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PERSPECTIVE

# Supply chain myths in the resilience and deglobalization narrative: consequences for policy

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**Abstract**
The economic disruptions experienced during the COVID-19 pandemic and Russia's invasion of Ukraine have generated a narrative of resilience and deglobalization that brings the old world order into question. Heightened public attention on perceived supply chain failures has exerted pressure on governments to intervene in firm-level operations to assure supply of essential or strategic goods. This paper argues that the narrative is founded on false premises. In particular, three supply chain myths have emerged in public and academic discourse: (i) lean management has gone too far and exacerbated disruptions in global supply chains; (ii) efficient supply chains are less resilient; and (iii) foreign supply makes supply chains less resilient. We argue that these beliefs are not adequately supported by evidence. They can displace analysis to negatively impact policy and actually diminish resilience. Drawing upon IB and supply chain management research, we investigate the root causes of perceived market failures. Recommendations are for an evidence-based debate on current events and policies.

**Keywords** Supply chains · Global value chains · COVID-19 · Resilience · Lean · Deglobalization

## Narratives of resilience and deglobalization

Recent international crises like the COVID-19 pandemic and the war in Ukraine have created a new world order, with profound consequences for global supply chains. During the pandemic, shortages and delays in product deliveries made ordinary citizens unpleasantly aware of the global operations of a trade system which, until then, had toiled out of sight and mind (Delios et al., 2021). Russia's invasion of Ukraine and its disruption of energy markets provided further reasons to question the viability of an international system of trade and specialization, in which economic shocks are transmitted through supply chains and trade dependencies can be weaponized (Farrell & Newman, 2022). Mounting geopolitical tensions between the United States and China were evident prior to the pandemic and Ukraine war, but the calls for 'decoupling' the two economies have since intensified, with material effects on the global business environment (Petricevic & Teece, 2019; Teece, 2022).

A narrative has emerged (Evenett, 2022) that implies that deglobalization is inevitable because international supply chains are inadequately resilient and trade partners hostile (Foroohar, 2022; Coveri & Zanfei, 2023; Witt et al., 2023). Terms like 'friend-shoring' have been introduced into the policy discourse, with some voices insisting that the virtues of regional supply chains exceed those of the global ones (O'Neil, 2022). The decline of global trade and investment measured in the past years is interpreted as the dawn of a new phase of deglobalization, linked to supply chain failures. In the words of Witt et al. (2023), the pandemic has revealed "cost-optimized global supply chains as the Achilles' heel of IB". The narrative proceeds roughly as follows: recurrent disruptions (like stockouts and volatility in prices and supply in the wake of crisis), are equated with market failure, and market failures demand regulatory attention, perhaps even targeted industrial policy. Policymakers have come under pressure to take action.

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Like wars, supply chain disruptions and their negative impact on consumer experience are not new to scholars (Tang, 2006). The eruption of an Icelandic volcano in 2010 caused backups at ports in Shanghai and Long Beach that shut down automotive plants in Germany, threatened shortages of food in the UK, and narrowly avoided a stockout of pharmaceuticals in Ireland (Gross, 2010). In the past, the issues were reported in the press, but soon forgotten as firms and consumers resumed business as usual. In the course of COVID-19, attention paid to supply chains was higher, generating an ongoing scrutiny of disruptions and failures. This high-volume discourse earned the term "supply chain" a ranking in Lake Superior State University's annual list of banished words for 2022. The press release noted that "supply chain issues have become the scapegoat of everything that doesn't happen or arrive on time and of every shortage" (Lake Superior State University, 2021).

Public interest in supply chains should usually be good news for the international business (IB), global value chain (GVC), and supply chain management (SCM) scholars who conceptualize them. However, the heightened attention they now draw has created misleading oversimplifications in both the press and scholarly literature. We therefore urge academic experts to address three particular myths for which the evidence is thinner than one might expect. The first myth asserts that supply chains have become 'too lean', and that a lack of redundancies and buffer stocks caused recent supply chain failures. The second myth assumes that there is a natural trade-off between efficiency and resilience and that today's firms have created supply chains that collectively prioritized the former to the detriment of the latter. As a consequence, they tacitly accepted a reduction in resilience. The third targets the international structure of supply chains with the claim that foreign supply creates vulnerabilities and lowers resilience. As with most myths, each of these contains elements which seem plausible at first glance. After all, is it not logical to respond to a *disruption in supply* with an *increase in supply*, by investing in stockpiles and expanded production capacity? When shocks are transmitted through international supply chains, is it not a good idea to reduce dependencies on foreign economies by moving production closer to home? The evidence suggests that these conclusions are not as logical as they might appear.

These myths reveal a broader misunderstanding of how supply chains actually work and contradict fundamentals of business literature and economics. They have the power to draw the attention of policymakers away from the root causes of disruptions (which may have nothing to do with supply markets), towards policies that cannot realistically achieve the required resilience of supply chains. Worse, over time, they may prevent the adoption of more appropriate policies and weaken a productive system of global trade. The unintended consequences would negatively impact income and access to essential goods and services.

The rest of the paper is organized as follows. We begin by reviewing principles established by the supply chain management literature which are prerequisite for a discussion of resilience and deglobalization. We then revisit business fundamentals and empirical evidence to address the narrative's three influential myths. In the subsequent section, we consider how these myths could negatively impact policy. The paper concludes with a discussion of future IB research which would promote an evidence-based debate on trade and industrial policy.

## The literature on supply chain management and global operations

Defined formally, the term 'supply chain management' (SCM) denotes the flows of material, information, and finance in a network of firms which extends from providers of raw material to end consumer of a finished product, all of which are managed to maximize the total economic surplus of the interconnected system (Chopra & Meindl, 2016; Christopher, 2011). The SCM literature can be challenging to non-specialists since its range of constructs, units of analysis and methodologies are so heterogeneous that it resists systematic reviews (Croom et al., 2000; Durach et al., 2017; Spearman & Hopp, 2021). Its scholars acknowledge a 'methodological chasm' between empiricists and mathematical modelers (Sanders, 2009). And yet, in spite of its complexity, this literature has established a number of principles which can inform the current debate, briefly summarized as follows: supply chains exhibit decentralized decision-making and control, their economic performance is achieved through the network, in which participating firms are mutually dependent, and the fact that not all supply chains are designed to minimize operational costs.

An important review of 40 years of research in the modeling stream describes a shift of focus from optimizing tactical decisions on production, distribution, and inventory, towards strategic decision-making in distributed supply chains that span multiple organizations and independent decision-makers (Graves, 2021). The evolution is more than one of unit of analysis, since it accounts for a key effect of de-verticalization. It acknowledges that, compared to individual firms, decision-making in a supply chain is decentralized, with no single point of control.

While the deglobalization narrative imagines resilience through decoupling from trade partners, the literature emphasizes the economic performance of networks. Following the dis-integration of the corporate core, a stream of literature posits that it is no longer individual firms which

compete, but supply chain vs. supply chain[1] (Croom et al., 2000; Christopher, 2011; Dyer & Singh, 1998; Harland, 1996; Ketchen Jr & Guinipero, 2004; Mentzer et al., 2001). In other words, superior value creation, competitive advantage, and resilience originate in the network, not in the single firm. The economic success of single firms which trade tasks within a GVC is achieved through (and depends upon), the integrated performance of the network of firms, including their suppliers.

By extension, in order to achieve the optimal performance of the system, the research advises against the pursuit of any single, isolated objective, especially cost. Contrary to the contemporary narrative, "assuming cost efficiency to be the only indicator of viability (results in) a myopic and suboptimal analysis" to support decision-making (Sanders & Wagner, 2011). Because cost-cutting in silos leads to sub-optimal performance of the network, the extant literature does not generalize the management of all supply chains to be "cost-optimized", especially if this is understood as reducing cost at the expense of other profit-maximizing performance indicators (like order fulfilment rates). Certain types of supply chains, like those of spare parts, strategically maintain costly inventory stockpiles and expensive (usually faster) transport modes, to cash in on high margins, and avoid the cost of lost sales.

