enlarged set of available inputs. Yet the same mechanism can compress profits and weaken local industrial ecosystems if domestic suppliers disappear.

Lábaj & Majzlíkov (2022) conclude that international outsourcing and offshoring were the main drivers of deindustrialisation in the G7 developed economies over the 2000−2014 period. Ruzic (2025) examines how inputs external to the firm displace labour from production. He states that external inputs are closer substitutes for labour than for capital. When labour becomes more expensive relative to the cost of outsourcing, firms substitute towards both capital and external inputs, making the capital−labour ratio more responsive to labour prices than to capital prices. The effect is expected to be stronger when importing inputs from low−cost labour abundant countries. But the ultimate impact may eventually be an increase in efficiency in the home economy, with a positive impact on exports and employment (Mankiw & Swagel, 2006).

3. Accounting Framework: Production Function in an Open Economy

Inter−Country Input−Output (ICIO) data provide a detailed picture of both the supply and demand aspects of a global multi−agent/multi−sector model. The information is sufficiently detailed to allow moving from a standard growth accounting perspective to a structural view, aggregating firm–level data into sectorial supply–use tables. As a result, ICIO data have become the main statistical tool for analysing global value chains (WTO & IDE−Jetro, 2011; Timmer, 2017).

3.1 Initial Supply-Side Formulation

As a theoretical point of departure, we draw on the canonical KLEM production model. The accounting relationships developed in the following sections can be interpreted as a simplified monetary representation of this underlying production structure:

$$Q = A\, f(K, L, E, M) \qquad [1]$$

where output is produced using capital (K), labour (L), energy, (E) and material inputs (M), conditional on technology and organisational efficiency A.

For each firm, the subset of efficient {K,L,E,M} combinations is conditional on A, the firm's technology and organisational efficiency, and on Q, the expected scale at which production takes place. For any given desired level of output, the subset of the efficient {KLEM} combinations in physical terms can be written as:

$$\widehat{(K, L, E, M)}_{A,Q} = \left\{ \widehat{(K, L, E, M)} \in (K, L, E, M) \middle| (f, A, Q) \right\} \qquad [2]$$

K is the flow of productive benefits (or "capital services") derived from an asset (k) over a period of time.

Moving from the space of efficient production capabilities to the sub−space of financially profitable ones requires affecting a market price to each component of the production function.

$$\hat{Q} = \left\{ f(\widehat{K_1}, \dots, \widehat{K_K}, \widehat{L_1}, \dots, \widehat{L_L}, \widehat{M_1}, \dots, \widehat{M_I}) \middle| \overbrace{(K, L, E, M)}_{A,Q} \right\} \quad [4]$$

Where: $\widehat{K_k}$= $p_k K_k$; k =1,…,K ; $\widehat{L_l}$= $p_l L_l$; l =1,…,L and $\widehat{M_i}$= $p_i M_i$; i =1,…,I

In national accounting practice, K and L remunerations are included in the sectorial value-added.

Denoting by p_q^c the domestic market price of output Q in country "c", $\hat{Q}$ must verify that the unit cost of production is at, or below, the prevailing domestic market price in order for production to be economically sustainable.

$$\frac{\hat{Q}}{Q} \leq p_q^c \quad [5]$$

In a globalised open market economy, the domestic price of tradeable products is equal to the prevailing international price (p_q^w) plus the cost of importing a similar product.

$$p_q^c = p_q^w \left(1 + \Theta_q^c\right) \quad [6]$$

With $\Theta_q^c \geq 0$, the ad–valorem trade cost (tariffs and transportation, plus other monetary transaction costs) of importing the internationally tradeable product q in country c.

Productivity gains in [4] may partly stem from relative−price shifts or from intermediate imports substitution. They may also reflect behavioural strategies or simply modifications in the broader industrial eco–system context. In a way analogous to the cost of production–based theory of value in the neo–Ricardian model proposed by Shiozawa (2012), the sub−space of financially profitable technologies is determined by the relationship between technology, wage rate and trade costs.

This Producer Based Accounting (PBA) provides the basis for decomposing observed manufacturing output into contributions from domestic and foreign intermediates and from factorial value−added. We derive from it an empirical "Cost-Weighted Factor Growth Decomposition" (see section 4.1 below)

3.2 Demand-Side Constraints and Effective Demand

Product markets clear, so the output produced in a particular country-sector must equal the

quantities of this product used domestically and abroad. Thus, supply may be constrained by demand. In particular, export-led strategies may suffer from a fallacy of composition, since not all countries can expand net exports simultaneously (Mayer, 2003). McMillan, Rodrik & Sepulveda (2017) emphasise (p. 35) that "the success of East Asian economies […] poses significant competitive challenges to newcomers in manufacturing, especially in light of globalization and the reduced barriers to trade virtually everywhere".

We define two indicators measuring the strength of effective demand for domestic industrial products on both the home and the foreign markets.

- Aggregate and Effective Demands

Let's define Aggregate domestic demand ($AdD_{m,h}$) for manufactured product as the total demand for industrial goods "m" in an economy "h". We don't consider exports for the time being.

$$AdD_{mh} = IC_{mh} + FD_{mh} \quad [7]$$

Where:

IC_{mh} and FD_{mh} are the value of intermediate and final goods required by the Home country *h* agents (firms, households and public administrations). These products can be locally produced or imported. [7] can be directly extracted from the IO table.

