Supply Chain Resilience Enhancement and Budget Considerations

Written Testimony of
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Chairman Whitehouse, Ranking Member Grassley, and Members of the Committee, thank you for the opportunity to appear before you today. I would like to address two topics in my testimony: First, how we might think about the topic of supply chain resilience. Second, the implications of the U.S. fiscal situation for adopting measures that could enhance supply chain resilience. While I will predominantly address the delivery of containerized goods[1] to the United States, oceans play a very significant role in this supply chain.

What do we mean by supply chain resilience?

Increasing the resilience of supply chains has been a major policy goal in the wake of the disruptions and inflation of recent years.[2] Before delving into the topic, it may be worth pausing to consider what this means.

At a simple level, this could be an expectation that the supply chain deliver the goods and inputs that American businesses and consumers want or need. But that begs the question. To see how, consider the analogy of a restaurant that provides food to its clientele and normally seats 50 diners each evening. If there were a breakdown in the restaurant's kitchen that left it only capable of serving 25 diners, that would seem a clear analogy to a supply chain breakdown.

What if, continuing our example, 75 diners showed up one evening, demanding to be fed. If the restaurant is unable to accommodate them, does this count as a supply chain breakdown? Should the restaurant be sufficiently resilient that it could accommodate an unexpected surge in demand? If so, how big a surge should it be able to accommodate?

The difficulty is that spare capacity is costly. For the restaurant to rent space and buy ingredients sufficient to handle a large surge that comes only rarely would likely eat up whatever margin the restaurant enjoyed. We might conclude that if the number of diners fluctuates between 45 and 55, a resilient restaurant would equip itself for the high end of that range.

Now let us turn back from restaurants to the supply chain for the delivery of goods into the United States. Here, too, there are capacity constraints: the capacity of factories, the availability of ships and containers, the size of ports, the speed at which they can process containers and move them to other modes of transport such as trucking or rail, and the ability of warehouses to store the goods.

There are two key constraints that limit resilience. The first is that it is costly to purchase capacity that is unlikely to be used. The second is that adjustments take time. Any decision to expand ports, rearrange rail, build warehouses, or purchase new ships can take months or years to carry out.

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[1] The term "supply chain" is applied to multiple operations which can differ significantly in their operation and geographic location. Prominent among these are containerized goods (e.g. furniture, apparel, equipment), energy (oil and gas), and commodities (agriculture).

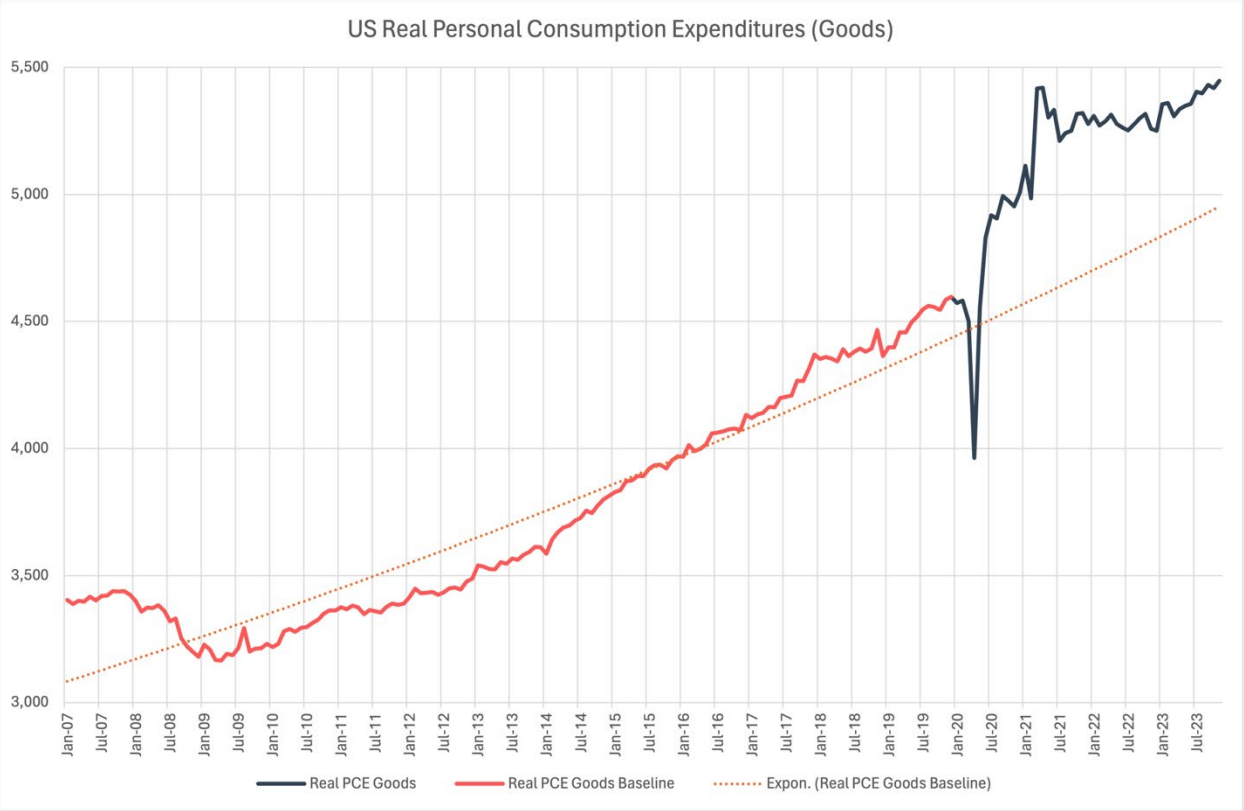
[2] As one example, see the newly-created White House Council on Supply Chain Resilience.