Because each node in the network waits for inputs from its suppliers upstream, the literature acknowledges an inherent mutual dependency (Billington & Sandor, 2016; Ellram, 1991; Mentzer et al., 2001; Tan, 2001). Interdependency is not automatically a vulnerability, but is "a prime force in the development of supply chain solidarity" (Mentzer et al., 2001), which in successful supply chains translates into coordinated decision-making, especially planning. Therefore, in order for a supply chain to perform well, the firms in its network will need to align interests, share information in a timely manner, and collaborate to fulfil orders. According to Sanders "by definition, the key aspect of SCM is the coordination and collaboration of functions within the enterprise and between enterprises" (Sanders, 2009).

Last, but not least, the literature has extensively studied risk and the causes of disruptions (Bode & Wagner, 2015; Sodhi & Tang, 2021a; Tomlin, 2006). Significant evidence confirms that volatility of demand and supply causes disruptions of material flows (Snyder et al., 2016; Tang, 2006). These principles are directly relevant to an ongoing debate which insists, among others, that governments take a more active role in influencing the organization of supply chains and in bringing them closer to home in order to strengthen their resilience.

Important contributions have also been made by the IB and GVC literature streams. Because these scholars provide inputs to policymakers, the narrative of resilience and deglobalization could not be more relevant to their lines of inquiry. The stream of GVC literature has been instrumental in transforming the conceptualization of global trade beyond foreign direct investment (Baldwin, 2016). It has since defined a set of tools, including governance typologies, and upgrading strategies, with which to analyze interfirm relationships (Gereffi & Korzeniewicz, 1994; Gereffi et al., 2005). A core research question in the IB literature is the motivation of firms who engage in international production in a process of externalization (Buckley & Casson, 1976; Dunning, 1981; Strange & Humphrey, 2019). While IB theory did not initially conceptualize global supply chains *per se*, it moved closer to SCM by looking at networks of suppliers in the 'global factory' (Buckley, 2009; Buckley & Strange, 2015) and by acknowledging the role of vertical specialization and fine-slicing of activities across locations (Buckley & Ghauri, 2004; McCann & Mudambi, 2005).

Finally, a discussion of resilience needs to precisely specify how supply chains should be able to withstand shocks and disruptions. This requires definitions of closely related concepts like robustness, security of supply, or viability of supply chains (Galaitsi et al., 2020; Ivanov & Dolgui, 2020). The risk management literature defines resilience as the ability to return to normal operations after a disruption in an acceptable period of time (Brandon-Jones et al., 2014; Christopher & Peck, 2004; Sheffi, 2015). Resilience is therefore not the absence of risks or disruptions. Robustness is defined as continuity in a crisis, or "black swan" scenario like the COVID-19 pandemic. The related concepts of security of supply, and viability of supply networks focus on how supply chains can sustain operations to 'survive' a crisis.

## Myth 1: lean management has gone too far, exacerbating disruptions in global supply

During the COVID-19 pandemic, the belief that lean management principles had been excessively applied—or 'gone too far'—began to spread. This myth asserted that just-in-time (JiT) operational strategies had exacerbated disruptions, or even caused the failures of global supply chains during the crisis. The New York Times explained that shortages during COVID-19 were the outcome of "the disruptions of the pandemic combined with decades of companies limiting their inventories" (New York Times, 2021). A number of economists and business scholars announced that lean management had overstepped its bounds (Allon, 2021; Javorcik, 2020; Simchi-Levi & Simchi-Levi, 2020), while consulting

[1] According to Christopher, "perhaps one of the most significant breakthroughs in management thinking in recent years has been the realization that individual businesses no longer compete as standalone entities but rather as supply chains" (Christopher, 2011).

firms shifted from traditional cost-cutting advice to prescribing a 'rebalance' of JiT with "just-in-case" inventory strategies.[2] The shortages of semiconductors that affected automakers in 2021 led to similar conclusions about "aggressive lean inventory practices" (Vakil & Linton, 2021).

A search for empirical evidence for these statements yields few research papers that have examined private-sector inventories, either during the pandemic or in other major crises. This is perhaps attributable to the difficulty of obtaining a large enough sample of firm-level data on global supply chains and their stockpiling strategies.[3] To our knowledge, the only paper that suggests that supply chain vulnerability increased in firms with JiT inventory systems, is Ortiz (2022). In its sample of 200 listed manufacturing firms who faced unexpected weather disasters, the author found that the JiT adopters experienced a 3% sharper drop in sales. When it comes to the COVID-19 pandemic, some papers highlighted the role of inventories in absorbing shocks at the firm level (Lafrogne-Joussier et al., 2023), but without assessing the role of lean management. Other papers which conducted an in-depth study of recent shortages of face masks and personal protective equipment (PPE), concluded that these stockouts were not caused by inventory decisions (Gereffi, 2020; Sodhi & Tang, 2021b).

In the missing inventory debate, a number of assumptions deserve closer attention. First, lean management is not synonymous with low or no inventory levels (Choi et al., 2023). This literal interpretation is a fundamental misunderstanding of 'lean' because it fails to distinguish between management programs and the description of a state of a system. The programmatic origins of lean management trace back to the Toyota Production System, or TPS (Womack et al., 1990), which reduces waste in the value chain through continuous improvement. Excessive inventories can indeed be a source of waste, but lean manufacturing programs do not necessarily strive to eliminate them. The waste targeted by lean management programs like TPS include defects, overproduction, transportation, waiting, superfluous motion and processing (Hopp & Spearman, 2021). Eliminating these categories of costly waste contributes to a reduction of disruptions in the supply chain. It also increases the ability of firms to cope with uncertainty, like increases in demand or shortages of inputs. Toyota originally developed its JiT policy to avoid parts shortages (Sheffi, 2020), by introducing smaller batches and smoother material flows to stabilize yields, while improving product quality. Tellingly enough, it is the lean pioneer Toyota that was the car manufacturer the least impacted by the semiconductor shortage in 2021–2022 (Shih, 2022). Toyota had accumulated strategic stockpiles and drew upon a base of suppliers with whom it had built trust.

Another logical contradiction in the "too lean" myth is the fact that, in practice, economic rationality works against extreme cost-cutting. Any discussion of efficiency must account for the fact that all firms have a natural and rational incentive to invest in stockpiles. It can never be in the interest of firms to eliminate inventory at all points of the supply chain because this effectively makes it less likely (or impossible) to make or sell anything. Firms therefore position different types of stock (pipeline, cycle, safety, seasonal) at various points in the network to cope with the contingencies of production, distribution, and demand. The combinatorial possibilities are virtually infinite, and these optimizing decisions must be made whether the business is domestic or international.

The operative challenge is how much to keep. How the decisions are made in practice can be described as a natural oscillation between states of high and low inventory levels, as internal functions jockey to assert competing interests (Fig. 1). When paying for too much unsold inventory, a firm can quickly run out of money which is needed elsewhere for operations, investments, and innovation (all of which support firm-level resilience and competitiveness). Overstocks are flagged by financial controllers who insist that these be corrected downwards, which eventually leads to low order fulfilment levels and lost sales. This in turn provokes protest from sales executives, who lobby to correct inventory levels upwards to boost revenues and market share. The ongoing negotiation creates the 'service–inventory pendulum' (Johnson & Davis, 1998), mediated by supply chain engineers who perpetually fine-tune a firm's investment in stockpiles to maximize revenue at the lowest cost. The pendulum achieves efficiency at a firm level.

Coined in 1998, the logic of the service–inventory pendulum is worth revisiting in the current debate. The asymptomatic curve represents the best possible tradeoff (efficient frontier) between inventory and customer service, incorporating the uncertainties of demand and supply measured during regular operations (Silver et al., 1998). If, in the pursuit of resilience, the uncertainty of black swan events (more

[2] For example, a report by PwC (2022) indicates that "a decades-long focus on increasing the cost efficiency of supply chains has led to fragility and limited transparency" and suggests "balancing just-in-time with just-in-case" (https://www.pwc.com/gx/en/about/pwc-asia-pacific/building-rebalanced-and-resilient-supply-chains/balancing-just-in-time-with-just-in-case-profitable-redundancy-in-supply-chains.html). McKinsey (2021) mentions that "The shift to just-in-time and lean production systems has helped companies improve efficiency (…) But now they may need to strike a different balance between just-in-time and 'just in case'" (https://www.mckinsey.com/capabilities/operations/our-insights/risk-resilience-and-rebalancing-in-global-value-chains).