We define Effective domestic demand (EdF_{mh}) as the domestic demand for domestically produced final goods and services. Effective domestic demand is equal to Aggregate demand minus imports of "m" goods for intermediate and final uses (IM_{mh}).

$$EdF_{mh} = AdD_{mh} - IM_{mh} \quad [8]$$

Total effective demand should include exports: $EdF_{m,h}$ represents only the domestic part of the demand addressed to the home manufacturing sector. To obtain the total effective demand (EF_{mh}) for domestically produced "m" products, we must add the foreign demand (EX_{mh}) addressed to the Home producers.

$$EF_{mh} = EdF_{mh} + EX_{mh} = Q_{mh} \quad [9]$$

- Indicators of Demand Strength and Orientation

From a demand−driven perspective, EF_{mh} is deemed "effective" because it translates into actual purchases of locally produced products "m", influencing domestic production levels and employment. Let's note:

$$\Omega = EF_{mh}/AdD_{mh} \quad [10]$$

With Ω, the share of total demand for home product "m" relative to aggregate domestic demand.

AdD_{mh} is a function of the domestic income. The dynamic of demand for products "m" is usually expressed in terms of income elasticity of demand. It measures how much the quantity demanded of a good or service changes in response to a change in consumer income. As long as domestic and imported products are substitutes, Ω is also analysed in terms of relative price elasticity.

In a closed economy or when exports and imports of "m" balance exactly, $\Omega = 1$. More generally, in an open economy, $\Omega < 1$ when country "h" is a net importer or $\Omega > 1$ when it is a net exporter.

The purpose of Ω in our analysis is to capture the strength of the domestic demand, governed by income and price elasticities. But exports may be as effective as domestic demand for driving output and be a marker of comparative advantages.

A natural complement is therefore to measure the evolution of ζ, the share of output that is exported.

$$\zeta = EX_{mh} / EF_{mh} \quad [11]$$

Ω and ζ can be computed for each {country−sector−year} triplet using ICIO data: Intermediate and final demand (domestic and foreign) for domestic output; imports and exports by product and origin.

3.3 Dynamic Equilibration

Input−output models are a representation of an equilibrium between supply and demand at a given point in time. In the canonical Leontief (1941) model, any change in the demand for outputs for one given industry will fully be passed on backwardly to other industries, leading to proportional changes in their demand for intermediate and primary input. [2] In our case, the demand for both final and intermediate goods that is addressed to the domestic sector "*m*" is the sum of the domestic and foreign demand for home products "Q*mh*":

$$Q_{mh} = EF_{mh} = \Omega\, AdD_{mh} \quad [12]$$

AdD_{mh} is directly (final demand) or indirectly (intermediate goods), a function of the domestic income (GDP). The dynamics of final demand for products "m" is usually expressed in terms of income elasticity of demand, which measures how much the quantity demanded of a good or service changes in response to a change in consumer income.

[2] This is only a reasonable assumption when supply is price-inelastic (Oosterhaven, 2025); for example, when the economy is below full capacity utilisation.

Demand for intermediate products is endogenous in this model and determined by the (fixed) technical coefficients of the production function [4]. Intuitively, (as in Rowthorn & Ramaswamy, 1999), there is a relationship between the inverted-U pattern observed in many developed economies for the manufacturing's share of GDP (see Escaith, 2026a) and households' preferences: as income rises, the income elasticity of demand for manufactured goods declines (an Engel-type mechanism), leading to a saturation of demand and a subsequent shift of both production and consumption toward services.

In an open economy, exports — on the supply side —, and imports on the demand side, complete the equation. As long as domestic and imported products are substitutes, demand for imports is usually analysed in terms of price elasticity. Thus, when it comes to manufacturing in mature or maturing economies, the static equilibrium [12] hides a systemic contradiction from a dynamic perspective.

- dQ_{mh}/dt seen from the supply side as in [4] benefits from rapid technological progress.
- Demand side "$dAdD_{mh}/dt$" is constrained by Engel's law that predicts an income−elasticity close or lower than 1 when domestic demand is saturated.

In a mature economy, avoiding deindustrialisation and sustaining industrial production growth when domestic demand is constrained by market saturation imply increasing ζ, the share of output that is exported. But ζ itself is constrained by the "fallacy of composition": not all mature or maturing economies can export their way out of deindustrialisation, especially when the global market is already dominated by large low−cost emerging economies.

The issue is more complex for smaller low–to middle income countries. Even when the income elasticity of demand for manufactured products remains high at home, domestic producers may not be competitive for a series of structural reasons, ranging from small size of both market and firms, inadequate infrastructure, adverse business environment and overvalued exchange rate. Even the small economies that have successfully inserted themselves into specialised segments of global value chains face the challenge to enlarge this industrial enclave and build a larger and more diversified domestic value chain by incrementally adding domestically sourced activities.

With the passing of time, the economic and business environment changes, coerced by the availability of new technology and modifications in income, consumer preferences, business models and prices. Since the late 1980s, this environment has been deeply affected by the growing interdependence of the world's economies, cultures, and populations, brought about by cross−border trade in goods and services, technology, and flows of investment, people, and information.

While our data stop in 2019, it should be mentioned that in the 2020s, two additional forces reshaped GVCs. First, geopolitical tensions are pushing multinational corporations to move

beyond just-in-time and cost-driven optimization and adopt a "just-in-case" risk adverse strategy. Second, the global shift toward low-carbon production techniques in some large import markets introduced stricter constraints and additional investment in green technologies (Anukoonwattaka, Sukuman & Takinami, 2026). These constraints reduced the subset of feasible technologies available to the firms.