A resilient supply chain will be able to handle fluctuations in demand and interruptions to supply within a normal range. However, when we move beyond that normal range, we are likely to see strains.

The example of supply chains in the Covid era

As most of the urgency for achieving supply chain resilience comes from the experience of the last several years, we can consider these broader thoughts in that context.

Figure 1



Source: Bureau of Economic Analysis, St. Louis Fed (FRED), and author's calculations. $2017 Billions.

Figure 1 shows inflation-adjusted (real) US personal consumption expenditures (PCE) on goods from January 2007 to present.[3] The solid red line depicts monthly expenditures through December 2019, the eve of the Covid shock.

A first point to note is that consumption sagged at the beginning of the graph with the onset of the global financial crisis. After reaching a local peak in September 2007, goods consumption fell to a trough in April 2009. It did not regain its September 2007 level until February 2012, over four years later.

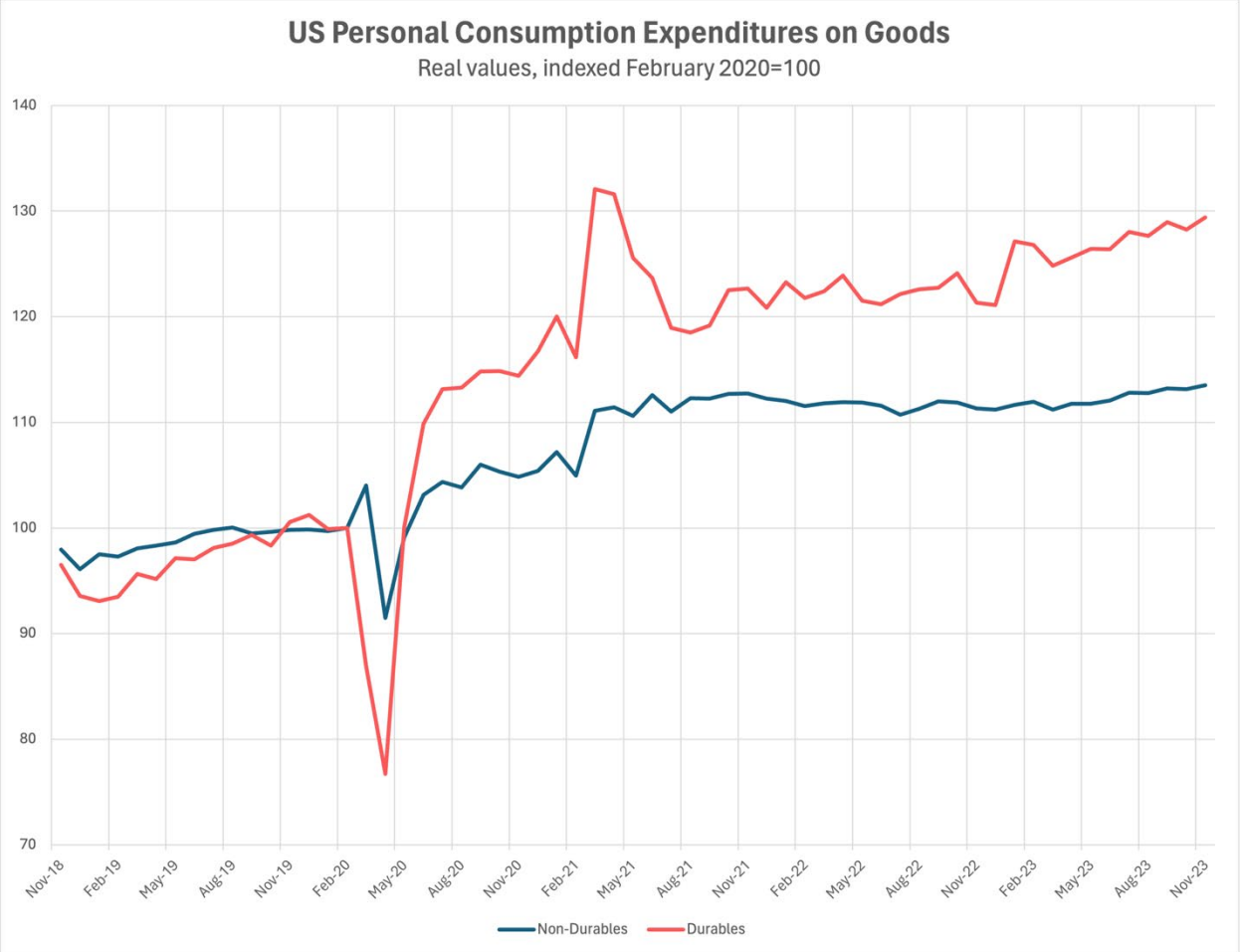
This is relevant when we think about the expectations that went into setting supply chain capacity at the beginning of 2020. One approach would have been to look at the

[3] This was the length of the available data series for this variable.

preceding 13 years, take the average growth rate, and assume that it would apply going forward. That's what the dotted line does. An alternative approach would have been to suppose, with an oncoming recession, that it might take four years to recover pre-recession consumption levels. In this case, the expectation would be to regain February 2020 levels by February 2024. This second, more cautious approach, might have seemed even more appropriate as we moved toward spring of 2020 and goods consumption plunged.

Figure 2 offers a decomposition of this goods demand into durables and nondurables, where the former are products that are expected to last three years or more.