[3] Validation of the narrative of supply chain failure requires a data-driven analysis of how firms-level decisions impact the performance of the supply chain, as do Inoue and Todo (2019) and Diem et al. (2022). These particular papers do not, however, examine the role of inventories.

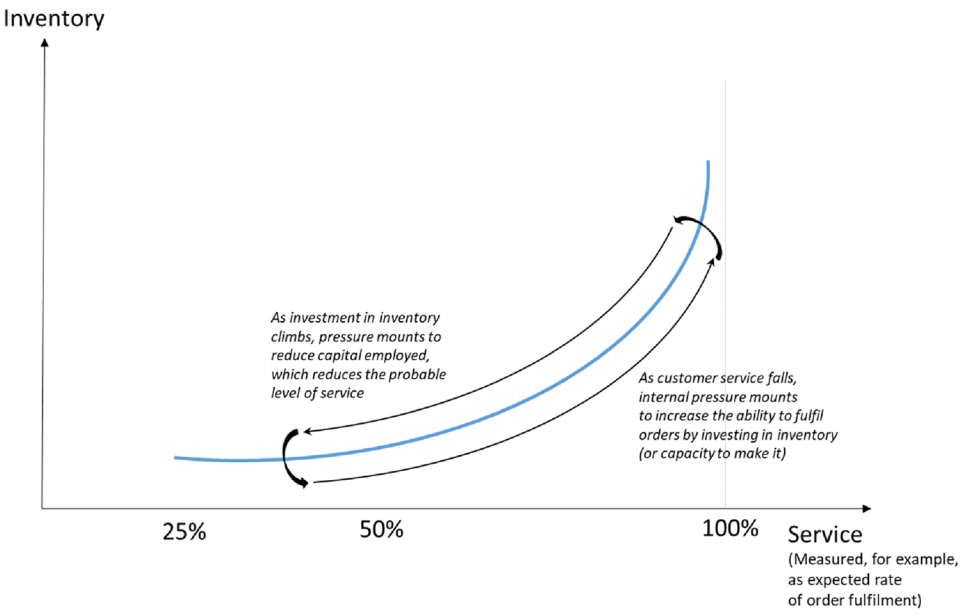


**Fig. 1** The service–inventory pendulum, based on Johnson and Davis (1998). The best possible trade-off between inventory and service (measured as probability of order fulfilment) is an asymptotic curve which reflects regular demand and supply uncertainties. Firm-level performance is not located as a static point on the curve. In practice it is a dynamic, whose position on the curve at any time is determined by the outcome of negotiations between competing functional interests.

than 10 standard deviations of demand or supply), were to be incorporated, the resulting trade-off curve would sharply shift upward, rendering most firms unprofitable (and consumer goods unaffordable).

The stockpiles which firms routinely optimize therefore support the demand of their respective business models, not the extreme spikes or external shocks which occur during a global crisis. The proportionately larger stockpiles, which could prepare for extreme outliers of demand or shocks, are likely to reduce firm performance in "peacetime", without actually protecting against stockouts in the moment of need (Choi et al., 2023; Sheffi, 2020; Sodhi & Tang, 2021b; Tomlin, 2006). This is especially true should consumer preferences shift, or items are perishable (like medical supply or PPE).

In 2006, Tang made an important distinction between two modes of supply: regular and emergency. "The regular supply model is based on a regular supply lead time, while the emergency supply is available instantaneously". Because instant fulfilment of demand spikes is extremely costly to maintain, a combination of "efficiency and resiliency are critical for firms to ensure profitability and business continuity" (Tang, 2006). In their recent discussion of how to deal with the pandemic and geopolitical tensions, Sodhi and Tang (2021a), repeat the same distinction. Risk management in regular operations is not the same as the emergency response to "extreme events", which are global and protracted over longer periods of time. Their research concludes that the tactics of everyday operational risk management, like the buffer stocks which protect against fluctuations of demand and supply, should not be applied to the demand spikes of extreme disruptions. Firms looking to bounce back quickly at the lowest feasible investment will have to devise more sophisticated solutions than static, 'just-in-case' stockpiles.

At the same time, lean management offers solutions in times of crisis. According to Sheffi (2021) and Netland (2021), it remains one of the most effective strategies to enable firm-level preparedness for disruptions. In one of the few empirical papers looking at the relationship between resilience and lean manufacturing, Birkie (2016) concludes that lean practices help to mitigate disruptions. The essence of lean is not only the elimination of waste, but a culture of continuous improvement to relentlessly optimize the production system. Shih (2022) highlights that it is lean management's principles of decentralized problem-solving that really enabled Toyota to better address semiconductor shortages in 2021–2022. With respect to the COVID-19 pandemic, Sheffi went so far as to declare that it was "supply chain's finest hour", bringing the best to bear in a system of collective intelligence (Sheffi, 2020).

While analyses of how buffers contribute to resilience are welcome, the extant literature suggests that lean management is part of the solution, not the problem. An increasingly uncertain world should encourage firms to a more widespread use of lean management to better prepare for shocks and disruptions. New research explores innovative ways to leverage JiT in turbulent environments. For example, Choi et al. (2023) propose the novel design of production networks in which individual JiT segments are linked by buffers which reinforce the resilience of the total supply chain. By the word "buffer", they mean not only material stockpiles, but "spare or backup capacity, redundant suppliers, and even facilities shared with other companies, including competitors" (Sodhi & Choi, 2022).

## Myth 2: efficient supply chains are less resilient

The misconception of excessively 'lean' supply chains depicts firms in a single-minded pursuit of 'efficiency', at the expense of resilience. Efficiency here is understood as a progressive divestment in material supply, to the point where firms become incapable of responding to demand or supply uncertainty. We have already argued against the claim of lean as no-inventory. In this section, we review evidence of the assumption that there is a natural trade-off between efficiency and resilience. In other words, whether firms must choose one capability at the cost of the other.

There is, again, little research that confirms the existence of this trade-off. When applied to communications and engineering, some network theory has identified trade-offs between efficiency and resilience (or robustness) (Brede & de Vries, 2009). For example, star-like configurations generally provide the best efficiency to communicate across nodes, while resilience is achieved by avoiding short loops and degree homogeneity. The resilience and deglobalization narrative is not, however, concerned with design choices like these. It assumes a firm-level trade-off, in which nodes are 'hyper-specialized' within long and complex supply networks, to maximize efficiency at the expense of resilience to shocks (Coveri et al., 2020; Farrell & Newman, 2020).

A recurring element of the narrative is that supply chains are excessively focused on the reduction of short-term costs (Ellram et al., 2020; Javorcik, 2020). While the service–inventory pendulum illustrates that negotiations between functional specialists naturally re-balance limited firm-level resources, there is little evidence that supply chains today are designed to always and only reduce cost. The supply chain research confirms that single cost factors (like wage) constitute a much smaller portion of total landed cost than might be intuitively expected (around 10%, according to Christopher, 2011). Not all firms systematically measure inventory levels in isolation. There exist case studies of the 'cost-to-serve' of a portfolio of customer accounts (Seifert & Markoff, 2021; Thakur-Weigold & Lorenzon, 2015), in which managers determine which customer accounts are most profitable, in order to focus resources and attention accordingly. Efficiency must therefore be defined as the best use of resources in the pursuit of business results like customer satisfaction, product quality, and profit. It will follow that inefficient and wasteful firms are neither resilient nor competitive in the long run.

