

Stress Test: Supply Chains, Inflation & a Future for G7 Economic Cooperation

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Introduction

The global response to Covid-19 has evidenced a novel international willingness to spend. Concerns about “bond vigilantes” that moderated public debt in the 1980s, beliefs in “expansionary austerity” that curtailed deficits in the 2000s, and ideological commitments to “balanced budgets” appear to be fading from view – if not in theory, then certainly in practice. The pandemic’s economic *volte-face* should be celebrated as both an intellectual awakening and a necessary step in future fights against global health challenges, climate change, extreme poverty, and more. Yet as today’s widespread supply chain disruptions and rising price levels make clear, it must also force the international community to rethink certain elements of its macroeconomic management.

In *The General Theory of Employment, Interest and Money*, John Maynard Keynes argued, “The right remedy for the trade cycle is not to be found in abolishing booms and thus keeping us permanently in a semi-slump; but in abolishing slumps and thus keeping us permanently in a quasi-boom.” The newfound acceptability of deploying fiscal and monetary resources is putting the Keynesian prospect of the *quasi-boom* within reach. But a puzzle remains about how to *abolish slumps*, as one should not be mistaken that a world of economic prosperity necessarily implies a world free from economic crisis. This essay will focus on and attempt to resolve two critical ways in which Keynes’ *quasi-booms* can in fact induce *semi-slumps*.

First, the boom from greater government stimulus creates the possibility that demand rapidly outstrips supply. In theory, this is fine: prices rise, supply expands, prices fall, and the economy grows. In practice, however, this economic adjustment can be painful and unnatural. This is what we are seeing now as massive demand-side stimulus (expanded unemployment insurance, direct cash transfers, etc.) has led to sharp increases in global goods consumption. With uncertainty pervading the future of the global economy, firms have been slow to expand capital expenditure and increase supply in response to rising prices. Combined with pandemic-induced supply chain disruptions, this unmet demand spike has caused shortages to surface across a wide range of goods. As shortages have affected key industrial inputs (e.g., semiconductors), the production of automobiles, electronics, and other important goods has stalled, and the global economic recovery has too.

Second, viewing these unconventional shortages as a conventional

inflation problem, central banks are considering various contractionary monetary policies. Even as governments become more accommodating of rising prices (as the US Federal Reserve’s new “Flexible Average Inflation Targeting” strategy shows), inflation-management tactics have remained blunt and *ex post*. If price levels are rising, even if only for certain goods and for specific non-monetary reasons, central bankers will respond by raising interest rates and suppressing demand. This makes no attempt to address price pressures before they emerge or where they are actually building, and it makes no effort to dynamically expand supply so as to keep up with demand in a pro-growth way. The effect of contractionary monetary policies – indeed, the intention of them – is to induce a broad-based controlled recession. However, experience shows that central bankers have little “control” over what can come next. As the 2013 “taper tantrum” showed, the investor panic and destabilizing capital flight from emerging markets that can follow monetary tightening may very well make the policy “solution” to the inflation “problem” worse than the problem itself.

We may have the fiscal and monetary resources to enjoy *quasi-booms*, but we must still develop the right tools to stave off *semi-slumps*. This essay seeks to address this problem in both theory and practice.

The Return of Inflation (Fears)

It should seem strange that inflation has become such a hot-button issue among so many policymakers and central bankers in so many countries today. The world has just experienced the deepest economic contraction in as long as the World Bank offers data, which goes back to 1961. For the United Kingdom, last year’s recession is the greatest since the Great Frost of 1709. Few events have been as *deflationary* in modern economic history, and with the emergence of new Covid-19 variants – Delta, Lambda, Mu, and counting – these deflationary pressures might not soon pass. Why, then, is inflation becoming such a concern?

Since the beginning of 2021, shortages have been surfacing and price pressures have been building in many segments of the global economy. These have become present in many price indices used to track inflation. From August 2020-2021, the UK’s Consumer Prices Index (CPI) rose by 3.2% and the CPI including owner-occupied housing (CPIH) rose by 3.0%. Some of the monthly price movements were the steepest in the UK in over a decade, and similar

inflation readings across the pond have confirmed the unusual nature of today's problem. From June 2020-2021, the US CPI rose by 5.4%, the greatest annual increase in over a decade, and from August 2020-2021 the Producers' Price Index (PPI) rose by 8.3%. Japan, too, experienced an interesting jolt of inflation. From July 2020-2021, Japan's Corporate Goods Price Index (CGPI), a measure of wholesale prices for goods and services, rose by 5.6%, its sharpest annual rise in 13 years. The most severe humanitarian consequences have been associated with the record rise in food price inflation, which has soared by 40% over the past 15 months.