Heterogeneous firms do not respond equally to trade opportunities (Melitz, 2003). The set of feasible technologies, A_q is likely to be larger for firms operating at greater scale. Access to technology is also influenced by the broader economic environment: firms located in advanced economies typically handle a wider range of technological opportunities than firms in developing countries. These structural constraints manifest themselves at the firm level. Small firms are particularly affected by financing frictions that restrict investments in process upgrading, technological adoption, environmental compliance, and supplier certification. At the same time, import competition can erode profit margins and weaken investment capacity, while shifts in consumer preferences towards imported products may further disadvantage domestic producers. Collectively, these factors shape firms' ability to enter, remain in, and upgrade within global value chains.

As a result, we believe dQ_{mh}/dt , Ω and ζ should be considered jointly when asserting deindustrialisation: a country can experience apparent deindustrialisation according to dQ_{mh}/dt because domestic effective demand (Ω) weakens, even if its export orientation (ζ) rises.

4. Empirical Framework and Data

We use OECD's Inter−Country Input–Output (ICIO) tables for 1995–2019, expressed in current USD. Constant price data are derived from UNIDO value–added deflators and national sources. Economies are grouped by development level and their industries are disaggregated by technology intensity: high, medium, and low tech (see Annex). The measurement framework aims to capture changes in industrial production structures over time, including those arising from outsourcing, offshoring, and other organisational transformations, through shifts in the relative contribution of inputs required to produce a unit of output.

4.1 The Measurement Framework

In the simple case of a two−country, two−product (manufactured goods and services) model, the data are structured as in Table 1 .

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Table 1. Simplified structure of an inter−country input−output table

Origin [a]	Sector	Home		Foreign		Final demand		Output
		Industry	Services	Industry	Services	Home	Foreign	Home
Home	Industry	$Z_{hm,hm}$	$Z_{hm,hs}$	$Z_{hm,fm}$	$Z_{hm,fs}$	$FD_{hm,h}$	$FD_{hm,f}$	Q_{hm}
	Services	$Z_{hs,hm}$	$Z_{hs,hs}$	$Z_{hs,fm}$	$Z_{hs,fs}$	$FD_{hs,h}$	$FD_{hs,f}$	Q_{hs}
Foreign	Industry	$Z_{fm,hm}$	$Z_{fm,hs}$	$Z_{fm,fm}$	$Z_{fm,fs}$	$FD_{fm,h}$	$FD_{fm,f}$	Q_{fm}
	Services	$Z_{fs,hm}$	$Z_{fs,hs}$	$Z_{fs,fm}$	$Z_{fs,fs}$	$FD_{fs,h}$	$FD_{fs,f}$	Q_{fs}
	Value added [b]	Y_{hm}	Y_{hs}	Y_{fm}	Y_{fs}			
	Output	Q_{hm}	Q_{hs}	Q_{fm}	Q_{fs}			

Note: a/ Production is in column, uses are in line; for simplicity, other sectors (agriculture, mining) are omitted; b/ net taxes on production (taxes less subsidies) are included in value−added.

Both input and output are measured in current prices. This has important implications when we look at substitution effects, as an increase in the use on a specific input $\boldsymbol{Z}_{i,j}$ may reflect an increase in the quantity of intermediate good "*i*" purchased, an increase in the unit price in USD paid by the firm "*j*" for the same quantity of good "*i*", or the resultant of both price and quantity effects.[3] The decomposition should therefore be interpreted as describing changes in the nominal production structure rather than identifying technological substitution.

We adapt equation [4] in order to match data availability. In particular, we merge the remuneration of Labour and Capital factorial services and the net taxes on production into the gross value−added data. Using standard Input−Output notations, the accounting decomposition of the value of the manufacturing production into the cost its intermediate and factorial inputs at time "*t*" is:

$$Q^t_{hm} \equiv Z^t_{hm,hm} + Z^t_{hs,hm} + Z^t_{ho,hm} + Z^t_{f.,hm} + VA^t_{hm} \qquad [14]$$

With, in current output values at basic prices and inputs at current purchaser's prices:

- Q^t_{hm} : manufacturing output (hm: Home manufacturing sector)
- $Z^t_{hm,hm}$: manufactured inputs from other Home manufacturing suppliers
- $Z^t_{hs,hm}$: business services input, from Home suppliers
- $Z^t_{ho,hm}$: other inputs from Home suppliers (primary goods, other services)
- $Z^t_{f.,hm}$: all foreign intermediate inputs
- VA^t_{hm} : factorial inputs (Value−Added)

[3] Computing input–output tables at constant prices is a complex process and the data were not available for the ICIO tables at the time of writing this report.

4.2 Cost-Weighted Factor Growth Decomposition

Changes in the total cost of manufacturing production between years "t" and "t+1" can be expressed as:

$$\eta = (Q^{t+1}_{hm} - Q^{t}_{hm})/ Q^{t}_{hm} = \sigma + \theta + \mu + \varphi + \nu \quad [15]$$

With the following relative contributions to growth, normalised by the value of output in time "t":

- $\sigma = (Z^{t+1}_{hm,hm} - Z^{t}_{hm,hm}) / Q^{t}_{hm}$ contribution of intra−sectorial use of home inputs
- $\theta = (Z^{t+1}_{hs,hm} - Z^{t}_{hs,hm}) / Q^{t}_{hm}$ contribution of the use of home business services inputs
- $\mu = (Z^{t+1}_{ho,hm} - Z^{t}_{ho,hm}) / Q^{t}_{hm}$ contribution of intra−sectorial use of home other inputs
- $\varphi = (Z^{t+1}_{f.,hm} - Z^{t}_{f.,hm}) / Q^{t}_{hm}$ contribution of all imported inputs
- $\nu = (VA^{t+1}_{hm} - VA^{t}_{hm}) / Q^{t}_{hm}$ contribution of Value Added

We disaggregate $Z_{f.,hm}$ into its three components (fm, fs and fo) to calculate the substitution between home and foreign products, business services or other inputs.