Figure 2



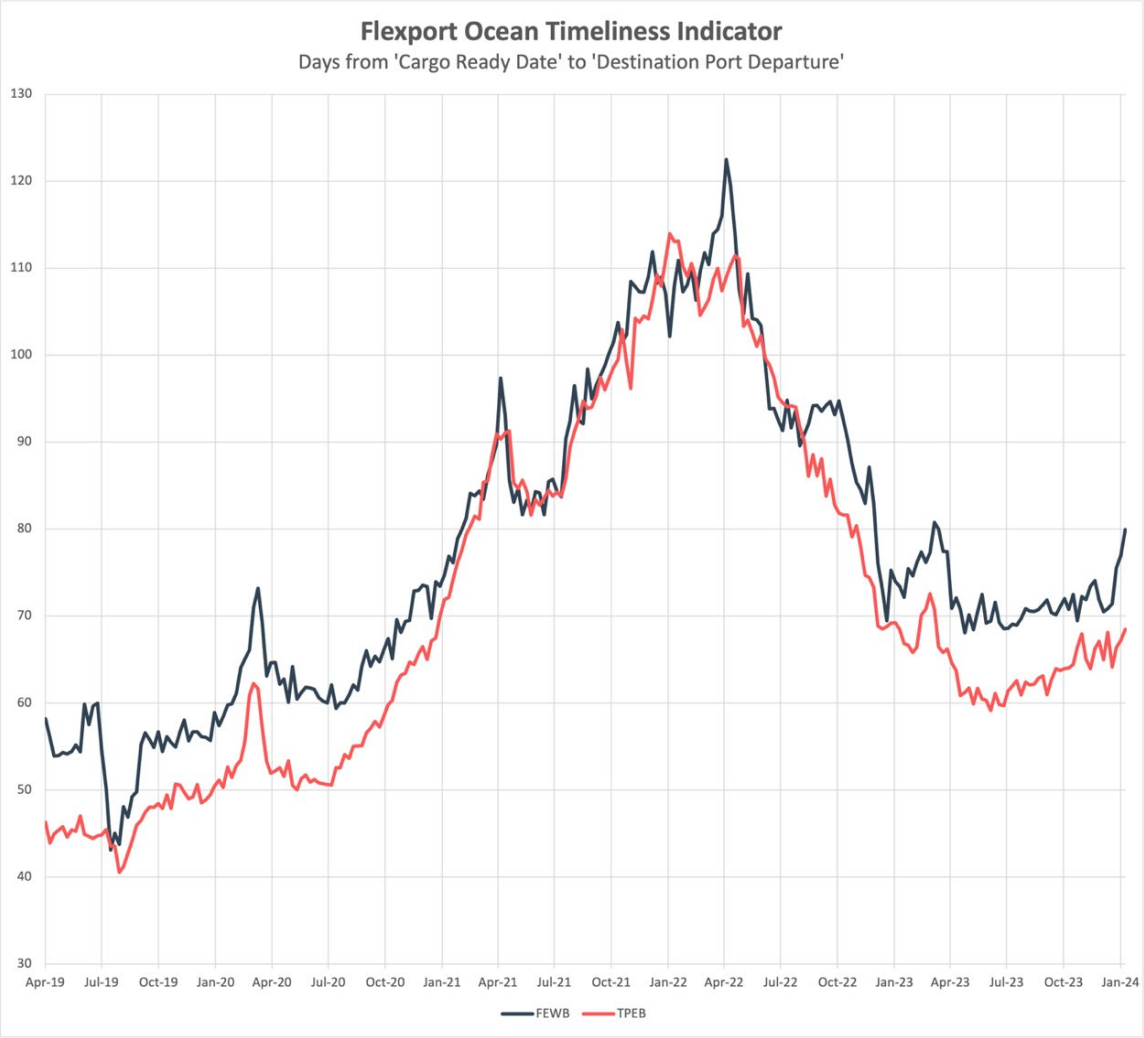
Source: Bureau of Economic Analysis, St. Louis Fed (FRED), and author's calculations.

Beyond the decomposition, Figure 2 indexes consumption to February 2020 levels, allowing easy inspection of the magnitude of the swings. The first section of the graph, going back to November 2018, shows how minimal the variation in goods consumption had been prior to the Covid shock. We can also note the extreme magnitude of the initial Covid shock: non-durables consumption fell by 8.5% to April 2020; durables fell by 23.3%.

Nonetheless, any assumption of a slow recovery would have been far off. Instead of taking four years to regain pre-shock values, both categories were there by May or June of 2020! They then soared to the point where durable goods consumption was up 32.1% above its February 2020 level by March of 2021.

It is tempting to stop at this point and declare US supply chains remarkably resilient. After all, the figures shown so far depict goods *delivered and consumed*. Even though the levels of consumption were far above reasonable expectations, the goods came through.

Figure 3



The difficulty, of course, was that the adjustment was painful and expensive. Figure 3 depicts the average amount of time it took to move containers on the ocean from Asia to either North America (red line) or Europe (dark line). It shows, on the left, what the norms were pre-pandemic. While there was variation across the year, it roughly took 45-55 days to move

containers on the Trans-Pacific Eastbound (TPEB) lane to North America. That was less time than it took for cargo to move along the Far East Westbound (FEWB) lane to Europe. By the peak of the pandemic shipping crunch in early 2022, these series had largely converged and hit lengths over 110 days.

By the spring of 2023, times had dropped back notably, but not completely. The most recent upturns (the data runs through January 12) reflect the most recent shipping disruptions in the Red Sea (missiles) as well as the Panama Canal (drought).