Why Is Inflation Rising? From the Quantity Theory of Money to Market Microstructure

When hotter inflation readings are reported, there is an impulse to point towards government spending. Given the scale of pandemic-related fiscal and monetary policies, this is an understandable (if not entirely accurate) place to start. In April 2020, Japan launched a ¥117 trillion (\$1.1 trillion) stimulus package, amounting to 22% of GDP, which included a cash transfer program of ¥100,000 (\$940) that reached a remarkable 98.5% of households. The United States launched the world's most expansive fiscal policy program, passing roughly \$3.5 trillion in relief and stimulus spending under President Donald Trump, \$1.9 trillion under President Joe Biden, and it is nearing finalization on a new \$3.5 trillion budget bill and \$1 trillion infrastructure bill. The UK's efforts have been smaller but no less remarkable for the country that championed "expansionary austerity" during the Great Recession. The UK inaugurated its Covid-19 spending with a £330 billion (\$456 billion) relief package in March 2020, which has been followed up with itemized stimulus efforts such as £9 billion (\$12.45 billion) to guarantee 80% of wages for furloughed workers and £38 billion (\$52.57 billion) to support the ailing services sector. The European Union also took the unprecedented step of launching an 800 billion euro (\$947 billion) joint recovery package, which was remarkable not for its size but for the common debt issuance underlying it – a step in the EU's evolution that has been called a "Hamiltonian moment".

All of these measures have been complemented by aggressive and unorthodox monetary policies. Going beyond interest rate cuts and conventional open market operations, the major central banks moved into purchases of mortgage-backed securities (with the Federal Reserve buying \$100 billion per month), corporate bonds, municipal bonds, and more. While these measures have been domestic in nature, they have succeeded in holding down interest rates and creating favorable monetary conditions globally. Yet there has also been a more deliberately international form of monetary relief which has come in the form of liquidity swap lines, a key instrument during the Great Recession that was brought back to clear up dollar shortages at the beginning of Covid-19 and to keep global finance running smoothly afterwards.

Might governments and their generous spending programs be the cause of global inflation? Such a view would fit Milton Friedman's famous dictum that "inflation is always and everywhere a monetary phenomenon." However, a Quantity Theory of Money explanation of today's inflation explanation would have to entail at least two specific inflation dynamics which we are not currently seeing.

First, the rise in inflation would have to be *permanent*, not *transitory*. This requirement is derived from how Friedman formally represented his monetarist theory – $PQ=f(M)$ and $P=g(M)$ – where P is the price level, Q is output, f is a function of money in the short term, and g is a function of money in the long term. In this framing, output increases with an increase in the money supply in the short term, but in the long term a rise in the money supply is *only* accompanied by a rise in price levels. Yet we are already receiving clear, countervailing data that today's inflation is not a long-term phenomenon. Items which experienced price spikes in earlier stages of the pandemic have now fallen back to pre-pandemic levels. Lumber provides an important example. In the first month of the pandemic, consumer spending seized up, lumber prices collapsed by 40%, and the industry quickly reduced production. Yet as home renovations and lumber purchases picked up during the homebound solitude of the pandemic, lumber prices were catapulted from \$278 per 1,000 board feet, the unit in which lumber is priced, to upwards of \$1,600. After pushing up housing costs and spreading further inflation fears, that 478% price spike quickly fell by 250%. Now the price of lumber is hovering comfortably around its pre-pandemic levels, and the inflationary pressures – though costly and destabilizing while they lasted – have subsided.

The second missing dynamic relates to *which* price levels are rising. In the monetarist and spending-skeptic framing, inflation must come as a rise in the *general* price level with the increase in the money supply pushing up all prices. On this view, inflation would not be contained to specific segments of the economy. Yet this is clearly not the case, which we can see when we inspect the idiosyncratic movements and weighting of specific components of specific price indices. Consider the case of the UK's CPIH ([Table](#)).