To explore the assumptions behind the purported efficiency–resilience trade-off, we revisit the risk management literature, especially the definition of firm-level resilience. As presented in the Introduction, resilience is the ability of a firm to bounce back after a disruption. This can be achieved in two ways, the first being 'redundancy', in the form of excess capacity or assets like inventory. Redundancy strategies can potentially lead to a reduction in cost-efficiency. However, this is the inferior alternative for a number of reasons we have discussed, including the misallocation of resources and compromising effects on product quality. The supply chain literature has also shown that increasing the number of backup suppliers can reduce resilience because of the necessarily weaker relationships between individual firms (Jain et al., 2016; Sheffi, 2005a). Working with multiple suppliers also increases what is known as horizontal complexity, which increases the probability of disruption (Bode & Wagner, 2015; Mizgier et al., 2015).

The second way to achieve resilience is through flexibility and a culture of coordination and collaboration (Sheffi, 2005b). This method is more effective, if only because it reinforces competitiveness over a longer period of time by deploying supply chain fundamentals. While the risk management literature may not definitively confirm the relative importance of flexibility vs. redundancy for the pursuit of resilience (Kamalahmadi & Parast, 2016), a large body of empirical work concludes that investment in supply chain risk management improves firm-level outcomes (Sheffi, 2005a, 2015). Firms that prepare for risks have strategies that enable them to recover at a quicker pace than unprepared competitors. Firms that invest in risk management develop the agility, flexibility, and dynamic capabilities that drive performance in multiple dimensions, be they operational, competitive, or financial. Firms that are more resilient are also perceived as more reliable, hence more attractive for collaborations, alliances, and talents (Buzzao & Rizzi, 2023). This literature stream does not suggest that resilience is increased by foregoing efficiency. Rather, investment in risk management programs prove to add value by mitigating costs when risks actually materialize, and improving operations when nothing unusual occurs, i.e., when business proceeds as usual.

Finally, strategies of redundancy and flexibility can actually be combined. For example, Sodhi and Tang (2021a, b) propose a three-tiered combination of inventory, backup capacity, and standby capabilities, facilitated by an "industry commons", as a cost-effective way to prepare for resilience in the future crises. Their work highlights that, when it comes to extreme shocks, viable strategies do not strive to correct operational strategies in all firms, but arise from cooperative solutions and public–private partnerships.

We note a recent study which positions the efficiency–resilience trade-off at the national, rather than the firm level (Coveri & Zanfei, 2023). It argues that comparative advantage and functional specialization create vulnerability. "Hyper-specialization" in supply chains heightens interdependencies across countries. In response, as a way

to absorb shocks, the authors propose the diversification of economic activity within a single country. In the next section, we investigate the supply chain myth associated with this logic; one that assumes that international interdependencies make supply chains less resilient.

## Myth 3: foreign supply makes supply chains less resilient

A recurrent argument in the resilience and deglobalization narrative asserts that foreign supply creates dependence on countries that are hostile and unreliable. The shocks which affect these countries will be transmitted through supply chains into the domestic economy. Moreover, foreign trade partners might prioritize their own market when essential goods or key inputs are unavailable. This became apparent during the pandemic when certain countries imposed export restrictions on face masks or ventilators, and hoarding behavior ensued (Evenett, 2020). In the debates on geopolitical tensions and decoupling (Bown & Irwin, 2019; Felbermayr, Mahlkow, & Sandkamp, 2022), dependence on international suppliers also becomes a matter of national security, especially when foreign partners are not 'like-minded' and trade could be weaponized in a conflict (Farrell & Newman, 2019; Teece, 2022). These arguments are gaining traction, feeding into policy actions that potentially turn deglobalization into a self-fulfilling prophecy (Evenett, 2022).

The SCM literature acknowledges that participation in global supply chains entails a number of risks specific to international transactions. These risks include uncertainties in logistics operations, longer lead times, concerns about the dependability of suppliers and the rules of conducting business abroad, policy risks, security risks, and exchange rates risks (Cooke, 2002; Huchzermeier & Cohen, 1996; Kouvelis, 1999; Manuj & Mentzer, 2008; Miller, 1991). Some of these risks will be more pronounced in the supply chains located internationally within weaker institutions, with less reliable infrastructure, and in the jurisdiction of illiberal governments. It must be clear, however, that with the exception of exchange rates, purely domestic supply chains are never free of these operational risks.

The supply chain risk literature also explicitly states that "spreading multiple suppliers in multiple countries would enable a firm to manage operation risks such as normal exchange rate fluctuations efficiently. In addition, having multiple suppliers in multiple countries can make a supply chain more resilient during a major disruption" (Tang, 2006). Economic model simulations indicate that, in a world of localized production, countries are less exposed to foreign shocks, but are also less able to cushion those shocks through trade (Arriola et al., 2021). Relying on domestic inputs does not make supply chains more resilient (Bonadio et al., 2021). Empirical evidence confirms that, during the COVID-19 pandemic, international supply chains sheltered firms and countries from shortages, thereby contributing to their resilience (Giglioli et al, 2021). Globally engaged firms recovered faster, due to their higher capabilities and their capacity to adjust (Constantinescu et al., 2022). On the anniversary of the Russian invasion of Ukraine, the WTO reported that international supply chains also offered flexibility and adjustment channels to the shock, and that resilience came from the ability to trade (Ossa, 2023).

By applying real options theory, the IB literature offers a pragmatic conceptualization of risk in networks of international subsidiaries (Kogut & Kulatilaka, 1994). The real options concept recognizes not only the potential downsides of international production, but also its benefits. Production sites in multiple countries enables the flexibility which is prerequisite to resilience. During the pandemic, the advantages of a portfolio of locations became apparent when some companies were able to shift production across countries affected by COVID-19 waves at different points in time (Miroudot, 2020).

Another business fundamental asserts that firms select the location for their activities according to the comparative advantage of countries. The decision to select which segments of the value chain to specialize in, by "trading tasks" (Grossman & Rossi-Hansberg, 2008), is determined by the competitive advantage of firms. It is this complex interplay between comparative and competitive advantage that defines the firm's global strategy (Kogut, 1985a). The fact that these decisions "are based upon considerable uncertainty over future costs, market developments, and technologies" (Kogut, 1985b), is the point of departure for real options theory. By this logic, uncertainty is not an essential vulnerability, but an opportunity for global firms to benefit from market arbitrage, shifting production, or exploiting opportunities in local markets. This is in line with the SCM research on the 'power of resilience': global firms with the best risk management strategies benefit from crises and economic shocks because, when everyone is affected, the most resilient firms respond faster than the competition (Sheffi, 2015, 2020).

Today's face-off between great powers, who do not share the same political and economic convictions, has driven up uncertainty in our world, and raised the level of risk that businesses face. Petricevic and Teece (2019) and Teece (2022) discuss the implications for firm strategies. Nevertheless, geopolitical reality does not invalidate the applicability of real options, and the fact that firms must manage these very risks with trade and economic interdependencies. It is conceivable that, under pressure exerted by their governments, or through internal risk assessments, firms operating in strategic sectors will constrain activity in selected countries. These reductions will, however, in turn, ramp up

economic activities elsewhere, without necessarily severing all links with countries classified as higher risk. The resilience and deglobalization narrative assumes that the only options available to decision-makers in strategic sectors is reshoring, or relocation in 'friendly countries' as defined by the political logic of economic blocs (Witt et al., 2023).

Decision-makers in firms may conclude that their best choices are elsewhere. While the fine-tuned division of labor in their supply chain creates interdependency, it is also a source of economic strength that cannot be discarded lightly. It remains to be seen whether the benefits of specialization and comparative advantage can be viably substituted by the expected gains from diversified activity within domestic economies, as suggested by Coveri and Zanfei (2023). As product design becomes infinitely more sophisticated than Ricardo's wine and cloth, economists can no longer assume that all the necessary inputs to production can be manufactured domestically. Not only the raw materials, but the skills and know-how requisite for modern industrial production are distributed unequally among countries. Global supply chains have emerged in recent decades for a reason. They have created international markets of specialized suppliers who compete with operational excellence and product innovation. Domestic supply chains eliminate these material benefits by creating a single source at home, which may or may not possess the capabilities to perform to benchmarks, and have little incentive to improve.