The extended transit times in the crunch made it difficult to obtain parts or to stock shelves, particularly in industries that had tried to reduce costs through lean inventories. Further, the delays were combined with increases in shipping costs of 5X or more.

If the point of enhancing supply chain resilience is to avoid similar episodes in the future, it is essential to diagnose the cause of the crunch. An overtaxed system and skyrocketing prices could be the result of either a contraction in supply or an expansion of demand. One can distinguish between the two by looking at the quantity transacted. If the quantity decreased, supply effects dominated; if the quantity increased, demand effects were the driving force.

We saw in Figures 1 and 2 that quantities consumed increased remarkably. Figure 4 showed that this was true not only in personal consumption expenditures but also in real imports. Note that in 2019:Q4, real imports were below 2018:Q1. Thus, over that 2-year period, an observer might have concluded that real import growth had tapered off. Yet, from 2019:Q4 to the peak in 2022:Q3, real imports grew 16.8%, or at a 5.8% annual rate. That dramatic growth ignores the collapse in imports in the first two quarters of 2020.

While there were indisputably instances in which factories or port terminals or other links in supply chains were disrupted by disease or disease-prevention measures, the net effect was a very substantial expansion of supply.

Before accepting that the episode was predominantly a demand shock, we should ask whether there were plausible stimulants that could induce such a shock. In fact, there were. The inability of people to circulate and consume services as they normally would tilted personal consumption expenditures toward goods.[4] Then there was highly expansionary monetary policy, with negative real interest rates and a dramatic quantitative easing. Finally, Figure 5 shows the impact of fiscal measures on income.

[4] As a measure and forecast of this, see Flexport's Post-Covid Indicator.