Moving beyond the headline "*UK Inflation Hits Highest Figure in Almost a Decade*" and decomposing this index, we find that inflation is contained to two heavily-weighted components: food and transport, which account for 19.6% of the index. When these components swing, the index must follow, giving the (false) impression that all prices have risen. On a close reading, one cannot make the case that food or transport inflation are monetary phenomena or that they are representative of movements among any of the index's other components. Food price inflation, for example, is evidently not due to a quantitative easing-induced dining splurge, or anything of this sort, but rather to a combination of rising shipping costs, which are a consequence of Covid-19's supply chain disruptions; African swine fever and the depletion of global meat supplies; the locust outbreak that ravaged the agricultural capacity of

TABLE

Consumer Prices Index including owner-occupied housing costs (CPIH), 2021

Components	Weighting (%)
Food & non-alcoholic beverages	8.9
Alcohol & tobacco	3.5
Clothing & footwear	5.9
Housing & household services	32.8
Furniture & household goods	4.9
Health	2.0
Transport	10.7
Communication	1.9
Recreation & culture	11.2
Education	3.0
Restaurants & hotels	6.9
Miscellaneous goods & services	8.3

Source: Office for National Statistics, UK (September 2021)

East Africa and South Asia between 2019 and 2021; and more secular trends such as climate change and crop failure. Transport, which accounts for over one-tenth of the UK's price index, has been equally unrepresentative of broader monetary phenomena. When the pandemic emerged, the global automobile industry stalled given Hubei Province's role in sourcing the world's automotive parts. This early fall in production was compounded when Covid-19 spread, factories closed, and companies cancelled orders for key inputs such as semiconductors. As societies opened back up, consumers sought the sanitary isolation of cars, whose supply had fallen – leading to a transport price spike. And without an accessible supply of semiconductors, automobile production has not been able to expand to meet this demand. The result is a record supply shortfall in automobiles and a record spike in the CPIH's transport price component.

What Covid-19 has demonstrated is that inflation is not necessarily a monetary phenomenon. We must rather be mindful of the “market microstructure” of the goods in question. How, where, when, by whom, and at what cost are goods produced and transacted? How quickly can supply respond to swings in demand? In the case of semiconductors, a market microstructure approach allows us to understand inflationary shortages when we pay closer attention to the fragmented nature of semiconductor supply chains, the geopolitical issues around the semiconductor industry, and the high costs and long time-horizon associated with building new fabrication plants. Moreover, when we pay closer attention to the exogenous shocks that affect normal market functioning, such as how climate change weighs down food production and the global

lumber supply, or how trade and geopolitical problems affect global steel and aluminum prices, we can develop a finer understanding of the sources of and solutions to inflation problems.

Introducing Systemically Important Supply Chain Stress Testing

The inapplicability of the Quantity Theory of Money and the centrality of market microstructure are not just analytical matters. These relate firmly to domestic and foreign economic policymaking. Given that the Quantity Theory of Money does not accurately describe today's inflation dynamics, the monetarist solution to today's inflation – raising interest rates, tapering asset purchases, and/or limiting government spending – does not hold. Monetary tightening will do nothing to resolve the particular issues creating price pressures for lumber, food, or transport. Insofar as monetary tightening does bring down price levels, this would only be achieved through the blunt and broad suppression of aggregate demand and economic growth. As we can see, bad theory makes for worse practice. Instead, it is important to pursue a careful and dynamic policy regime that can respond to the particular drivers of inflation that we are now encountering.

The best policy precedent for this comes from the stress testing of “Systemically Important Financial Institutions” which emerged in the 1990s and was popularized in the mid-2000s. These stress tests are administered by domestic regulatory and monetary authorities but coordinated and adapted internationally through the Financial Stability Board, a 2009 outgrowth of the G20. By simulating a variety of macro-financial issues, stress-testing allows governments (and firms) to preempt problems and improve policy.

There is now a clear need to apply this analytical and policy framework to the segments of the economy where new macroeconomic and political risks are arising. This will help us move away from simplistic, monetarist prescriptions to sophisticated, case-specific solutions. In order to apply the insights of the market microstructure approach to price level problems, we must stress test supply chains that are (1) systemically important to the global economy, (2) of vital strategic interest, and (3) least likely to adjust to market fluctuations without government regulation or investment.

