What Makes a Supply Chain Resilient?

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COVID-19 has re-ignited debates about global production

- Do global value chains (GVCs) make economies more vulnerable when exposed to shocks?
- Will more domestic production and shorter value chains make GVCs more resilient?
- What is the role of firms and governments?

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Concerns about GVCs: face masks

The face mask value chains and its main bottlenecks during COVID-19

Raw materials → Processed inputs 1 → Processed inputs 2 → Assembly line → Sterilisation → Testing and packaging → Distribution

Raw materials	Processed inputs 1	Processed inputs 2	Assembly line
Petroleum oil Metal Paper pulp (Cotton)	Polypropylene Nylon spandex Aluminium Galvanised iron or steel Cardboard	Nonwoven fabric Metal strips Ear loops Boxes for packaging (Other fabric)	[Ultrasonic welding]

There was a shortage of melt-blown polypropylene manufactured by a limited number of companies

While ultrasonic welding is used in a variety of industries, assembly lines for face masks are very specific and were in shortage. Other machines can be used but requiring some adjustments

Most countries manufacturing face masks have put in place export bans or equivalent measures.
Distribution was more complicated in the context of the shortage

Source: OECD (2020). https://read.oecd-ilibrary.org/view/?ref=132_132616-l4i0j8ci1q&title=The-Face-Mask-Global-Value-Chain-in-the-COVID-19-Outbreak-Evidence-and-Policy-Lessons

GVCs and COVID-19: re-assessing the evidence

- GVCs have been rather resilient during COVID-19
  - Limited disruptions in food supply chains and pharmaceuticals
  - A major shortage for key medical supplies but due to an unanticipated surge in demand (and addressed through GVCs)
- Main issues with COVID-19 based on OECD interviews with firms:
  - Disruptions in transport networks
  - Volatility of demand
  - Health measures in domestic economies
  - Policy uncertainties
- Factors of resilience:
  - Risk management strategies
  - Safety stocks and capacity to increase production
  - Shifting production across locations

Robustness versus resilience in GVCs

- **Robustness** is the capacity to continue to produce during a crisis
  - Achieving robustness is generally more costly (and during a pandemic, this ‘cost’ involves exposing workers to risks)
  - Robustness is an objective for the production of essential products or activities that cannot be easily stopped
- **Resilience** is the ability to return to normal operations in an acceptable period of time after being disrupted
  - Some firms accept risks (and prefer to not invest to be robust) - they focus on the time to recover in their risk management strategies
- Complex value chains (with production in multiple countries) are generally less robust but more resilient (i.e. they recover more quickly)
- Single sourcing is a strategy focusing more on resilience while the redundancy in suppliers is a strategy aiming more at robustness
- Some risk management strategies are common to robustness and resilience

Redundancy in suppliers and production capacity?

- Redundancy is part of the toolkit of risk management strategies…
- … but generally has a limited utility
- Often a costly and impractical strategy
  - Useful for high frequency and high impact risks
- Empirical analysis suggests that firms relying on single sourcing are more resilient than firms with diversified sourcing (Jain, Girotra and Netessine, 2016)
  - Importance of long-term relationships with suppliers

Just-in-case strategies instead of just-in-time?

- A bit of a misunderstanding about just-in-time manufacturing:
  - Not anymore the dominant manufacturing model (replaced by agile manufacturing)
  - Most resilient companies also favor lean manufacturing
    - Most efficient companies are the most resilient
  - Just-in-time strategies and efficient risk management generally go together
- If 'just-in-case' means creating buffer stocks, companies with lower costs for inventories are better placed to do it.

Reshoring and shorter value chains?

- No empirical support for the idea that domestic production is more resilient
  - Risks are different at home and when producing abroad
  - Firms are resilient through their international production networks
- Reshoring is generally motivated by other determinants than reducing the supply chain risk
- No evidence either that reshoring is actually happening
- Basic economic mechanisms remain in favor of the international fragmentation of production
  - Scale economies, gains from specialization, serving different markets

