Macroeconomics and COVID-19

As the COVID-19 shock continues to fan out across the global economy, policymakers are contemplating the correct response. Curiously, though the shock is of a different character to that during the Great Financial Crisis (GFC) the policy response should be broadly similar—monetary easing, (where possible) liquidity provision by central banks, and fiscal expansion. Whether policymakers react in the correct manner is crucial; the biggest danger facing the global economy right now is that they take the view that a different shock requires a different policy response. This is not the case—with an important caveat. Here we briefly frame the challenge of responding to COVID-19.

Some macroeconomic accounting helps frame the issues. Nominal GDP is equal to nominal spending which is, in turn, equal to nominal income:

$$GDP = P^C C + P^I I + G + (P^X X - P^M M) = wN + \Pi + T$$

Where the terms are defined as usual—here w is the average nominal wage and N the number of employed workers. Subtracting government spending from both sides allows us to write a measure of "private" nominal spending:

$$\widehat{GDP} = GDP - G = P^C C + P^I I + (P^X X - P^M M) = wN + \Pi + FB$$

Deflating by the consumption price index gives real private activity (measured in terms of consumption goods) which is equal to real wage income plus the real value of profits and the fiscal balance:

$$\widehat{GDP^R} = \frac{\widehat{GDP}}{P^C} = C + \frac{P^I}{P^C} I + \frac{P^M}{P^C}\left(\frac{P^X}{P^M} X - M\right) = \frac{w}{P^C} N + \frac{(\Pi + FB)}{P^C}$$

Moreover, there is a relation between the workforce, imports, the capital stock and real private output of the economy, which we write simply as:

$$\widehat{GDP^R} = \theta N$$

where represents the role of accumulated knowledge, the capital stock, and other inputs on overall production. Assume initially a closed economy and no government, we have three relations equating real output, expenditure, and income:

$$\theta N = C + \frac{P^I}{P^C} I = \frac{w}{P^C} N + \frac{\Pi}{P^C}$$

Output, spending, and income are equal at all times, allowing for inventories through I. Here they meet at employment $\widetilde{N}$ which represents some natural rate where income distribution and expenditure choices sustain something resembling full employment. Figure 1.

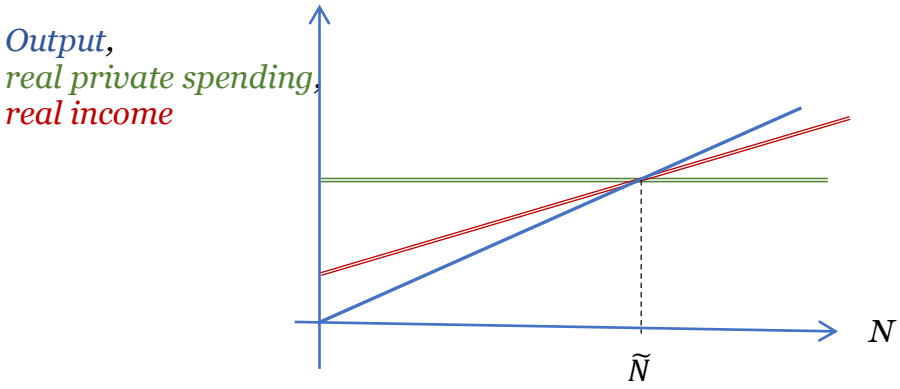

***Figure 1**: Output, private spending, and real income deliver something close to full employment.*

Typical "expenditure shock"

A typical "recession" involves a fall in private expenditure—perhaps as some prior ebullience is abruptly unwound and balance sheet repair initiated. As private spending falls so too does output and income.

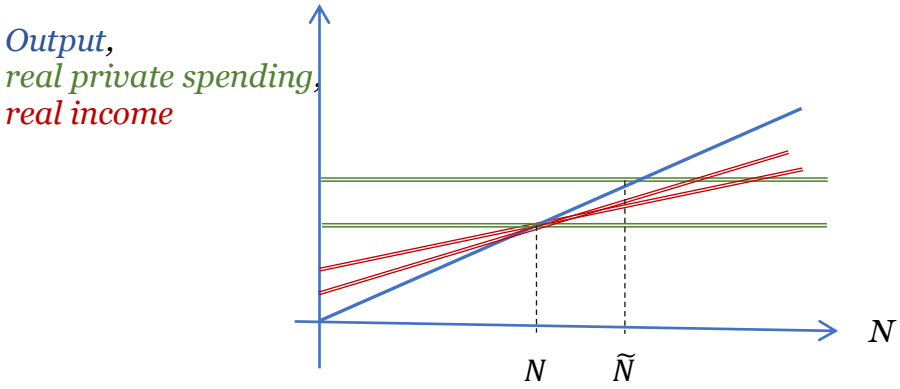

***Figure 2**: Following a contraction in private spending, output and employment is driven lower; a combination of a lower real wage or profit is needed for those remaining in activity.*

Since income falls by less than output (probably a strong assumption), either real profit or the real wage, or some combination, have to adjust lower, while employment falls to N, resulting in unemployment given by the difference between $\widetilde{N}$ and N. Figure 2. Lower spending means lower real output and income—everyone is worse off due to individually reasonable but collectively damaging tightening of purse strings.