4.3 Interpretation and Caveats

This analysis relies on input−output data measured at current prices, which introduces important interpretative limitations. Performance is proxied by output in nominal terms, potentially conflating real productivity gains with price−driven effects such as exchange rate fluctuations or shifts in input or output prices. While input composition reflects actual market transactions and thus captures meaningful substitution patterns, it is sensitive to price movements.

The methodology cannot isolate volume-based changes from prices. For instance, a decline in the share of foreign inputs may reflect not a reduction in quantity, but a drop in import prices. Consequently, observed associations between input structure and performance may reveal price dynamics rather than underlying technological changes.

These caveats underscore the need for cautious interpretation. The results should be viewed as exploratory correlations within the constraints of current−price data, rather than definitive causal inferences.

5. Industrial Performance and Demand Constraints

5.1 Global Patterns, 1995–2019

The results obtained for developed and developing countries are in Table 2.

Table 2. Contribution of the various components of the production function to industrial output, 1995−2019 nominal variations by technology content and level of development

	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
1995_2019	High−Technology			Medium−Technology			Low−Technology		
Var Output(mean)	2.75	5.79	2.1	1.99	4.82	2.4	1.39	4.28	3.1
FromH_Manuf(mean)	0.46	1.59	3.4	0.32	1.13	3.5	0.18	0.83	4.7
– fromH_High(mean)	0.26	0.98	3.8	0.06	0.22	3.6	0.02	0.07	4.0
– fromH_Med(mean)	0.10	0.39	4.1	0.18	0.62	3.5	0.04	0.10	2.5
– fromH_Low(mean)	0.11	0.22	2.0	0.08	0.29	3.7	0.12	0.67	5.5
FromH_BSect(mean)	0.35	0.72	2.1	0.27	0.62	2.3	0.21	0.51	2.4
FromH_OtherSect(mean)	0.11	0.40	3.6	0.19	0.67	3.6	0.18	1.03	5.7
FromF_Manuf(mean)	0.68	0.93	1.4	0.33	0.55	1.7	0.14	0.35	2.6
– fromF_High(mean)	0.49	0.58	1.2	0.11	0.18	1.6	0.03	0.04	1.7
– fromF_Med(mean)	0.12	0.22	1.8	0.16	0.22	1.4	0.04	0.04	1.1
– fromF_Low(mean)	0.07	0.12	1.7	0.06	0.15	2.4	0.07	0.27	3.6
FromF_NonManufSect(mean)	0.33	0.27	0.8	0.23	0.27	1.2	0.27	0.31	1.2
VarValue−Added (mean)	0.82	1.89	2.3	0.66	1.58	2.4	0.41	1.25	3.0

Note: Simple average of countries' cumulative nominal variations over the 1995−2019 period, divided by the respective output value in 1995. [1] stands for developed countries, [2] stands for developing countries, including China, [3] is the ratio [2]/[1]; H stands for Home inputs, F for foreign ones (imported).

Source: Author, based on OECD data.

Five stylised facts summarise the worldwide evolution of manufacturing:

1) ***Developing economies expanded low−tech industries more rapidly.*** In line with Heckscher−Ohlin's theory of comparative advantages, developing countries increased their Low−Technology industrial production faster (4.3%) than developed countries (1.4%). Yet several developing ones achieved also strong growth in high−tech segments (mostly through integration into GVCs, as we shall see).

2) ***Developed economies preserved output levels, especially in high−tech industries.*** Nevertheless, the results indicate that developing countries as a group are catching−up with developed ones.

3) ***Value−added remained the largest single contributor to output growth***, followed by home−manufacturing inputs.

4) ***Regional divergence increased***: Asia surged ahead but Latin America lagged. Europe splits between a laggard core (EU15) and a catching–up regional periphery (EU13), again thanks to integration into regional value chains.

5) ***A rising tide lifts all boats:*** The 1995−2007 years of hyper−globalisation was also a time of high growth for most countries, while the slow–growth "new−normal" period that followed the 2008-2009 global financial crisis was one of increased heterogeneity (see next section). Both the Gini and Herfindahl−Hirschman concentration indices, estimated using countries' manufacturing value−added at country level at current and constant USD reached a minimum in 2007 (see Escaith, 2026a). Divergence increased in the post–crisis period.

5.2 The Post-Crisis Slowdown

Table 3 reveals a clear deceleration in the post–crisis period compared with the 1995−2007 years of hyper−globalisation. The contrast between pre and post Global crisis is particularly acute for the group of developed economies and for Latin America. In both groups, the growth of factory output was anaemic at best.