## How false premises negatively impact policy

The three myths we address are the building blocks of a narrative which has far-reaching implications for policymaking. The myths suggest that disruptions in supply during recent crises were market failures which exposed a collective design error in global supply chains. The managerial failures now require state intervention to correct. Reshoring, near-shoring, and 'friend-shoring' are the preferred options since trade dependencies create vulnerabilities. Because firms have overstepped reasonable boundaries in their pursuit of efficiency, they should be compelled to revert to lower levels of profit to support higher objectives like resilience, or national security. The costs of the requisite restructuring of supply chains are assumed to be acceptable. While it is legitimate for policymakers to address resilience or national security, we have examined the limited evidence for these myths to arrive at different conclusions. In the rest of this section, we consider each in sequence.

The first myth, that supply chains are "too lean", suggests that inadequate levels of inventories in firms are the main vulnerability and require public action. Encouraging firms to add redundancies and increase their level of stocks for 'just in case' situations may look like a good idea. In practice, it can create waste and financial burden that will divert investment from other business priorities, including the development of the very dynamic capabilities which improve resilience. Waste cannot be ignored because of its destructive ecological effects and the moral problem of destroying stocks of essential goods when they expire. For example, global wastage of COVID-19 vaccines could total 1.1 billion doses (Airfinity, 2022), while developing countries never gained access to these vaccines when they were needed, a disparity estimated to have cost over 1 million lives (Ledford, 2022). Avoiding waste and efficiently managing stocks is therefore as much of an imperative for governments as it is for firms, requiring state-of-the-art supply chain management, rather than rough-cut, 'just-in-case' methods.

Another proposal based on the first myth is for governments to organize stress tests for critical supply chains (Ivanov & Dolgui, 2022; Simchi-Levi & Simchi-Levi, 2020). There is some general merit in this idea, whose rhetorical roots are traceable to the 2008 Financial Crisis and the undercapitalization of banks. Risk management programs in firms already test event scenarios and construct heat maps to anticipate outcomes. These tests are common firm-level practice to assess and improve the resilience of supply chains. Government-backed stress tests could play a role in fostering the kind of public–private co-operation necessary for dealing with crises. However, it is not governments who will be the most qualified to calculate the right target levels of inventories. Only firms have the expertise, and it is hard enough for their specialists to make the necessary judgments and trade-offs. Moreover, today's snapshot of inventories in the supply chain are outdated tomorrow. Solving the optimal configuration is an ongoing challenge in every network, and should be delegated to the internal experts familiar with the vicissitudes of each firm's service–inventory pendulum.

Moreover, public focus on inventories is a concern if it is the only tool used to achieve continuity of supply. As previously explained, inventories are the first layer in risk management strategies (Sodhi & Tang, 2021b), but on their own can never address extraordinary demand spikes. Of higher potential are those policy initiatives which look at ramping up production, and repurposing existing capacity in case of a crisis, together with advance and contingency planning. The EU Single Market Emergency Instrument (SMEI), which is currently under discussion, includes an 'emergency mode' in which the European Commission could facilitate the expansion and repurposing of production lines for essential goods. A policy agenda like this requires looking beyond static levels of inventories.

The second myth implies that when market forces prioritize efficiency and cost reduction, the investment by firms in resilience may be sub-optimal. As explained by Grossman et al. (2021), this is when private incentives for resilience fall short of the social benefits that governments need to

become involved and to design policies that can incentivize firms to invest in resilience.

Following COVID-19, several countries, such as Canada or the United States, started to create supply chain task forces to identify vulnerabilities. Australia created an Office of Supply Chain Resilience, while the European Union published a report analyzing the EU's strategic dependencies (European Commission, 2021). While there is nothing wrong with governments analyzing supply chain vulnerabilities, it becomes a concern if they assume that these vulnerabilities were caused by an excessive pursuit of efficiency and cost-cutting and that a government-led re-direction of investment would be the best solution to improve resilience, even if this means driving up operating costs. Such policy action usually takes the form of subsidies or tax breaks (Grossman et al., 2021). For example, Japan introduced in 2020 a Program for Promoting Investment in Japan to Strengthen Supply Chains, with subsidies aimed at reshoring. In the United States, the CHIPS and Science Act of 2022 included subsidies for creating chip manufacturing capacity on US soil, and for strengthening resilience in supply chains with specific foreign partners (Luo & Van Assche, 2023). These measures may be motivated by a policy agenda that privileges national security and reduced international dependence over the realized benefits of trade. However, the more emphasis placed by policy on a perceived trade-off between efficiency and resilience (or security), the easier it will be for government policy to compromise the efficient organization of supply chains, and encourage the dismantling of functional GVCs.

Finally, the third myth may encourage reshoring policies in which higher resilience is expected by replacing foreign sourcing with domestic options. In addition to the general issue of policy instruments which incentivize firms to redesign their production systems, practice shows that reshoring has been effectively limited to a single segment of the supply chain. Because the reproduction of all its stages in a single location is unrealistic, it is usually only the factory which moves (closer to) home (Choudhary et al., 2022). Many of the other production stages, which depend on natural resources, skills, and know-how, cannot easily be moved across borders. A survey of reshoring manufacturing in Germany cautioned that, since suppliers would need to be moved, or developed from scratch, they present a non-trivial obstacle to regionalization (Hoberg et al., 2021). This demonstrates that reshoring does not automatically diminish the risks associated with foreign supply, only shifts them to other parts of the supply chain, while concentrating supply in the domestic economy, and giving rise to a new vulnerability.

Policy based on the false premises reviewed here will be more than ineffective. They will limit the rational options available to firms attempting to develop the agility, flexibility, cooperative culture, and the other dynamic capabilities that are the prerequisite to resilience. The narrative of supply chain failure and decoupling discounts the productive forces which made global trade an engine of economic growth, while withholding comment on the expected cost of dismantling GVCs, or exactly how the linkages at local, regional, and global levels should be set in the future (Evenett, 2022). It will threaten the gains from trade and specialization that have raised income and living standards around the world, while making nations and firms more vulnerable to shocks.

## Conclusion

Based on a review of empirical data and research, this paper finds little evidence of market or managerial failure that would have exacerbated supply chain disruptions during recent crises. Most of the turmoil in supply chains was caused by the extraordinary shocks on demand and supply. These disruptions could not have been fully mitigated by backup suppliers, stockpiles, or more localized production. Ongoing geopolitical tensions, together with calls for a 'decoupling' from international markets, in fact represent new sources of risk for global operations. There is little reason to believe that these risks will be better addressed by policies that reduce real options for supply, or which shift factory allocation closer to "home". Results-oriented policy must remain wary of interventions that distort markets, and compromise firm-level productivity. These should defer to more resource-optimizing proposals, in which public–private partnerships set up an "industry commons" (Sodhi & Tang, 2021a, b). This commons would maintain a portfolio of capabilities which ensures emergency preparedness, for example at a national level.

A key insight from the system dynamics literature (Forrester, 1958) recognized that cause and effect are *not always* directly linked in complex industrial networks. These systems are subject to the delays and distortions caused by breakdowns in feedback loops and material flows between decision-making nodes (which are firms). Adding supply at one central point in the supply chain does not necessarily increase supply where and when it is most needed. Because of their non-intuitive behavior, global supply chains must resort to collaboration, coordination, and ongoing re-assessment if they are to build resilience. Policymakers need to understand that this cannot be achieved through centralized or unilateral decisions. Firms and governments will also have to develop collaborative strategies which leverage the strength of international networks, and deploy appropriate tools to build resilience to shocks or assure supply. The success of these strategies will depend on shrewd applications of lean management, economic efficiency, and trade,

hence our concern about a discourse which discredits these enablers. As nations confront rising geopolitical tensions, uncertainty, and climate change, this is not the time to render functioning supply chains more fragile.