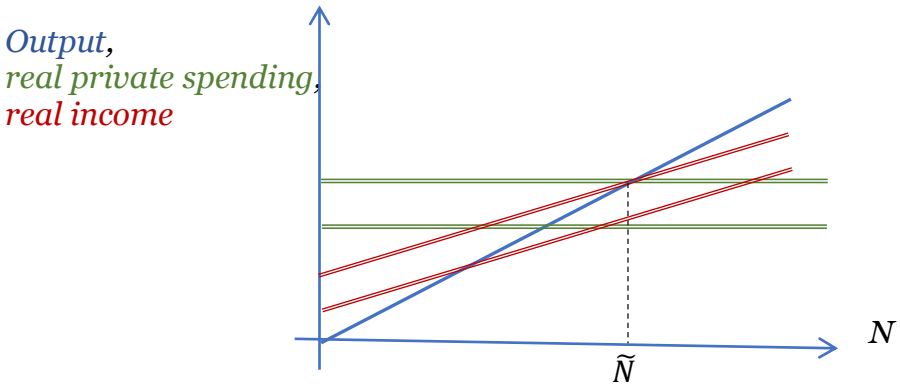

***Figure 3**: A fiscal deficit (here shifting down in income line) can absorb the increase in private saving, recycle this back into final demand, to sustain full employment.*

Monetary policy can try and offset this fall, of course, by cutting interest rates to encourage greater private spending. But this might not be enough, particularly in a panic and balance sheet repair following a Great Financial Crisis (GFC)-type shock.

Alternatively, if we re-introduce the fiscal balance, government action can sustain spending at the "natural" level previously established. Figure 3. Indeed, the fall in private spending implies a surplus of private saving over investment which, other things equal, is seeking some saving vehicle. This can be channelled into government debt—an "outside asset" to the private sector—recycled back into final spending. The fiscal balance can therefore offset entirely the fall in private spending.

Note, in this case, government spending replaces private spending to keep employment at the original level. And the fiscal balance can continue to absorb and recycle private saving for as long as is necessary for private spending to recover to levels consistent with full employment.

COVID-19 "production shock"

So far so familiar.

The COVID-19 shock is a shock to production, however, meaning the workforce is—while still technically employed—unable to produce output for the private sector for some period due to absence. Alternatively, an outbreak elsewhere disrupts the supply chain such that, even if workers can reach the production line, there is a sharp drop in output per person—a reduction in θ for all levels of employment. In both cases, there is as a result a sudden downward shift in the production function.

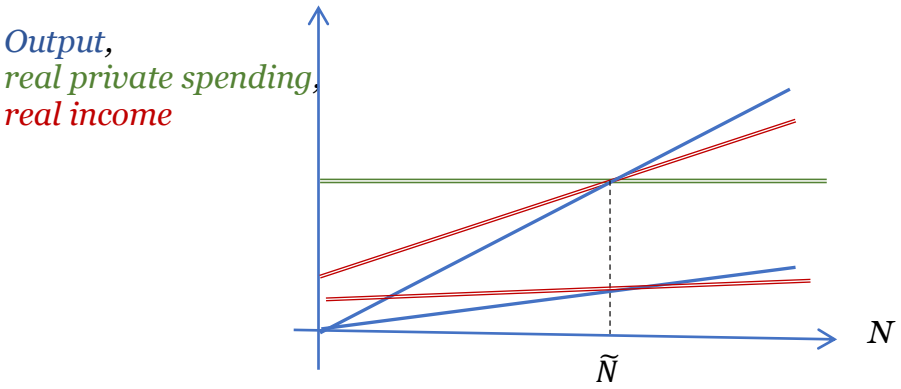

***Figure 4**: A sharp fall in production for each level of employment means private income will have to adjust downward—either through lower profits, a sharp reduction in the real wage, or both. Private spending will follow due to rationing.*

Without government support, at the existing level of employment private real income will have to adjust in down. Figure 4. Either profits need to turn negative, or the real average wage lowered, to be consistent with the economy's (temporary) lower real output. Lower or negative profit means firms will need to access credit during the period when activity is disturbed. Or, if they lower real wages paid to workers, the workforce will be found short of the income to make regular outgoings on interest payments, food and fuel etc. Most likely both will occur. As such, the sudden drop in income creates growing risk of delinquency or default if credit is not made available to see through the shutdown.

