CHAPTER

Accumulated trade costs and their impact on domestic and international value chains

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According to trade analysts, trade costs—together with the relative size of the exporting and importing economies—are D

to the value added generated at each step of the supply chain. The latter value is often much smaller than the full commercial value of the intermediate good to which trade costs apply, so the financial impact of trade costs on the processing firm's competitiveness and profitability in a GVC context is said to be amplified.

To see how amplification affects the bottom line of an exporting firm, take an export processing firm that uses imported inputs that cost a hypothetical value of 40 (excluding trade costs) to produce a final good that sells on the international market for 100 (table 4.1). The value added of 60 generated at international prices is split between employee remuneration (40) and gross profit (20). If the processing firm is a price taker and the cost of labor is exogenously fixed, any increase in trade costs (10 in the example) will reduce gross profit. The impact of trade costs on the input procurement cost is magnified on what truly matters for the firm: the share of value added that remains as gross profit, on

domestic producers would rather export their product and sell it at the higher world price.

for the domestic market will benefit from a higher effective protection on their value added. By contrast, upstream industries producing unprocessed inputs and basic parts and components will have a low extended effective protection rate—and possibly a negative one if the sum of tariff and transport margins paid on inputs is higher than the margin of protection received on the output.

Therefore, downstream industries registering a high extended effective protection rate on their production will have little incentive to export because the rate of return from exporting is lower than that from selling on the domestic market.[6] Even upstream industries supporting a negative effective protection rate will still be better off selling on their domestic market, and the result holds for all domestic firms, but the anti-export bias is stronger for highly protected industries. This hurtful effect of escalation is particularly relevant for developing countries that want to diversify their export basket away from basic commodities.

Trade frictions reduce the competitiveness of domestic firms in the ml

transport equipment (24%), agriculture (22%), and textiles (21%). The bottom fve are computers (17%), other nonmetallic mineral products (17%), chemicals (17%), pulp, paper, and p, ప్ s cD e ¦ epM76).' p

industry, a sector closely associated with GVCs, would register a gross margin 27% lower than the benchmark frm. Benefting from drawbacks would reduce this loss, but the home industry would still lag behind the international competitor by a margin of about 20% if it continued sourcing other inputs domestically. Food industries also have little incentive to export: their value added would be 18% lower than the benchmark (14% with drawbacks). When the industry relies heavily on imported inputs, as in the case of petroleum products, drawback schemes can yield an improvement of 10

and accelerating the structural adjustment of China and the world economy under three policy scenarios. They looked at the implication for China of a similar initiative and explored three policy

measures the length of each component.[12] The decompositions of GVCs at the sector level reveal substantial variation in the length and importance of the relevant parts of the value chain. Using the international input-output matrices behind the OECD–WTO Trade

In the spider frst-tier suppliers of parts and components are arranged around a central assembly plant that ships the end product to its fnal destination. Unbundling costs are lower in the hub and spoke confguration: inputs cross a border at most twice, once as a part and once embodied in fnal output. In a snake each task is embodied in goods during processing, which are shipped again to the next production stage. At each stage the gross commercial value of the good in process increases, leading to cascading transaction costs. Diakantoni and others (2017)

and downstream GVC partners: the production chain will be as swift as its slowest link. Bilateral trade frictions should therefore be analyzed from a multiplayer perspective, including not only the other bilateral trading partners, as in conventional gravity models, but also indirect participants that are farther upstream or downstream in the supply chain. Improving the effectiveness in processing trade with a minimum of frictions will not have the same impact on the world trade network as improving logistic and trade facilitation in a country playing the role of a GVC hub.

Network and graph analysis applied to trade in intermediate inputs identifies key players by computing centrality indicators. If a trading partner (a node or a vertex, in network analysis) "influences just one other node, who subsequently influences many other nodes (who themselves influence still more others), then the first node in that chain is highly influential" (Borgatti 2005, p. 61). A player's centrality is therefore a function of both its own importance in the world trade economy and the centrality of the trading partners it is associated with.

Trade in intermediate goods is organized along three large regional clusters—East Asia, centered on China; Europe, centered on Germany; and North America, centered on the United States—and dense extraregional exchanges (figure 4.4). The East Asia and Europe regional value chains include several smaller clusters organized around, for example, Japan and the United Kingdom.

To assess the contribution of each economy as a GVC trade facilitator, Diakantoni and others (2017) computed the PageRank centrality indicator, which is a more robust centrality indicator than alternative specifications, for each partner. They then compared the PageRank indicator with various trade and transportation indicators, including the World Bank's Logistics Performance Index, the most appropriate for the purpose (figure 4.5).

