From John Muellbauer March 23 2020

The coronavirus pandemic and U.S. consumption

The coronavirus shock began with disruption to China-related supply chains and the fall in demand for exports to Asia. Subsequently, the disruption to foreign travel and the enforced domestic social distancing, and ultimately lock-down, together constituted a mix of extreme supply and demand shocks. Central banks have responded by lowering interest rates, giving additional liquidity support, and by QE, with the aim of supporting asset values and credit flows.

It is likely that the second quarter of 2020 will see the largest falls in quarterly income and in aggregate consumption experienced in the last 100 years. Normally, one thinks of consumption as being less volatile than income. There are two reasons for this. One is lags in adjustment to shocks and the other is the potentially stabilising influence of expectations of future income.

However, this time we are likely to see a radical reversal of this pattern, and for multiple reasons. These include the fact that part of the shock comes from consumption itself, that the jump in the unemployment rate greatly increases income insecurity and hence precautionary saving, and that falls in asset prices and in credit availability also lower consumption.

To think about this and some of the further ramifications of the crisis, it is useful to examine empirical estimates of the drivers of consumption building on research published in Aron et al. (2012) and Duca and Muellbauer (2013). The 'credit-augmented consumption function' set out there is a generalisation of the text-book permanent income model. There are three crucial extensions of the model. First, the credit channel is explicitly incorporated by the inclusion of credit conditions indices for unsecured credit and for mortgage credit, the latter interacted with housing collateral – as varying access to home equity credit determines the spending power of housing wealth. Second, household balance sheets are split into liquid assets and debt, illiquid financial assets and housing wealth, with different propensities to consume rather than being combined in a single net worth sum. Thirdly, permanent income applies a far higher discount rate to future income streams than the text-book model. This is an aggregate approximation to the behaviour of heterogeneous agents facing liquidity constraints and justified by the buffer-stock theory of saving, see Muellbauer (2020) for further explanation. The model also incorporates short-term roles for income insecurity, proxied by the change in the unemployment rate, and changes in interest rates to cover cash flow effects on indebted households.

It is important to acknowledge that a vast and complex general equilibrium problem underlies the economic situation faced by the U.S. For example, I am implicitly making assumptions about the multiplier process by which falls in consumption spending feed into employment and income generation. I am also making assumptions on how the financial system, and contagion within the financial system and hence credit availability respond to these shocks. One would need a far larger econometric model to capture all this, and no satisfactory models exist. A single equation or indeed the household sector subsystem estimated in Chauvin and Muellbauer (2018) however, can still provide useful insights into some of the key issues.

A slightly stylised version of the basic equation (all in constant prices) looks like this:

$$\log c = 0.6 \log c(-1) + 0.2 \log y + 0.2 \log yperm + 0.04 NLA/y + 0.008 ILA/y$$
$$+ 0.016 HLIxHA/y + 0.04 CCI - 0.005 DUR + \varepsilon$$

c is aggregate consumption,

y is non-property income (annualised),

yperm is fitted permanent income which uses a 25% per annum discount to discount future income flows – i.e. the horizon is much shorter than in text-book models,

NLA is liquid assets (bank and saving deposits, money market funds) minus debt, all assets measured at the end of the previous quarter,

ILA is illiquid financial assets (mainly stock market wealth and other pension assets),

HLI is our index of housing credit conditions, the 'housing liquidity index', scaled to be 1 at the starting point,

HA is housing wealth,

CCI is our index of credit availability for unsecured credit, based on the Fed's Senior Loan Officer Survey, normalised at 1

DUR is the change in the unemployment rate,

ε is the consumption shock not accounted for by the other terms.

To interpret the model, note that the long-run solution requires division of the coefficients on log y and the other terms (apart from the change in the unemployment rate) by 1-0.6=0.4, also known as the speed of adjustment. [1]The sum of the two income coefficients is 1 in the long-run. This is imposed as a requirement to make sure that in the long-run, if income and all components of wealth double, then consumption doubles as well. In the aggregate, the marginal propensity to consume out of current income is around 0.2 within the quarter and around 0.45 after four quarters. However, buffer-stock saving theory suggests that higher income uncertainty lowers the time horizon, so that, at this time of record household uncertainty, the weight on current income rises relatively to that on permanent income.