Figure 4

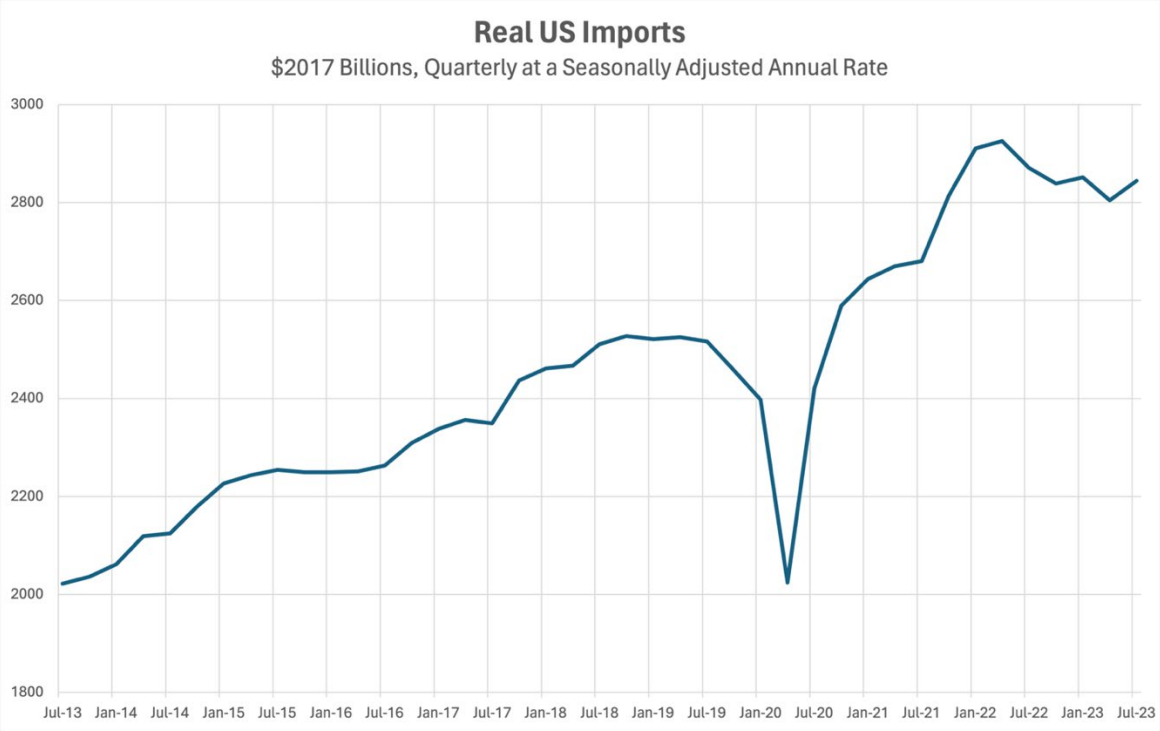
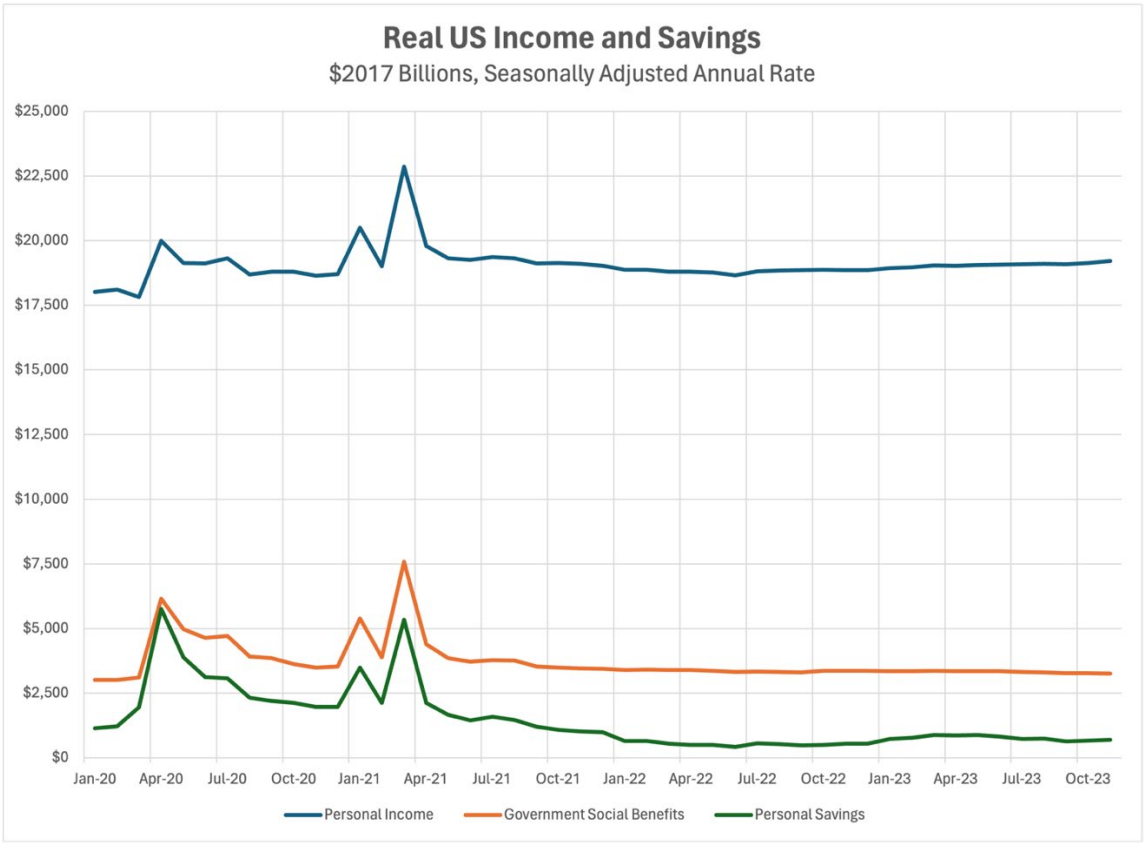


Figure 5



Source (both): Bureau of Economic Analysis, St. Louis Fed (FRED, income here).

The top line in Figure 5 shows real personal income, a key determinant of consumption spending. Perhaps the most remarkable feature of this series was that income never dropped below its March 2020 levels. The orange line that runs nearly parallel to income represents government social benefits to persons, including the large fiscal stimulus responses to the pandemic. The green line at the bottom shows the amount of money that went to saving, ensuring that buying power persisted after the stimulus measures were no longer stoking demand. Perhaps as striking as the sharp upward jags in government support and income was the stability that ensued after the major stimulus funds had been disbursed.