Trading partners are ranked according to their network centrality and compared with their relative performance in timeliness (as measured by a trade facilitation index). An ideal situation would be to have a perfect fit between GVC centrality and trade-cost efficiency. When that is not the case, the analysis identifies where trade facilitation investments would have the largest global impact. The hypothesis is that investments in upgrading trade-facilitation performance will have a large positive spillover and be highly profitable for global welfare when they improve the situation of a key player. A perfect fit between centrality and trade facilitation would show all countries aligned on the diagonal, which is far from the case. There is a large mismatch between the quality of trade and transport facilitation and the role of each economy in the world trade network.

The benefits of improving trade facilitation are usually measured using the traditional bilateral trade perspective, which is only part of the bigger GVC picture. The OECD has estimated the bilateral benefits of reducing trade costs from full implementation of the WTO Trade Facilitation Agreement at 16.5% of total costs for low-income countries, 17.4% for lower-middle-income countries, 14.6% for upper-middle-income countries, and 11.8% for OECD countries. Together, these estimates imply that a 1% reduction in trade costs has the potential to increase bilateral trade by 2.8–4.5% (WTO 2015; G20 TIWG 2016). While the direct benefits of trade facilitation will be proportionally higher for countries not well integrated into international trade because of their high trade costs, the global benefits will be higher if key traders at the core of GVCs undertake trade facilitation investments (see figure 4.5). Improving trade facilitation for economies below the line would benefit the entire trade community by reducing accumulated trade costs—the farther from the line, the higher the expected benefits. Six countries (among the 61 in the Trade in Value-Added database) are particularly relevant from this perspective: Indonesia, the Russian Federation, Brazil, India, China, and Italy.

The network approach also suggests that the global benefits will be higher when trade facilitation investments go to the key GVC traders. As mentioned by Hayakawa, Laksanapanyakul, and Yoshimi (2016), trade costs often take the form of customs delays due to processing issues such as inconsistencies in Harmonized System codes between importers and customs, particularly when the correct applicable Harmonized System code is unclear for a product. Those issues can be solved without huge investment costs—for example, by implementing an advance ruling system that expedites the delivery of shipments because importers and other related parties can inquire about tariff classifications and duty rates prior to import.

Conclusions

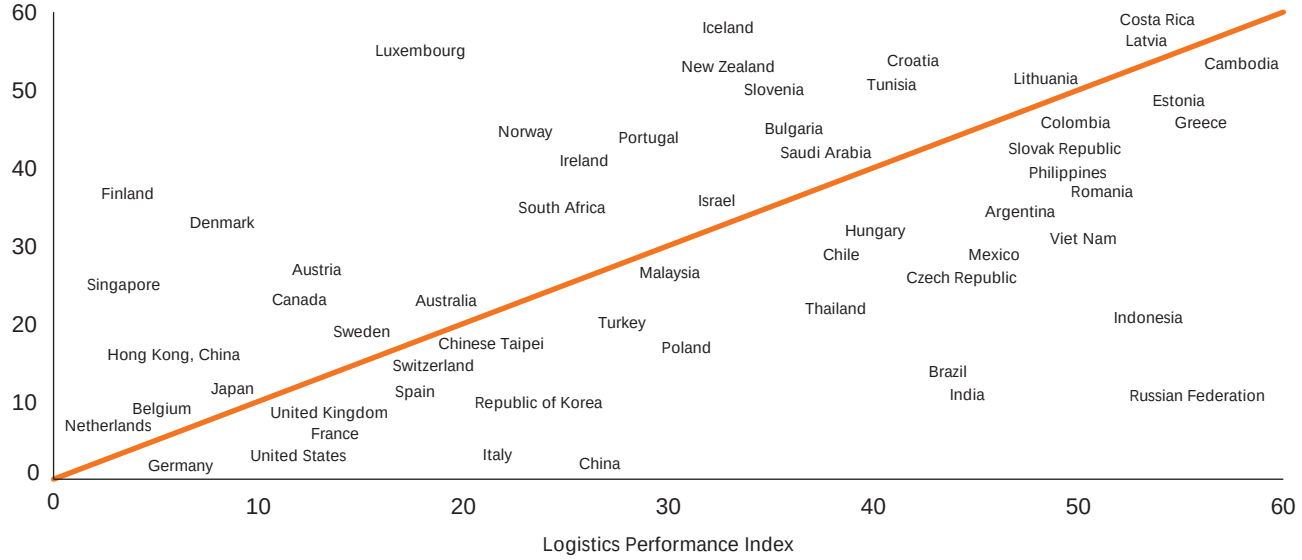
The accumulation and magnification effects of cascading trade costs explain why complex GVCs cannot develop when those costs are above a certain threshold (Yi 2003). When the production of a final good is fragmented across several countries, trade

and uncertainty, are particularly relevant when the manufacture of merchandise is fragmented across several countries. Delays in a just-in-time business model disrupt the whole supply chain and render the entire process inoperable.