My empirical work with a number of co-authors on other countries suggests that the main differences in parameter estimates between countries occur in the second line of the above equation. The housing collateral effect is absent in many European countries where home equity withdrawal is almost unknown. The effect of shifts in credit conditions will be greater where indebtedness is higher. And the effect of the change in the unemployment rate is far greater in the U.S. than in European countries with stronger social safety nets. However, there is another major source of heterogeneity: differences in financial balance sheets relative to income. Germany has a far higher ratio of liquid financial wealth minus debt than the U.S. and

[1] Incidentally, typical speeds of adjustment in inadequately specified consumption equations in structural econometric policy models at central banks are almost invariably below 0.2, see Muellbauer (2020), and many models do not even include unemployment effects.

a far lower ratio of stock market wealth to income. It will therefore experience a less negative household reaction to these shocks than the U.S.

The coefficients on the wealth components can be interpreted as their marginal propensity to consume. For example, a $100 increase in illiquid financial assets raises annual consumption by $2. However, this is not the only way that the stock market affects consumption, as it also plays an important signalling role in forecasting future income. The model is useful in thinking about the multiple channel through which these shocks transmit – the direct shock, the effect on income and components of wealth, through asset prices, and the effects through credit conditions. Any attempt at forecasting with the equation has to make heroic assumptions about a number of key factors. Fundamental is the ability of the health system to cope and the speed of government policies on social distancing and eventually lock-down. The next key assumptions concerns government support packages to keep businesses afloat and support household income, about stock market and housing market declines, and as noted above, about the ability of financial system to cope with the coming wave of corporate bankruptcies and loan defaults across the spectrum.

On health systems and the speed of government response, the excellent analysis of Tomas Pueyo, provides much evidence on differences between countries in health systems https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56

and the speed and scale of government responses. The U.S. does not come out well in this comparison. The rapid efforts across much of Europe to provide financial support to companies and households compares with a laggardly response in the U.S. Both sets of differences suggests that the U.S. will suffer a greater degree of long-run damage than much of Northern Europe

Below, I have set out what I think is a plausible scenario for the U.S. which incorporates experience as an economist in thinking about the system as a whole, but is not based on a large quantitative model.

To begin, examine the consumption shock itself. Consider the most vulnerable of the broad components of total private consumption expenditure at the end of 2019. These are restaurants and hotels at 7%, transport services at 3.3%, recreation services at 4.1% and gasoline and other energy at 2.3% of total consumption expenditure. There is also likely to be a more generalised shock because a lock-down makes shopping harder and delivery services will not be able to compensate entirely, at least in the short-run. So food consumed at home, currently at 7%, will undoubtedly increase. The other major beneficiary is obviously healthcare at 17% of spending at the end of 2019.

One scenario for the second quarter of 2020 for the consumption shock looks like this:

A decline from 7% to 2% in restaurants and hotels. Some of the former will convert to home delivery, and some hotels will be converted to hospitals. This raises questions about how the national income accountants measure the new activities and I assume they will not reclassify in the short-run and just measure sales in this sector.

A decline in transport services from 3.3% to 1% as airport travel is hit.

A decline in recreation services – gyms, theatres, cinemas, concert venues etc. from 4.1% to 1.5% as live activities collapse and there is some switch to online.

A rise in food at home from 7% to 10%.

A rise in healthcare spending from 17% to 20%, probably constrained by capacity, a constraint that could increase as medical staff themselves are infected.

The net effect so far is a decline of 3%. However, there will surely be a decline in other goods and services simply because of the constraints on shopping. I will assume this accounts for another 2%, probably quite a modest assumption.

This overall 5% decline is apart from any effects that operate via the other channels represented in the model. I am assuming that the postponement of purchases of durables is mainly part of the process of adjustment to the income, wealth, credit drivers and unemployment rate drivers.

I will assume that labour income y falls by 15% in the quarter. This takes into account the within quarter multiplier effects of the consumption shock and the supply shock across the economy, but makes a fairly optimistic assumption about the cash support provided by the Federal Government to household incomes.

I will assume that permanent income yperm falls by 7.5%, around half the fall in current labour income. There are indications that the health crisis will last a year or more and that some disruption to the economy will continue for longer as re-infection from foreign countries with still virulent epidemics remains a risk.