Our analysis has implications for the IB research, which traditionally informs policymakers. The extant IB literature conceptualizes the Global Factory as the interplay between MNEs, their suppliers, and regulatory stakeholders. This model may apply to a vertically integrated firm, but as Graves (2021) observed, it is necessary to model the decentralization of decision-making, and the consequent distribution of information across multiple stakeholders. A new conceptualization of the Global Factory as a network, without a central point of control, would raise interesting research questions. For example, how do material and information flows between interlinked firms in the network contribute to the performance of those nodes and stakeholders. The point of central control, which is currently assumed to be wielded by a MNE, should be re-conceptualized to reflect the mutual dependence of buyers and suppliers, or the fact that even the lead firm is usually a supplier to other MNEs.

Second, an expanded research focus could also modify the persistent notion that all value chains are designed to globally arbiter wages or cut costs. This could reveal opportunities to explore the wider set of factors that drive supply chain performance, and the way competitive advantage shapes the organization of value chains. For example, innovation and intangible assets are known to be important drivers (Jaax & Miroudot, 2021), but are not frequent subjects of the debate on reshoring or "shortening" value chains. The division of labor between specialists is the other major driver, as most manufacturers in high-cost countries will confirm (Thakur-Weigold, 2021). IB research could make a positive contribution to guiding government to manage the trade-offs of specialization and trade.

The recent stockouts and disruptions in international supply chains have been intuitively attributed to a lack of resilience within a fragile global economy. These impressions have given credit to a broader narrative which simultaneously predicts, and wishes for, the dismantling of global supply chains for the greater good. Understanding the false premises of this current debate is the first step towards more productive mental models. Research shows that alternate solutions are both possible, and necessary, to support evidence-based policy for sustainable economic growth.

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## References

Airfinity. (2022). Global wastage of COVID-19 vaccines could be 1.1 billion doses. 11 July. Retrieved October 15, 2022, from https://www.airfinity.com/articles/global-wastage-of-covid-19-vaccines-could-be-1-1-billion-doses

Allon, G. (2021). Rethinking your just-in-time supply chain. *Wharton at Work*, August. Retrieved October 5, 2022, from https://executiveeducation.wharton.upenn.edu/thought-leadership/wharton-at-work/2021/08/rethinking-your-supply-chain/

Arriola, C., Guilloux-Nefussi, S., Koh, S.-H., Kowalski, P., Rusticelli, E., & van Tongeren, F. (2021). *Efficiency and risks in global value chains in the context of COVID-19*. OECD Economics Department Working Paper No. 1637.

Baldwin, R. (2016). *The great convergence: Information technology and the new globalization*. Belknap Press.

Baldwin, R., & Freeman, R. (2020). Trade conflict in the age of COVID-19. VoxEU, May 22. Retrieved March 3, 2022, from https://voxeu.org/article/trade-conflict-age-covid-19

Billington, C., & Sandor, J. (2016). Who's kidding who?: Your strategy should get you fired. *Supply Chain Management Review, 20*(1), 22–27.

Birkie, S. E. (2016). Operational resilience and lean: In search of synergies and trade-offs. *Journal of Manufacturing Technology Management, 27*(2), 185–207. https://doi.org/10.1108/JMTM-07-2015-0054

Bode, C., & Wagner, S. M. (2015). Structural drivers of upstream supply chain complexity and the frequency of supply chain disruptions. *Journal of Operations Management, 36*(1), 215–228. https://doi.org/10.1016/j.jom.2014.12.004

Bonadio, B., Huo, Z., Levchenko, A., & Pandalai-Nayar, N. (2021). Global supply chains in the pandemic. *Journal of International Economics, 133*, 103534. https://doi.org/10.1016/j.jinteco.2021.103534

Bown, C. P., & Irwin, D. (2019). Trump's assault on the global trading system and why decoupling from China will change everything. *Foreign Affairs, 98*(5), 125–136.

Brandon-Jones, E., Squire, B., Autry, C. W., & Petersen, K. J. (2014). A contingent resource-based perspective of supply chain resilience and robustness. *Journal of Supply Chain Management, 50*(3), 55–73. https://doi.org/10.1111/jscm.12050

Brede, M., & de Vries, B. J. M. (2009). Networks that optimize a trade-off between efficiency and dynamical resilience. *Physics Letters A, 373*(43), 3910–3914. https://doi.org/10.1016/j.physleta.2009.08.049

Buckley, P. J. (2009). Internalisation thinking: From the multinational enterprise to the global factory. *International Business Review, 18*(3), 224–235. https://doi.org/10.1016/j.ibusrev.2009.01.006

Buckley, P. J., & Casson, M. (1976). *Future of the multinational enterprise*. Palgrave Macmillan.

Buckley, P. J., & Ghauri, P. N. (2004). Globalisation, economic geography and the strategy of multinational enterprises. *Journal of International Business Studies, 35*(2), 81–98. https://doi.org/10.1057/palgrave.jibs.8400076

Buckley, P. J., & Strange, R. (2015). The governance of the global factory: Location and control of world economic activity. *Academy of Management Perspectives, 29*(2), 237–249. https://doi.org/10.5465/amp.2013.0113

Buzzao, G., & Rizzi, F. (2023). The role of dynamic capabilities for resilience in pursuing business continuity: An empirical study. *Total Quality Management & Business Excellence, 34*(11–12), 1353–1385. https://doi.org/10.1080/14783363.2023.2174427

Choi, T. Y., Netland, T. H., Sanders, N., Sodhi, M. S., & Wagner, S. M. (2023). Just-in-time for supply chains in turbulent times. *Production and Operations Management, 32*(7), 2331–2340. https://doi.org/10.1111/poms.13979

Chopra, S., & Meindl, P. (2016). *Supply chain management: Strategy, planning, and operation* (6th ed.). Pearson.

Choudhary, N. A., Ramkumar, M., Schoenherr, T., Rana, N., & Dwivedi, Y. (2022). Does reshoring affect the resilience and sustainability of supply chain networks? The cases of Apple and Jaguar Land Rover. *British Journal of Management, 34*(3), 1138–1156. https://doi.org/10.1111/1467-8551.12614

Christopher, M. (2011). *Logistics and supply chain management* (4th ed.). Prentice Hall.

Christopher, M., & Peck, H. (2004). Building the resilient supply chain. *International Journal of Logistics Management, 15*(2), 1–14. https://doi.org/10.1108/09574090410700275

Constantinescu, C., Fernandes, A. M., & Reyes, S. (2022). *Globally engaged firms in the COVID-19 crisis*. CESifo Working Paper No. 9711.

Cooke, J. (2002). Brave new world. *Logistics Management and Distribution Report, 41*(1), 31–34.

Coveri, A., Cozza, C., Nascia, L., & Zanfei, A. (2020). Supply chain contagion and the role of industrialpolicy. *Journal of Industrial and Business Economics, 47*(3), 467–482. https://doi.org/10.1007/s40812-020-00167-6

Coveri, A., & Zanfei, A. (2023). The virtues and limits of specialization in global value chains: Analysis and policy implications. *Journal of Industrial and Business Economics, 50*(1), 73–90. https://doi.org/10.1007/s40812-022-00247-9

Croom, S., Romano, P., & Giannakis, M. (2000). Supply chain management: An analytical framework for critical literature review. *European Journal of Purchasing & Supply Management, 6*(1), 67–83. https://doi.org/10.1016/S0969-7012(99)00030-1

Delios, A., Perchthold, G., & Capri, A. (2021). Cohesion, COVID-19 and contemporary challenges to globalization. *Journal of World Business, 56*(3), 101197. https://doi.org/10.1016/j.jwb.2021.101197

Diem, C., Borsos, A., Reisch, T., Kertész, J., & Thurner, S. (2022). Quantifying firm-level economic systemic risk from nation-wide supply networks. *Scientific Reports, 12*(1), 7719. https://doi.org/10.1038/s41598-022-11522-z

Dunning, J. H. (1981). *International production and the multinational enterprise*. Allen & Unwin.