Trade costs vary by sector and country. Outside agriculture, the costliest sectors, as measured with the extended effective protection margin, are motor vehicles, transport equipment,

FIGURE 4.5

PageRank centrality indicator



carry the lowest trade costs because they require few inputs in the production chain. Small and low-income countries tend to suffer more from trade costs: Cambodia ranks as the most expensive country in additional trade costs.

The smaller domestic value added share in developing economies' manufactured exports, compared with that in developed countries' economies, tends to amplify the impact of trade costs through the magnification effect. From a trade and development perspective higher-than-average trade costs marginalize low-income countries and prevent them from joining international supply chains. They may still compete by further reducing the wages paid to workers and the gross profit retained by the firm, but such a race to the bottom would severely limit their potential for industrial and social upgrading.

Many developing countries intend to lower their trade costs by setting up duty drawback schemes and export processing zones. But the effect is limited in time and scope, because they compensate exporting firms for the additional production costs only when they use imported inputs. Such strategies tend to price-out second-tier domestic firms. These mitigating policies are only second-best alternatives to fully fedged trade facilitation when it comes to deepening domestic interindustrial links. Reducing tariff and nontariff trade costs globally through multilateral agreements is thus fully consistent with the interests of developing economies because it lowers their cost of GVC participation.

Finally, in a production network, bilateral trade costs tell only part of the story. In a close-knit network, competitiveness also depends on the costs faced by trading partners and by trade competitors. Poor trade facilitation among countries that rank highly in GVC trade (at or close to the heart of regional networks) impose a systemic cost both to themselves and to the rest of the trade community. The welfare benefits of the WTO Trade Facilitation Agreement from gains from trade will be enjoyed by the implementing economy, by its direct trading partners, and by the entire community. This magnified effect of trade facilitation is directly attributable to the way trade costs accumulate in GVCs.

ANNEX 4.1

Extended effective protection rates and the relative price of value added

Effective protection rates, in their original formulation, are calculated by deducting the additional production cost that manufacturers have to pay because of the tariff charged on tradable inputs from the additional benefit generated by selling their product at a price higher than the free-trade market price, thanks to the duties charged on competitive imports. Th
(*EEPR*) on tradable good *j* is the diff
added obtained on the domestic ma
trade costs), and V^*_j, the value adde
the absence of policy and natural trad
portion of the frictionless value adde

$$EEPR_j = (V_j - V^*_j) / V^*_j$$

Substituting products for indust
expressed in standard input-output

$$EEPR_j = \frac{p_j \times t_j - \sum_i (t_i \times a_{ij})}{p_j - \sum_i a_{ij}} - 1$$

where p_j is the nominal price of out
price; a_{ij} are elements of the matrix
an input-output matrix at the frictio
t_j is 1 + the rate of ad valorem tariff a
tion on sector *j*, where $t_j \geq 1$; and t_j
nominal tariff and transport protection on inputs purch)-18.6730C8>Tj/TT3 5(a)-i8 (p)3LGGA2GPA…here *t*

ANNEX 4.2

Measuring the length of global value chains and the number of border crossings

The analysis of trade costs embodied in multistage international production processes is often carried out using international input-output models. The calculations have been made possible by the availability of the underlying input-output tables: Koopman and others (2010) estimate the cumulative effect of transportation and tariff margins using Global Trade Analysis Project Multi-Country Input-Output tables; Tamamura (2010) uses the Institute of Devel-

Notes

1. Measuring the input use and value-added contributions along the production chain from beginning to end since the mid-1970s, the five stylized facts are the ratio of world value-added to gross exports (an indicator of GVC trade) has fallen over time, by roughly 10 percentage points; this ratio has fallen for manufacturing but has risen outside of manufacturing; changes have been heterogeneous across countries, with fast growing countries seeing larger declines in the ratio of their value-added to gross exports; declines in value added to export ratios have been larger for proximate partners that entered into regional trade agreements; and declines in value added to export ratios have been larger for country pairs that entered into regional trade agreements.
2. The author shows that in the presence of trade in intermediates GDP is not a good proxy for economic mass. As Noguera (2012) explains, deriving a gravity equation for bilateral value-added trade is complicated by the nonlinear relationship between the value added and final-good demands. Trade costs affect trade in value added through their effect both on bilateral gross trade and on production sharing arrangements, but also through the trade costs corresponding to other pairs of countries in the supply chain.
3. In competitive markets GVC trade exists only when trade costs are lower than the efficiency gains of fragmenting the supply chain and