Table 3. Average annual growth of manufacturing production by region and technological content, 1995−2019

Period	1995−2019			1995−2007			2010−2019		
Region/Country	High	Medium	Low	High	Medium	Low	High	Medium	Low
China	13.1	12.7	12.5	16.5	15.5	14.4	7.5	7.8	9.1
SAS	7.9	7.9	7.7	8.7	8.5	8.8	6.3	6.6	5.5
EAP_DVG	7.7	7.1	6.6	7.5	6.3	6.6	6.7	7.0	5.3
MNA	6.3	5.9	5.7	7.0	6.7	6.5	4.3	3.7	3.9
SSA	5.6	6.3	5.0	5.3	7.2	6.4	5.4	5.2	2.9
LAC	4.2	4.3	4.1	6.9	6.7	5.8	0.0	0.7	0.5
DVD (all)	4.6	3.8	3.2	8.0	7.8	6.2	1.9	1.3	0.9

Notes: Simple average of countries, output measured in current US dollar. Regions follow the World Bank categories. EAP_DVG: Developing East Asia and Pacific, excluding China; LAC: Latin America and the Caribbean; MNA: Middle East and North Africa, SAS: South Asia; SSA: Sub−Saharan Africa. DVD: Developed economies.

A simple disaggregation by development status (not shown here) would reveal that developed countries experienced a marked fall in the contribution of value−added (ρ), not compensated by more inputs being outsourced to domestic business services (tertiarization of manufacturing production), while foreign−input contribution (φ) remained high. This is consistent with symptoms of deindustrialisation. The EU results show also the large impact of increased regional integration after 1995, with a higher reliance on regionally sourced

imported inputs. The trend was particularly strong for EU13 countries that joined the EU in 2004 or later. The impact fades away after the 2008−2009 crisis.

Developing economies maintained their industrial growth mainly through a reliance on domestic intermediates (σ, in equation 15) rather than services (θ). This pattern suggests that post−crisis recovery in developing countries relied more on existing industrial capacity. Yet, not all developing countries share this pattern.

If China and many Asian developing countries registered double-digit increases in domestic production, other regions, such as Latin America, have been less dynamic. Sub−Saharan Africa, a region that was expected to suffer from premature deindustrialisation according to Rodrick (2016), seems to have avoided this trap and displays a modest resilience (a case of "thin industrialisation"). We observe in particular a rapid growth of the Value−Added, a proxy for employees' remuneration.

5.3 Prototyping Performer vs. Non-Performer

To document the cause of observed heterogeneity beyond the developed vs. developing country classification, we look at broader industrial characteristics that may explain differences in the manufacturing dynamics. We consider average output growth over the 1995–2019 period plus the decomposition shares (σ, θ, μ, φ, ν) and demand indicators (Ω, ζ). We incorporate two indicators (GDP and industrial value added per employee) at base year (1995), to control for the effect of catching-up due to convergence in labour productivity (Majzlíková, 2024).

Other contextual variables include: variation over time of the share of sectorial value−added in country's GDP; variation of the sectorial manufacturing deflators relative to the GDP deflator; variation of the share of aggregated manufacturing value−added in total GDP at constant prices. Deflators and constant price indicators are sourced from UNIDO database.

In order to identify (de)industrialisation profiles based on these indicators, we use a particular variant of cluster analysis, the Fuzzy K−Means clustering. Fuzzy clustering adds flexibility in the partitioning of the data. We fix the number of clusters to 5 per technological group. The associated production functions, typical of each cluster are reported in background paper Escaith (2026b).

The clustering results reveal substantial heterogeneity within each technology group, cutting across the developed/developing-country distinction. Fast-growing clusters combine value-added growth with strong domestic input linkages and, in several cases, integration into GVCs. Conversely, slow-growing clusters tend to exhibit weaker value-added growth and greater reliance on services or imported intermediates. In particular, we observe the following:

−***High−Tech clusters*** exhibit the widest range of outcomes. Some Asian developing countries, several transition economies, plus Ireland achieved rapid nominal growth through

increased sectorial value−added and integration into global supply chains. In contrast, many high−income legacy industries experienced stagnation, often accompanied by a higher weight of services in the total production cost. This shift had to be anticipated in post−industrial societies and may not be a sign of pathological deindustrialisation. Some developing countries registered also slow growth for this strategic high–tech sector.

−***Medium−Tech clusters*** show intermediate performances. Except for one cluster made of some developing countries plus a couple of transition countries and Ireland, growth was generally more modest, with some countries relying on self−generated value−added and others on domestic outsourcing. Lowest nominal growth is mainly observed for developed countries, plus Argentina. Relative prices appear to be a significant discriminant variable, though not uniformly decisive in all cases.

−***Low−Tech clusters*** are characterised by greater weight of the value of non−industrial inputs in the production function — a pattern consistent with commodity–intensive industries — and more limited growth. While some clusters managed to expand output through domestic linkages, others faced structural constraints that limited industrial progress, including adverse price dynamics and possible signs of premature deindustrialisation in the case of developing countries.

5.4 Top Performers and Catching-Up

To complement this clustering analysis, we investigate in our background paper Escaith (2026b) the catching–up dynamics between the Top performers in developing countries (Top−DVG firms, the rising stars) and the bottom performers in mature economies (the Bottom−DVD firms), as the latter are probably the most vulnerable to the competition of fast–growing developing countries' firms on the global market.

− ***Top High-Tech and Medium-Tech performers*** in developing economies rely more heavily on same-sector domestic inputs — especially for high−tech inputs — and show lower reliance on imported Hight−Tech inputs. In contrast, bottom performers in mature economies show a stronger shift toward business-services outsourcing and imported intermediates. Yet value-added contributions are remarkably similar across both groups, indicating that the difference — without advancing any causal inference — is in input composition.