Durach, C. F., Kembro, J., & Wieland, A. (2017). A new paradigm for systematic literature reviews in supply chain management. *Journal of Supply Chain Management, 53*(4), 67–85. https://doi.org/10.1111/jscm.12145

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review, 23*(4), 660–679. https://doi.org/10.2307/259056

Ellram, L. M. (1991). Supply-chain management: The industrial organisation perspective. *International Journal of Physical Distribution & Logistics Management, 21*(1), 13–22. https://doi.org/10.1108/09600039110137082

Ellram, L., Flynn, B., Harland, C., Kovács, G., Sarkis, J., & Tate, W. (2020). Report of the online forum 'Action agenda for effective post COVID-19 supply chain'. Retrieved November 3, 2022, from https://doi.org/10.13140/RG.2.2.31694.48966

European Commission. (2021). *Strategic dependencies and capacities*. Commission Staff Working Document. WD(2021) 352 final.

Evenett, S. (2020). Flawed prescription: Export curbs on medical goods won't tackle shortages. In R. Baldwin & S. J. Evenett (Eds.), *COVID-19 and trade policy: Why turning inward won't work* (pp. 49–61). CEPR Press.

Evenett, S. (2022). What endgame for the deglobalisation narrative? *Intereconomics, 57*(6), 345–351. https://doi.org/10.1007/s10272-022-1085-y

Farrell, H., & Newman, A. (2019). Weaponized interdependence: How global economic networks shape state Coercion. *International Security, 44*(1), 42–79. https://doi.org/10.1162/isec_a_00351

Farrell, H., & Newman, A. (2020). Will the coronavirus end globalization as we know it? *Foreign Affairs*, 16 March. Retrieved March 3, 2023, from https://www.foreignaffairs.com/world/will-coronavirus-end-globalization-we-know-it

Farrell, H., & Newman, A. (2022). Weak links in finance and supply chains are easily weaponized. *Nature, 605*, 219–222. https://doi.org/10.1038/d41586-022-01254-5

Febelmayr, G. J., Mahlkow, H., & Sandkamp, A.-N. (2022). *Cutting through the value chain: The long-run effects of decoupling the East from the West*. CESifo Working Paper No. 9721.

Foroohar, R. (2022). *Homecoming: The path to prosperity in a post-global world*. Crown.

Forrester, J. W. (1958). Industrial dynamics: A major breakthrough for decision makers. *Harvard Business Review, 36*(4), 37–66.

Galaitsi, S., Kurth, M., & Linkov, I. (2021). Resilience: Directions for an uncertain future following the COVID-19 pandemic. *GeoHealth, 5*(11), e2021GH000447. https://doi.org/10.1029/2021GH000447

Gereffi, G. (2020). What does the COVID-19 pandemic teach us about global value chains? The case of medical supplies. *Journal of International Business Policy, 3*(3), 287–301. https://doi.org/10.1057/s42214-020-00062-w

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy, 12*(1), 78–104. https://doi.org/10.1080/09692290500049805

Gereffi, G., & Korzeniewicz, M. (Eds.). (1994). *Commodity chains and global capitalism*. Praeger.

Giglioli, S., Giovannetti, G., Marvasi, E., & Vivoli, A. (2021). *The resilience of global value chains during the COVID-19 pandemic: the case of Italy*. DISEI, Università degli Studi di Firenze, Working Paper No. 07/2021.

Graves, S. C. (2021). Reflections on the evolution of operations management. *Management Science, 67*(9), 5379–5388. https://doi.org/10.1287/mnsc.2020.3802

Gross, D. (2010. The ash economy. How the volcano eruption exposed the vulnerability of the global supply chain. Retrieved March 5, 2022, from *Slate*, April 23.

Grossman, G. M., Helpman, E., & Lhuillier, H. (2021). *Supply chain resilience: Should policy promote diversification or reshoring?* NBER Working Paper No. 29330.

Grossman, G. M., & Rossi-Hansberg, E. (2008). Trading tasks: A simple theory of offshoring. *American Economic Review, 98*(5), 1978–1997. https://doi.org/10.1257/aer.98.5.1978

Harland, C. M. (1996). Supply chain management: Relationships, chains and networks. *British Journal of Management, 7*(s1), S63–S80. https://doi.org/10.1111/j.1467-8551.1996.tb00148.x

Hoberg, K., Alicke, K., & Strigel, A. (2021). Zurück nach Europa. *Harvard Business Manager,* 22 December. Retrieved April 15, 2022, from https://www.manager-magazin.de/harvard/strategie/supply-chain-management-regionale-lieferketten-aufbauen-a-89cebccd-0002-0001-0000-000180507138

Hopp, W. J., & Spearman, M. S. (2021). The lenses of lean: Visioning the science and practice of efficiency. *Journal of Operations Management, 67*(5), 610–626. https://doi.org/10.1002/joom.1115

Huchzermeier, A., & Cohen, M. (1996). Valuing operational flexibility under exchange rate risk. *Operations Research, 44*(1), 100–113. https://doi.org/10.1287/opre.44.1.100

Inoue, H., & Todo, Y. (2019). Firm-level propagation of shocks through supply-chain networks. *Nature Sustainability, 2*(9), 841–847. https://doi.org/10.1038/s41893-019-0351-x

Ivanov, D., & Dolgui, A. (2020). Viability of intertwined supply networks: Extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak. *International Journal of Production Research, 58*(10), 2904–2915. https://doi.org/10.1080/00207543.2020.1750727

Ivanov, D., & Dolgui, A. (2022). Stress testing supply chains and creating viable ecosystems. *Operations Management Research, 15*(1), 475–486. https://doi.org/10.1007/s12063-021-00194-z

Jaax, A., & Miroudot, S. (2021). Capturing value in GVCs through intangible assets: The role of the trade–investment–intellectual property nexus. *Journal of International Business Policy, 4*(3), 433–452. https://doi.org/10.1057/s42214-020-00086-2

Jain, N., Girotra, K., & Netessine, N. (2016). Recovering from supply interruptions: The role of sourcing strategies. INSEAD Working Paper No. 2016/58/TOM.

Javorcik, B. (2020). Coronavirus will change the way the world does business for good. Financial Times, April 2. Retrieved February 25, 2022, from https://www.ft.com/content/cc2ff3f4-6dc1-11ea-89df-41bea055720b

Johnson, M. E., & Davis, T. (1998). Improving supply chain performance by using order fulfillment metrics. *National Productivity Review, 17*(3), 3–16. https://doi.org/10.1002/npr.4040170304

Kamalahmadi, M., & Parast, M. M. (2016). A review of the literature on the principles of enterprise and supply chain resilience: Major findings and directions for future research. *International Journal of Production Economics, 171*(1), 116–133. https://doi.org/10.1016/j.ijpe.2015.10.023

Ketchen, D. J., Jr., & Giunipero, L. C. (2004). The intersection of strategic management and supply chain management. *Industrial Marketing Management, 33*(1), 51–56. https://doi.org/10.1016/j.indmarman.2003.08.010

Kogut, B. (1985a). Designing global strategies: Comparative and competitive value-added chains. *Sloan Management Review, 26*(4), 15–28.

Kogut, B. (1985b). Designing global strategies: Profiting from operational flexibility. *Sloan Management Review, 27*(1), 27–38.

Kogut, B., & Kulatilaka, N. (1994). Operating flexibility, global manufacturing, and the option value of a multinational network. *Management Science, 40*(1), 123–139. https://doi.org/10.1287/mnsc.40.1.123

Kouvelis, P. (1999). Global sourcing strategies under exchange rate uncertainty. In S. Tayur, R. Ganeshan, & M. Magazine (Eds.), *Quantitative models for supply chain management* (pp. 627–667). Kluwer Academic Publishers.