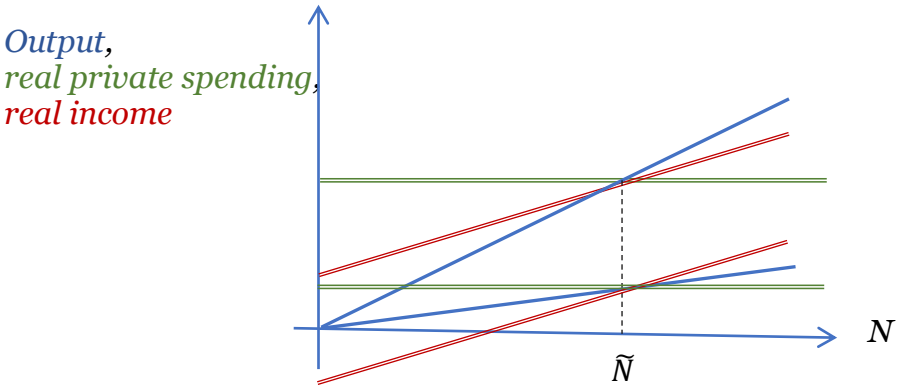

***Figure 5**: A fiscal deficit (shifting down in income line) again can play a crucial role, this time by sustaining the real incomes of workers and corporates. Since private expenditure will inevitably fall, a surplus of private saving will emerge to finance the fiscal deficit. But the impact on private credit will be minimized as the strongest balance sheet takes the temporary strain.*

Fiscal can again play an important role—in a similar but subtly different way to the GFC shock discussed above. Here, by lowering taxes or making outright transfers to

households and firms, fiscal policy can make sure that private real incomes, including profits, are unchanged despite the lower activity.

Unlike in the demand shock discussed above—where fiscal expenditure replaces the shortfall in private spending—here lower government taxes and transfers replace the income loss from the supply disruption.

Of course, this will become an expenditure slowdown as well—simply because, in time, there will fewer goods and services available for the private sector to buy. So, rationing brings private expenditure in line with the output of the economy automatically.

Since private income is supported by the government, but private spending is rationed, there is again a surplus of private savings—income exceeds spending. Therefore, the government deficit is again the mirror of the private surplus. However, this time the government balance sheet is absorbing the negative shock lest households and corporates risk liquidity or potentially solvency problems. The stronger balance sheet takes the strain.

More precisely, how might any fiscal deficit be financed? And what happens to the trade balance?

Rearrange the expression for $\widehat{GDP^R}$ in terms if sector balances:

$$\left(\widehat{GDP^R} - C - \frac{P^I}{P^C} I\right) = \frac{P^M}{P^C}\left(\frac{P^X}{P^M} X - M\right) = \left(\frac{w}{P^C} N - C\right) + \frac{(\Pi - P^I I)}{P^C} + \frac{FB}{P^C}$$

Take an extreme case as thought experiment. Let consumption fall to some minimal subsistence level, $\bar{C}$, while real private output, exports, and investment fall to zero. But let real wage income and profits stay the same on the basis of fiscal transfers and fixed price indexes:

$$-\bar{C} = -\frac{P^M}{P^C} M = \left(\frac{w}{P^C} N - \bar{C}\right) + \frac{\Pi}{P^C} + \frac{FB}{P^C}$$

The economy runs a goods and service deficit, real imports are needed to sustain real consumption:

$$M = \frac{P^C}{P^M} \bar{C}$$

while the fiscal balance is exactly equal to (the negative of) nominal wage income and profits:

$$FB = -(wN + \Pi)$$

This is an extreme case, of course. But illustrates how, when output comes to a complete halt, fiscal policy can keep real private incomes unchanged to avoid delinquency or default by private actors during the temporary shock; and the economy imports goods—such as food, medicine, face masks—from abroad to sustain some subsistence level of consumption.

As the fiscal deficit emerges, so does a trade balance deficit. The latter is presumably smaller than the former, however. The fiscal deficit is financed partly by private savings and partly using net external financing. This requires some economy less impacted to provide the imports needed as the shock unfolds. But the extreme case illuminates the logic.

This case is too extreme, of course. More realistically, the worst affected economies will see a fiscal expansion—through transfers not spending—monetary support through credit and liquidity, and deterioration in the trade balance.

In any case, fiscal and monetary expansion remains the correct policy response to the emerging COVID-19 crisis.

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