− In ***Low-Tech industries***, successful developing-country producers generate a larger share of growth from domestic value-added, whereas bottom performers in advanced economies depend more on purchases of imported commodities. But again, these patterns do not align neatly with income levels: some high-income low-tech industries behave like developing-country laggards, and vice-versa.

A consistent finding across all technology groups is the presence of endogenous cross- sectorial dynamism in fast-growing developing economies: expanding industries increasingly source inputs domestically, suggesting agglomeration effects and mutually

reinforcing industrial growth. This is illustrative of what Iacopo & Giovannetti (2025) call the "in–out–in again" GVC strategy: after joining an international supply chain, it helps countries maintain manufacturing strength while accumulating indigenous capabilities.

Overall, the clustering confirms that industrial performance is not determined by development status, technological category, or input composition alone. Broader structural conditions (not considered here: infrastructure, macroeconomic stability, business climate, and external integration) may shape outcomes in ways that blur the North–South boundary. This aligns with the broader literature on "globalisation readiness" (ADB et al., 2025), particularly relevant for regions facing risks of premature deindustrialisation.

Effective demand and industrial performance

Following Engel's Law — see Matsuyama (2018) for a formal treatment in open economies — we expect demand elasticity for manufactured products to be higher than unity in low and middle−income countries, dropping below one in higher−income economies. In the latter case, industrial products face a saturated market, while in the former one, there is still an unmet demand. Considering the weight of domestic market in driving output, even in open countries (Escaith, 2025), the relative evolution of domestic demand and industrial production is an important marker of possible industrialisation pathologies.

On this basis, we derive from [10] a synthetic indicator (Zeta = 1/ Ω; Ω > 0). Zeta measures the coverage ratio of aggregate domestic demand by domestic output (be it for sales on the domestic market or for exports). In mature economies with saturated markets for industrial goods, we expect the value of production to remain more or less in–line with a stable or slowly declining demand. In low–to– middle income countries, demand for industrial products is expected to rise with income and drive domestic production. Zeta variations (ΔZeta) help distinguishing between:

- *Mature deindustrialisation*: Low output and demand growth in high−income contexts, with stable or declining Zeta (ΔZeta ≈ 0).

- *Premature deindustrialisation*: Weak output response despite demand growth in middle− and low−income developing countries (ΔZeta < 0).

For each type of industry classified by technological intensity and for each sub–sample of developed and developing countries, we identify five clusters according to their profile in 1995–2007, 2010–2019 and 1995–2019. The variables used in the clustering exercise are the average nominal growth rate over each period for output, domestic demand, imports, exports, and ΔZeta. To control for the influence of the catching–up effect on industrial growth, we also include the level of output in 1995. Results are presented in background document Escaith(2026b).

Overall, the 1995−2007 *hyper−globalisation* period reflects a "rising tide lifts all boats"

dynamic, where domestic and external demand jointly supported industrial expansion. The alignment between output and demand suggests a relatively healthy industrial structure, even in clusters with moderate growth. The New−Normal period of "*slowbalisation*", after the 2008−2009 global crisis, exposed underlying fragilities. Output growth slowed markedly, leading to mediocre outcomes in all industries.

The downturn did not affect all countries uniformly. Some were particularly hit by the weaker international environment in 2010–2019 (see Escaith 2026b for details on clusters and sectors/countries). Countries of legacy industrialisation dominate these slow or negative outcomes.

- In ***High−Tech,*** one cluster experienced an average annual contraction in output of 0.5%. This cluster comprises 28 countries, many of which are developed economies or middle- to high-income developing economies. The negative outcome reflects contracting domestic demand in a context of stagnating exports. Sluggish domestic demand penalised also the high−tech cluster of most Western European economies.

- In ***Medium−Tech***, the slowest−moving cluster is also the largest (25 countries), including most high−income developed economies with the worrying presence of developing countries in Latin America, Africa (Tunisia and South Africa) and Turkey. This mediocre performance took place in a context of reduced domestic demand. Imports did not significantly displace domestic products (Zeta did not change much). A small and heterogeneous group of countries, mainly constituted of developing countries plus two ex−transition economies (Kazakhstan and Russia) is atypical: exports declined in a context of robust domestic demand.

- In ***Low−Tech*** industries, we observe a group of three clusters where the value of output is stagnating. In this group, the largest group is almost entirely constituted by European countries, plus Argentina and Taiwan. A 1% annual decline in domestic sales drove production growth into negative territory (−0.3%) for another cluster mainly composed of developed economies, with a few developing countries (Brazil, Turkey and South Africa among the largest ones). A cluster presents a borderline case, where we observe a meagre 1.2% of output growth while these countries faced a surge of imports in a context of weak exports. As a result, the variation in the Zeta indicator is negative, making this cluster a possible candidate for pathological deindustrialisation. The presence of India in this group is preoccupying, considering the importance of these industries as provider of low−skill jobs in rural areas.

In general, top performers in the three groups of industries build their performance on the strong growth of their domestic market. As we saw in the previous section, the domestic market includes both final and intermediate inputs, the demand for the latter group being positively correlated by the growth of the other classes of industries.

6. Identifying Countries at Risk of Deindustrialisation

We are now equipped to conclude our investigation by identifying on a case–by–case basis

countries at risk of deindustrialisation over the 1995–2019 period. The diagnostic relies on two indicators:

- ***Real growth of domestic output***, measured over the period. The cutoff threshold is defined as the first quartile of the country's development reference group; growth falling below this threshold is classified as low.