Lake Superior State University. (2021). 2022 Banished Words List Press Release. Retrieved January 15, 2022, from https://www.lssu.edu/traditions/banishedwords/#toggle-id-10

Lafrogne-Joussier, R., Martin, J., & Mejean, I. (2023). Supply shocks in supply chains: Evidence from the early lockdown in China. *IMF Economic Review, 71*(1), 170–215. https://doi.org/10.1057/s41308-022-00166-8

Ledford, H. (2022). COVID vaccine hoarding might have cost more than a million lives. *Nature*, 2 November. Retrieved November 3, 2022, from https://www.nature.com/articles/d41586-022-03529-3

Luo, Y., & Van Assche, A. (2023). Techno-geopolitical uncertainty and international business: Implications of the United States Chips and Science Act. *Journal of International Business Studies*. https://doi.org/10.1057/s41267-023-00620-3

Manuj, I., & Mentzer, J. T. (2008). Global supply chain risk management. *Journal of Business Logistics, 29*(1), 133–156. https://doi.org/10.1002/j.2158-1592.2008.tb00072.x

McCann, P., & Mudambi, R. (2005). Analytical differences in the economics of geography: The case of the multinational firm. *Environment and Planning a: Economy and Space, 37*(10), 1857–1876. https://doi.org/10.1068/a37311

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics, 22*(2), 1–25. https://doi.org/10.1002/j.2158-1592.2001.tb00001.x

Miller, K. (1991). A framework for integrated risk management in international business. *Journal of International Business Studies, 23*(2), 311–331. https://doi.org/10.1057/palgrave.jibs.8490270

Miroudot, S. (2020). Reshaping the policy debate on the implications of COVID-19. *Journal of International Business Policy, 3*(4), 430–442. https://doi.org/10.1057/s42214-020-00074-6

Mizgier, K. J., Wagner, S. M., & Jüttner, M. P. (2015). Disentangling diversification in supply chain networks. *International Journal of Production Economics, 162*, 115–124. https://doi.org/10.1016/j.ijpe.2015.01.007

Netland, T. (2021). Just-in-time and the COVID pandemic. *Planet Lean*, January 21. Retrieved January 22, 2022, from https://planet-lean.com/just-in-time-pandemic/

New York Times. (2021). How the world ran out of everything. 1st June.

O'Neil, S. K. (2022). *The globalization myth: Why regions matter. A Council on Foreign Relations Book*. Yale University Press.

Ortiz, J. L. (2022). *Spread too thin: the impact of lean inventories*. Board of Governors of the Federal Reserve System, International Finance Discussion Paper No. 1342.

Ossa, R. (2023). One year of war in Ukraine. What has been the impact on global trade? Retrieved February 24, 2023, from https://www.wto.org/english/blogs_e/ce_ralph_ossa_e/blog_ro_23feb23_e.htm

Petricevic, O., & Teece, D. J. (2019). The structural reshaping of globalization: Implications for strategic sectors, profiting from innovation, and the multinational enterprise. *Journal of International Business Studies, 50*(9), 1487–1512. https://doi.org/10.1057/s41267-019-00269-x

Sanders, N. R. (2009). Bridging the gap between methodological camps in supply chain management. *Journal of Supply Chain Management, 45*(1), 49–52. https://doi.org/10.1111/j.1745-493X.2009.03156.x

Sanders, N. R., & Wagner, S. M. (2011). Multidisciplinary and multimethod research for addressing contemporary supply chain challenges. *Journal of Business Logistics, 32*(4), 317–323. https://doi.org/10.1111/j.0000-0000.2011.01027.x

Seifert, R. W., & Markoff, R. (2021). *The digital supply chain challenge: Breaking through*. IMD Press.

Sheffi, Y. (2005a). *The resilient enterprise: Overcoming vulnerability for competitive advantage*. MIT Press.

Sheffi, Y. (2005b). Building a resilient supply chain. *Harvard Business Review Supply Chain Strategy, 1*(8), 1–2.

Sheffi, Y. (2015). *The power of resilience: How the best companies manage the unexpected*. MIT Press.

Sheffi, Y. (2020). *The new (ab)normal: Reshaping business and supply Chain strategy beyond COVID-19*. MIT CTL Media.

Sheffi, Y. (2021). What everyone gets wrong about the never-ending COVID-19 supply chain crisis. *Sloan Management Review*, 25 October. Retrieved January 22, 2022, from https://sloanreview.mit.edu/article/what-everyone-gets-wrong-about-the-never-ending-covid-19-supply-chain-crisis/

Shih, W. C. (2022). What really makes Toyota's production system resilient. *Harvard Business Review*, 15 November. Retrieved March 20, 2023, from https://hbr.org/2022/11/what-really-makes-toyotas-production-system-resilient

Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (Vol. 3). Wiley.

Simchi-Levi, D., & Simchi-Levi, E. (2020). We need a stress test for critical supply chains. *Harvard Business Review*, 28 April. Retrieved February 11, 2022, from https://hbr.org/2020/04/we-need-a-stress-test-for-criticalsupply-chains

Snyder, L. V., Atan, Z., Peng, P., Rong, Y., Schmitt, A. J., & Sinsoysal, B. (2016). OR/MS models for supply chain disruptions: A review. *IIE Transactions, 48*(2), 89–109. https://doi.org/10.1080/0740817X.2015.1067735

Sodhi, M., & Choi, T. (2022). Don't abandon your just-in-time supply chain, revamp it. *Harvard Business Review*, 20 October. Retrieved November 4, 2022, from https://hbr.org/2022/10/dont-abandon-your-just-in-time-supply-chain-revamp-it

Sodhi, M. S., & Tang, C. S. (2021a). Supply chain management for extreme conditions: Research opportunities. *Journal of Supply Chain Management, 57*(1), 7–16. https://doi.org/10.1111/jscm.12255

Sodhi, M. S., & Tang, C. S. (2021b). Rethinking industry's role in a national emergency. *MIT Sloan Management Review*, May 27. Retrieved April 4, 2022, from https://sloanreview.mit.edu/article/rethinking-industrys-role-in-a-national-emergency/

Spearman, M. L., & Hopp, W. J. (2021). The case for a unified science of operations. *Production and Operations Management, 30*(3), 802–814. https://doi.org/10.1111/poms.13318

Strange, R., & Humphrey, J. (2019). What lies between market and hierarchy? Insights from internalization theory and global value chain theory. *Journal of International Business Studies, 50*(8), 1401–1413. https://doi.org/10.1057/s41267-018-0186-0

Tan, K. C. (2001). A framework of supply chain management literature. *European Journal of Purchasing & Supply Management, 7*(1), 39–48. https://doi.org/10.1016/S0969-7012(00)00020-4

Tang, C. S. (2006). Perspectives in supply chain risk management. *International Journal of Production Economics, 103*(2), 451–488. https://doi.org/10.1016/j.ijpe.2005.12.006

Teece, D. J. (2022). A wider-aperture lens for global strategic management: The multinational enterprise in a bifurcated global economy. *Global Strategy Journal, 12*(3), 488–519. https://doi.org/10.1002/gsj.1462

Thakur-Weigold, B., & Lorenzon, A. (2015). Lean i$ not cheap. *Industrial Engineer, 47*(4), 26–31.

Thakur-Weigold, B. (2021). Capability mapping to improve manufacturing network performance: How a factory can target growth. *Journal of Manufacturing Technology Management, 32*(6), 1335–1356. https://doi.org/10.1108/JMTM-09-2019-0351

Tomlin, B. (2006). On the value of mitigation and contingency strategies for managing supply chain disruption risks. *Management Science, 52*(5), 639–657. https://doi.org/10.1287/mnsc.1060.0515

Vakil, B., & Linton, T. (2021). Why we're in the midst of a global semiconductor shortage. *Harvard Business Review*, 26 February. Retrieved March 20, 2023, from https://hbr.org/2021/02/why-were-in-the-midst-of-a-global-semiconductor-shortage

Witt, M. A., Lewin, A. Y., Li P. P., & Gaur, A. (2023). Decoupling in international business: Evidence, drivers, impact, and implications for IB research. *Journal of World Business*, 58(1): 101399. https://doi.org/10.1016/j.jwb.2022.101399

Womack, J., Jones, D., & Roos, D. (1990). *The machine that changed the world: The story of lean production*. New York: Rawson Associates.



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