Turning to the household balance sheet effects, these balance sheets are measured at the end of the quarter, i.e. at the end of March.

The ratio to income of net liquid assets, NLA/y was 0.15 at the end of 2019 – and is assumed to decline to 0.1 by the end of March, as cash reserves are drawn down and credit lines, especially via credit cards, expand.

The ratio to income of illiquid assets, ILA/y was around 6.8 at the end of 2019. The stock market could halve by end of March, suggesting a decline of the ratio to income of illiquid financial assets to 4.3.

The ratio to income of gross housing wealth, HA/y was around 2.6 at the end of 2019. House prices are sticky, so any short-run decline in house price indices as measured by the FHA by the end of March will be outweighed by the decline in income, leaving the ratio at 2.7. However, crucially, the housing liquidity index HLI is assumed to contract from 1 by 0.8 because of the disruption to credit markets and the rise in risk aversion. Unfortunately, later in the year, house prices are likely to fall, probably feeding back negatively on HLI, with longer-term consequences. Reasons for the fall include the decline in income, the contraction of credit conditions and the prospect of more housing coming onto the market given deaths among the elderly population.

I assume the credit conditions index for unsecured consumer credit falls from 1 to 0.85.

I will assume that the unemployment rate in 2020 quarter 2 jumps by 10%.

With these assumptions we can now add up the negative effect on **consumption in the quarter**:

Direct consumption shock 5%.

Current income decline	0.2 x 15%=	3%
Permanent income decline	0.2 x 7.5%=	1.5%
Decline in NLA/y	0.04x0.05x100 =	0.2%
Decline in IFA/y	0.008x2.5x100 =	2%
Decline in HLI xHA/y	(0.016x2.6 -0.016x0.8x2.7)100 =	0.7%
Decline in CCI	0.04x 0.15x100=	0.6%
Jump in the unemployment rate	0.005 x10x100 =	5%

The grand total is a 18% fall in quarterly consumption, which exceeds the 15% fall in labour income. I have probably underestimated the role of the current income decline since, as mentioned above, the rise in uncertainty makes households concentrate much more on the near term. This could increase the grand total to 19%. One qualification of this analysis is that data for March 2020 will already have been affected by some of these factors, though on a more modest scale. This means that some of the process of adjustment will already have begun in the first quarter of 2020, which reduces the relative magnitude of the second quarter decline.

By the third quarter of 2020, the direct consumption shock could have partially reversed **if** virus control measures are succeeding and supply chains improve, and most of unemployment shock effect will probably have gone. But there is not much reason to think that any of the other components will have improved, unless there are further income support measures from the Federal Government, and indeed, lower house prices are likely to be a further drag. According to the model, 0.6 of the second quarter's fall in consumption will feed through in the third, lowering consumption by a further 10.8%, other things equal, and a further feedthrough will occur in the fourth quarter. A sharp recovery in the stock market from the halving assumed by the end of March is also unlikely. Among the reasons are widespread bankruptcies and the wiping out of cash reserves for many companies, which will lead to major cuts in dividend pay-outs when profits recover as they seek to rebuild reserves. Further, the explosion of government debt issuance will stress sovereign bond markets and cause yields to rise, particularly in the absence of monetary finance of fiscal policy. The 'Fed model' of stock market valuation would then imply far lower values. Finally, the rise in risk aversion after such a catastrophy will constrain valuations for years to come.

The outlook for U.S. consumption and with it for the economy in this scenario is far more grim than at any time in the global financial crisis. Dealing with the health consequences of the virus, restoring supply chains, preventing capacity from being permanently lost, supporting consumer income and spending, and supporting the financial sector to keep credit flowing, are the most monumental tasks that any U.S. government will have faced, at least in peace time. Though the fundamental situation in health capacity and the vulnerability of households to declines in income, asset prices and credit availability is more severe in the U.S. than, for example, in Germany, the responses by the Federal Government, so far look wholly inadequate.

This is one scenario. The framework allows one to think through the consequences for other scenarios, both more positive and even more negative. The longer delayed are the government's respsonses, the more negative the scenarios that need to be considered.

References

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