- ***Zeta***, a market−based ratio that captures the alignment between domestic industrial output and domestic demand. We consider that a decline in Zeta (Δ Zeta<0) shows that domestic output has failed to keep pace with expanding domestic demand. Note that Δ Zeta may remain positive even when the value of imports substitute home products on the domestic market as long as export growth offsets declining domestic sales. In such cases, the issue is not competitiveness per se, but a structural mismatch between domestic production and domestic consumption.

Table 4 lists the countries where, for a given industry, both indicators show a red flag. We have the same number of cases (22) for both developed and developing sub−samples, but it is a coincidence.[4]

Table 4. Countries at risk of deindustrialisation, 1995−2019

Developed countries			**Developing countries**		
ISO3	**Industry**	**Region**	**ISO3**	**Industry**	**Region**
AUS *	Man_High	EAP	ARG *	Man_High	LAC
CAN *	Man_High	NAM	ARG	Man_Med	LAC
CHE *	Man_Low	ECA	BRA	Man_High	LAC
CHE	Man_Med	ECA	BRA	Man_Low	LAC
CYP	Man_Low	EU13	BRA	Man_Med	LAC
CYP *	Man_Med	EU13	CHL	Man_Med	LAC
DEU	Man_Low	EU15	CRI *	Man_High	LAC
DNK *	Man_Low	EU15	CRI *	Man_Low	LAC
DNK *	Man_Med	EU15	HKG	Man_High	EAP
ESP	Man_High	EU15	HKG	Man_Low	EAP
ESP	Man_Med	EU15	HKG *	Man_Med	EAP
FRA	Man_Low	EU15	MEX *	Man_Low	LAC
GBR	Man_Med	EU15	MEX *	Man_Med	LAC
GRC	Man_Low	EU15	NGA	Man_Low	SSA
HRV	Man_High	EU13	PER *	Man_High	LAC
HUN	Man_Low	EU13	PER	Man_Low	LAC
ITA *	Man_High	EU15	PER	Man_Med	LAC
JPN	Man_Low	EAP	THA	Man_Med	EAP
MLT	Man_High	EU13	TUN *	Man_Low	MNA
NOR	Man_High	ECA	ZAF	Man_High	SSA
NZL *	Man_High	EAP	ZAF	Man_Low	SSA
PRT *	Man_Low	EU15	ZAF	Man_Med	SSA

[4] The sample of countries is not balanced, with 41 developed and 35 developing countries; moreover, the number of Δ Zeta being negative is not pre–established.

Note: Based on concomitant negative evolutions of indicator Zeta and negative or low real growth of output over the 1995−2019 period.*/: Already flagged as an industry at risk in the early 1995−2007 sub−period.

In developed economies, most of the risky occurrences happen in the case of Low−Tech (41%) and High−Tech (36%). High−Tech industries in developing countries are relatively less prone to be at risk than the other two types of industries (27% against 36%). It probably denotes the fact that high−tech industries in these countries are relatively new and still in expansion.

The deindustrialisation signal is particularly revealing when it affects more than one sector in the same country and was already perceptible during the high−growth subperiod 1995–2007. In the case of developed economies, Denmark is mentioned for its low−tech and medium tech industries. Switzerland is also flagged as at risk for the same industries, albeit only its low−tech industries were already problematic in 1995–2007. Two sectors are also identified as at risk in Spain, albeit the issue emerged only after the global 2008−2009 crisis, which severely affected this country.

Several developing countries are showing signs of preliminary deindustrialisation. All three subsectors are flagged in Brazil, Hong Kong, Peru and South Africa. In Costa Rica and in Mexico, the two problematic subsectors were already in dire straits during the early 1995–2007 "golden age" of high global growth. The case of Mexican medium−tech industry is particularly interesting as the issue resides less in its modest industrial growth than in a mismatch between export−oriented output and domestic demand. It may be an example of GVC−based enclave industrialisation that could not succeed in spreading to other sectors/regions (Escaith, 2021). Of the two Argentinian sectors experiencing difficulties, one (high−tech) was already in this situation in 1995–2007.

There is more concentration of flagged industries in the same country in the case of developing economies. This probably points to more systemic than purely sectorial issues. As we measured growth in real terms, a nominal devaluation is not to be blamed. But we cannot exclude a real overvaluation of the currency which may have caused a Dutch disease in countries that benefited from large commodity export revenues during the "commodity boom" of the 2000s, affecting manufacturing exports and increasing import penetration on the domestic market (Palma, 2008). Çakir & Ademir (2022) estimate that a 50% overvaluation is associated with about 1.25 percentage point decline in manufacturing output over a period of 5 years.

7. Conclusions

While outsourcing motivated the investigation, the empirical analysis progressively relegates it to an ambiguous role. Industrial trajectories over the 1995–2019 period appear to be conditioned more by the compatibility between production structures and effective demand (a macro dimension) than by factor reallocation strategies at microeconomic level. In its quest

for deindustrialisation drivers, the study recognises the determining role of demand constraints. Accordingly, we distinguish "normal" and "pathological" deindustrialisation, the latter being the conjunction of a stagnating production despite a strong domestic demand for industrial products. We also identify a borderline case, when imports substitute home products on the domestic market but exports offset declining domestic sales. These cases reflect a mismatch between domestic production and domestic consumption that is not symptomatic of deindustrialisation.