As we have seen, price pressures today are global phenomena, and any effective response will necessarily be global. While the global coordination of macroeconomic policies can be difficult, the foundations for it are developing. In June 2021, the G7 pledged:

“We will consider mechanisms and share best practices to address risks to the resilience of the critical global supply chains, in areas such as critical minerals and semiconductors, reflecting on models used elsewhere such as stress-testing.”
(Carbis Bay G7 Summit Communiqué 2021)

At the same time, the White House conducted its first-ever supply chain review, inspecting the global markets for semiconductors, large-capacity batteries, rare earths, and pharmaceuticals. Where the G7 communiqué shows a willingness among allied upper-income countries to work together, the White House review gives a proof-of-concept for how this work would be done. Yet it remains necessary to formalize three principles of the Systemically Important Supply Chain Stress Test proposal.

First, what would be covered by supply chain stress tests?

Ultimately, this should be left to the G7 to decide at their next summit in Germany in 2022, but a sound model would follow the White House's four domains: advanced-technology industrial parts (e.g., semiconductors), advanced energy inputs, critical pharmaceutical goods, and dual-use technologies (i.e., items with civilian and military applications). These are not only of great economic and strategic interest, they are also least likely to respond dynamically to price pressures given the costs and complications around their production. This is what we are seeing with semiconductors, which have failed for two years to keep up with the global spike in demand, totally contravening conventional theories of how markets respond to prices. A stress-test focus on industry, energy, health, and dual-use goods would thus help national and international authorities *preempt* the inflation problems that would be exceedingly difficult to resolve after they have already emerged.

Second, how would stress tests work? The White House's review was in large measure a qualitative exploration of the issues surrounding each good. This is important but insufficient. Stress tests should calculate how production capacities would fare given a variety of exogenous shocks. Such "adverse scenario analyses" can include familiar macro-financial risks to supply chain resilience (exchange rate shocks, interest rate movements, commodity price swings, etc.) as well as non-financial risks such as global diseases, natural disasters, trade disputes, and geopolitical tensions. The simple calculation is *Time to Survive* minus *Time to Recover*. This would help authorities and firms assess how long a supply chain (or a critical node of it) can maintain production after a shock has occurred versus how long it will take to return production to normal. If *Time to Survive* is greater than *Time to Recover*, i.e. if a supply chain will not falter as firms build back production capacity, then there is theoretically no grave supply chain danger. Even in such a rosy case, however, the findings can help firms strengthen "survival" times and "recovery" rates. In less rosy cases, when *Time to Survive* is less than *Time to Recover*, national or international oversight and investment becomes more critical.

Third, what do stress tests accomplish? The aim of stress-testing is to support and improve firm-level awareness, government regulation and investment, and the international coordination thereof. When price spikes are driven by or compounded by geopolitical tensions – as in the case of semiconductors, which have been disrupted by US sanctions on Chinese suppliers – it is all the more

important that the G7 partners coordinate their inflation-management policies. Moreover, when price pressures face certain material constraints, such as the specific geography of rare earths, it is inevitable that partners will find ways to work together. The question is whether this will be slow and *ad hoc* or dynamic and preemptive. Stress tests will facilitate the latter by showing countries where vulnerabilities exist, how the private sector can adopt better practices, what sorts of regulations and investments are needed to ensure resilience, and the ways in which these governments can complement each other's policies. Just as the G20 pushed for the creation of the Financial Stability Board after the financial crisis, which has overseen global financial stress tests in the years since, the G7 ought to establish the "Forum on Supply Chain Resilience", as advocated by the Biden administration, to coordinate supply chain stress tests going forward.

Conclusion

Some may push back on this proposal. They may claim it is economically unnecessary and argue that no matter the inflation problem, markets will eventually push goods to acceptable equilibrium prices. It is true that market fluctuations ultimately force market adjustments. But before this adjustment occurs, there may be tremendous (and avoidable) volatility, drags on growth, and costs to society – as the lumber price swings, semiconductor shortages, and food price spikes show. Were such volatility or shortages to spread to pharmaceutical or military goods, a painful price stability problem could become a devastating health and security crisis. The appeal of government policy is the ability to solve problems when they matter most, in the short run, and to preempt them before they ever arise.

This new analytical and policy framework seeks to do just that. If we carry on with the pandemic-era agenda of deploying much-needed fiscal and monetary resources, as we should, it will be critical to ensure our *booms* do not induce *slumps*. Moreover, as global supply chains and global trends govern global prices, it will be critical to achieve some level of global coordination around supply chain stress tests and subsequent inflation-management policies. The G7 provides a natural home for this, and member countries would be well-advised to build on the progress of recent months. They must not let the current crisis go to waste. JS

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