Thus, there were ample demand-side explanations for the shock to the global market for goods.

Ways to enhance resilience

If we think of supply chain crisis as resulting from a sudden and unanticipated misalignment of supply and demand, resilience can be enhanced through three broad categories of measures:

- limiting the frequency or magnitude of shocks
- expanding supply chain capacity
- enhancing efficiency and flexibility in supply chains

Limiting the frequency or magnitude of shocks has great appeal, but can be difficult or costly, as in the case of deploying sufficient military forces to address shipping threats in the Red Sea. The cost argument, however, does not apply to the demand side. Consumer goods demand could be limited by reducing the size of costly stimulus packages; that would save money.

Enhancing supply chain capacity may seem a reasonable approach, but what magnitude of capacity expansion would be sufficient? Given the pattern of imports before the Covid shock, most observers would have thought that the ability to ramp up imports by almost 6% per year would have sufficed. Yet it did not.

There is an additional difficulty with relying on expanded capacity: if one ends up with supply significantly exceeding demand, prices are likely to drop. This, of course, is welcome for those who pay for shipping. But it can pose an existential threat to businesses that are trying to provide supply chain services. In 2023 we saw very low prices in ocean shipping, comparable to those of 2019. This was due to a combination of stable demand and significant supply expansion, as carriers invested in capacity.[5] Lest a return to prior prices seem manageable, a rough estimate is that costs increased by 30% over that period. If businesses are driven out of logistics, this does little to ensure supply chain resilience.

Enhancing the efficiency of supply chain operations may allow for more flexibility and resilience. One example could be the ability to reroute ships from one port to another. Advances

[5] Ocean container vessel capacity increased by 20% from January 2021 to January 2024 as new vessels hit the market. In 2024, another 10% expansion is expected. See "Updates on the Suez Canal: A Comparison of the Current Red Sea Situation Versus the Covid-Era Market," Flexport.com, January 22, 2024.

here are likely to come from a combination of private sector research and initiative, coupled with government assistance in areas such as information dissemination,[6] standardization, and regulatory accommodation of changes to infrastructure (e.g. facilitating better rail access to more ports).

Budget considerations

Given the potential range of efficacy for investments in supply chain resilience, it is particularly important for sound public policy to conduct a cost-benefit analysis.[7] In the current fiscal situation, that should include an acknowledgement of the very high cost of deploying public funds.[8]

In particular, publicly-held federal debt is approaching 100 percent of GDP, comparable to its all-time World War II high. Among other concerns, this creates a vulnerability to sustained higher interest rates, as they can have a dramatic effect on debt service costs as the debt rolls over.

Further, there are structural concerns about the budget deficit. A traditional Keynesian approach to stabilizing an economy advocates for deficit spending in downturns. But this recommendation is paired with the converse: in periods of strong economic growth, there should be public saving and debt reduction. We are currently seeing substantial deficits, even though we are in a period of sustained or strong growth, with real GDP growth positive since 2021:Q1 and an average of 2.5% real growth through 2023:Q3.

These considerations lend support to supply chain resilience measures that place a smaller dent in the public purse.

Conclusion

Supply chain resilience involves the ability to deal with significant shifts in supply or demand for global shipping. Shocks can come to either demand (the pandemic-era surge in goods consumption) or supply (the current situation in the Red Sea). This is a fundamentally difficult problem because excess capacity is costly, adjustment takes time, and extraordinary surges will always be difficult to deal with.

Fortunately, there are measures that can be undertaken by governments to limit these shocks and by both governments and the private sector to enhance supply chain efficiency.

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[6] There are a number of ongoing initiatives to provide information support, such as the Department of Transportation's Flow Initiative and the Federal Maritime Commission's Maritime Transportation Data Initiative.

[7] This cost-benefit can be particularly difficult in the case of climate investments. If the US were to invest $1 billion in climate amelioration today, can we quantify how much would this reduce the probability of droughts that limit the operation of the Panama Canal? Then, even if we have that number, what is the marginal benefit of a better-functioning Canal, given the existence of work-arounds (e.g. shipping to the US West Coast and distributing across the country by rail)?

[8] This is not unique to supply chain resilience investments, of course, but that is the topic under discussion.