Five broad lessons emerge from the analysis: (1) The heterogeneity of deindustrialisation, as the phenomenon is multidimensional and spreads over several developed and developing countries; (2) The role of effective–demand constraints, as industrial expansion depends as much on absorption capacity as on supply potential; (3) The dual impact of outsourcing, when domestic or international outsourcing often signals functional specialisation and efficiency gains (a "*Porterian*" form of outsourcing), but may instead signal a weakness (a "*post–Porterian*" strategy); (4) The importance of integration into global value chain (GVC) integration in developing successful business strategies; and (5) The importance of developing domestic value chain, as successful GVC−based industrialisation requires also developing a strong domestic supply chain, particularly between high and medium technology industries.

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Appendix A. List of Sectors by Technological Level

The C codes refer to the coding system used in OECD Inter−country Input−Output tables.

High and Medium−High Technology C20 Chemical and chemical products C21 Pharmaceuticals, medicinal chemical and botanical products C26 Computer, electronic and optical equipment C27 Electrical equipment C28 Machinery and equipment, not elsewhere classified (nec) C29 Motor vehicles, trailers and semi−trailers C30 Other transport equipment	Medium technology C22 Rubber and plastics products C23 Other non−metallic mineral products C24 Basic metals C31T33 Manufacturing nec; repair and installation of machinery and equipment Low and Medium−Low technology C10T12 Food products, beverages and tobacco C13T15 Textiles, textile products, leather and footwear C16 Wood and products of wood and cork C17_18 Paper products and printing C19 Coke and refined petroleum products C25 Fabricated metal products

Appendix B. Countries Covered in the Inter-country Input-Output Tables

Country	ISO3	Dev.Clas	Region	Country	ISO3	Dev.Clas	Region
Argentina	ARG	DVG	LAC	Kazakhstan	KAZ	DVG	ECA
Australia	AUS	DVD	EAP_DVD	Lao People's Dem. Republic	LAO	DVG	EAP_DVG
Austria	AUT	DVD	EU15	Latvia	LVA	DVD	EU13
Bangladesh	BGD	DVG	SAS	Lithuania	LTU	DVD	EU13
Belarus	BLR	DVD	ECA	Luxembourg	LUX	DVD	EU15
Belgium	BEL	DVD	EU15	Malaysia	MYS	DVG	EAP_DVG
Brazil	BRA	DVG	LAC	Malta	MLT	DVD	EU13
Brunei Darussalam [a/]	BRN	DVD	EAP_DVD	Mexico	MEX	DVG	LAC
Bulgaria	BGR	DVD	EU13	Morocco	MAR	DVG	MNA
Cambodia	KHM	DVG	EAP_DVG	Myanmar	MMR	DVG	EAP_DVG
Cameroon	CMR	DVG	SSA	Netherlands	NLD	DVD	EU15
Canada	CAN	DVD	NAM	New Zealand	NZL	DVD	EAP_DVD
Chile	CHL	DVG	LAC	Nigeria	NGA	DVG	SSA
China b/	CHN	DVG	PRC/ EAP_DVD	Norway	NOR	DVD	ECA
China, Hong Kong SAR	HKG	DVG	EAP_DVG	Pakistan	PAK	DVG	SAS
China, Taiwan Province	TWN	DVG	EAP_DVG	Peru	PER	DVG	LAC
Colombia	COL	DVG	LAC	Philippines	PHL	DVG	EAP_DVG
Costa Rica	CRI	DVG	LAC	Poland	POL	DVD	EU13
Croatia	HRV	DVD	EU13	Portugal	PRT	DVD	EU15
Cyprus	CYP	DVD	EU13	Republic of Korea d/	KOR	DVD	EAP_DVD
Czechia	CZE	DVD	EU13	Romania	ROU	DVD	EU13
Côte d'Ivoire	CIV	DVG	SSA	Russian Federation	RUS	DVD	ECA
Denmark	DNK	DVD	EU15	Saudi Arabia	SAU	DVG	MNA
Egypt	EGY	DVG	MNA	Senegal	SEN	DVG	SSA
Estonia	EST	DVD	EU13	Singapore	SGP	DVG	EAP_DVG
Finland	FIN	DVD	EU15	Slovakia	SVK	DVD	EU13
France	FRA	DVD	EU15	Slovenia	SVN	DVD	EU13
Germany	DEU	DVD	EU15	South Africa	ZAF	DVG	SSA
Greece	GRC	DVD	EU15	Spain	ESP	DVD	EU15
Hungary	HUN	DVD	EU13	Sweden	SWE	DVD	EU15
Iceland	ISL	DVD	ECA	Switzerland	CHE	DVD	ECA
India	IND	DVG	SAS	Thailand	THA	DVG	EAP_DVG
Indonesia	IDN	DVG	EAP_DVG	Tunisia	TUN	DVG	MNA
Ireland	IRL	DVD	EU15	Türkiye	TUR	DVG	ECA
Israel	ISR	DVG	MNA	Ukraine	UKR	DVD	ECA
Italy	ITA	DVD	EU15	United Kingdom	GBR	DVD	EU15
Japan	JPN	DVD	EAP_DVD	United States of America	USA	DVD	NAM
Jordan	JOR	DVG	MNA	Viet Nam	VNM	DVG	EAP_DVG

Note: DVD: developed; DVG: developing; a/ Classified here as developed; b/ China, a developing country in East Asia and Pacific region, is treated separately as a single "region" considering the sheer size of its manufacturing sector; c/ South Korea is considered a developed economy since 1996.