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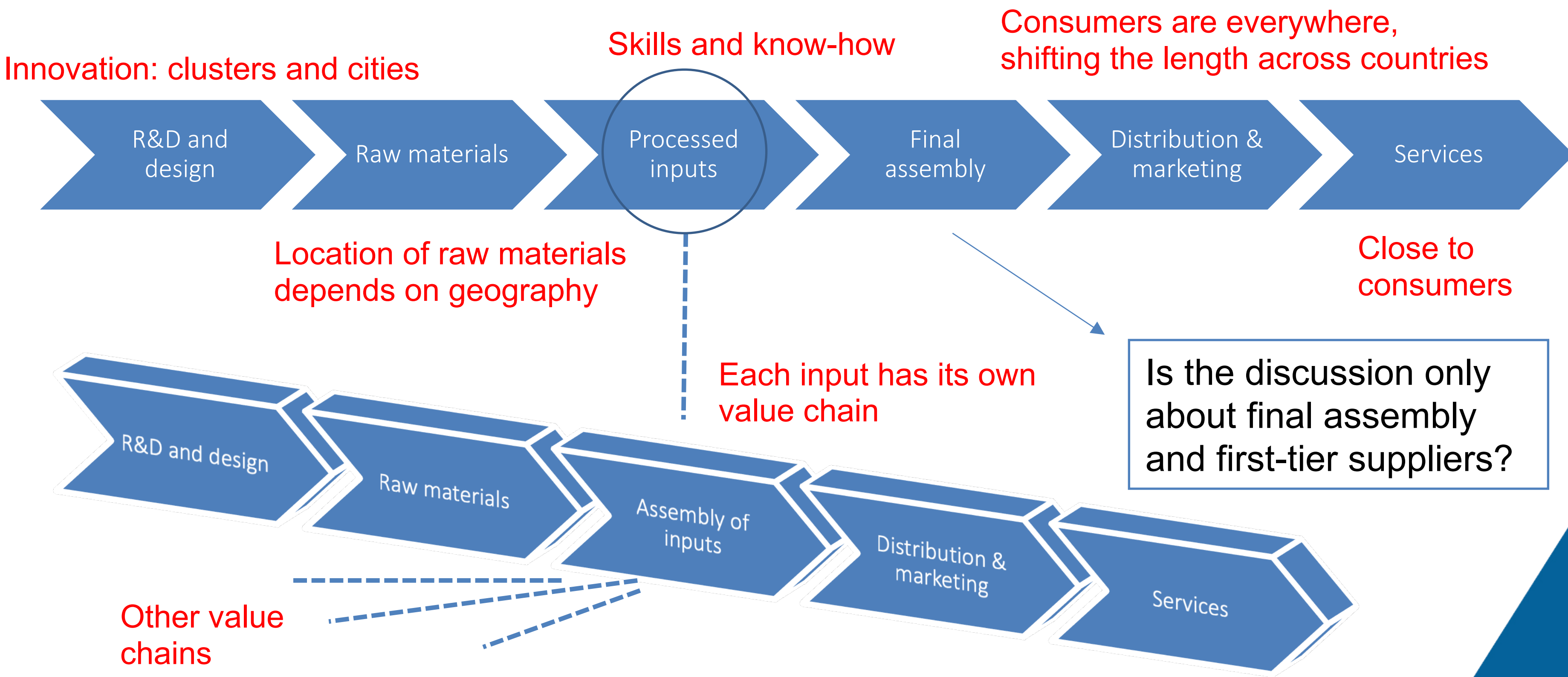
What part of the value chain can be reshored?



Resilience at the firm level: emphasis on capabilities of firms

- Agility: A management structure that allows to quickly take decisions when disruptions happen to mitigate their impact
- Flexibility: Be in a position to change the production process, to manage human resources, to re-route inputs, products, etc. when disruptions are there
- Visibility: Risk assessment all along the value chain, real-time monitoring, information on all suppliers and the time they need to recover
- Cooperation: With suppliers to help them to recover quickly, as well as with customers to let them know the impact of the disruption and find solutions

Resilience at the GVC or country level: how to define it?

- Diversification in sourcing is different at the firm and country level
  - Different firms relying on single sourcing can source inputs from different countries
  - No strong evidence of concentration of supply for most products and countries
- Firm heterogeneity: not all firms are well prepared for risks but some are
  - Resilience becomes an issue for more vulnerable firms (e.g. SMEs)
- Is the robustness of GVCs for essential products the main issue for resilient GVCs from a government perspective?

The way forward?

- Policies for GVCs need careful consideration
  - The benefits of new GVC policies should outweigh the risks
  - Experimenting with new trade and investment policies is risky in the middle of a deep economic crisis and growth of protectionism
- Role of governments:
  - During the crisis: Maintaining the functioning of key infrastructure, adapting regulations
  - Anticipating crises: Be as prepared as companies, contingency plans (e.g. to scale up production of essential goods) and specific agreements to limit the use of trade restrictions
  - Creating a stable regulatory environment (i.e. reducing policy risk)

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