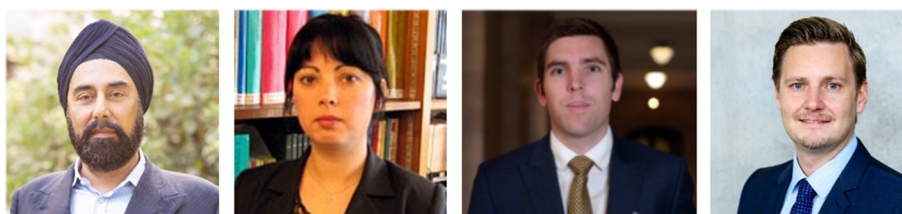


## Monetary and fiscal complementarity in the Covid-19 pandemic



By Jagjit S Chadha, Luisa Corrado, Jack Meaning and Tobias Schuler<sup>1</sup>

*Keywords: Covid-19, monetary-fiscal interaction, quantitative easing.*

*The 2020 pandemic had the features of a perfect storm: a supply (shutdown) and demand shock (lockdown), which halted the functioning of the global economy for several months. We show that monetary policy played a critical role in offsetting these shocks and in particular in stabilising asset prices and providing support for the fiscal policy interventions. While the monetary policy responses are calibrated to the Federal Reserve in the United States, the results can be generally interpreted as reflecting the supportive policies adopted by major central banks.*

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In response to the coronavirus (Covid-19) pandemic there has been a complementary approach to monetary and fiscal policy in the United States with the Federal Reserve System purchasing extraordinary quantities of securities and the government running a deficit of some 17% of projected GDP. The Federal Reserve pushed the discount rate close to zero and stabilized financial markets with emergency liquidity, which had been a key instrument innovation during the financial crisis. In March 2020 the Federal Reserve initially implemented emergency refinancing by cutting its discount rate close to zero and by setting a USD 700 billion limit for asset purchases.

We are able to match stylised facts of the economic effects of the pandemic in the United States by implementing a shock to the velocity of money and to labour supply. To capture the interventions, we develop a model in which the central bank uses reserves to buy much of the increased issuance of government bonds and this offsets the impact of shutdowns and lockdowns in the real economy. We show that these actions reduced lending costs and amplified the impact of supportive fiscal policies.

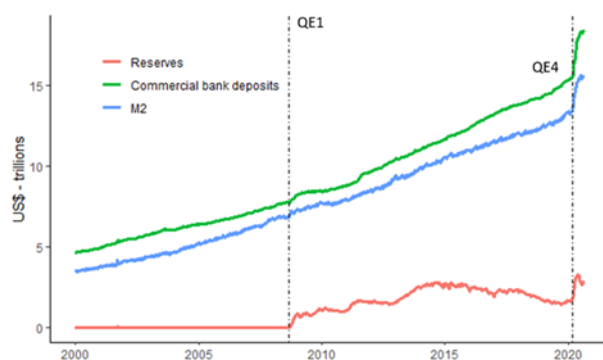
We demonstrate how a combined fiscal-monetary response helped avoid turning the Covid-19 crisis into an economic recession of even greater magnitude and severity in a counterfactual analysis. Our calibrated model shows that if the Federal Reserve had not intervened with quantitative easing (QE), output would have fallen by a further 10 percentage points, real wages would be down by a further 15 percentage points and employment down by a further 20 percentage points. As a result inflation would have fallen even further. Hence, we find that prompt, combined fiscal-monetary interventions mitigated the impact of the pandemic shocks and helped to establish a more rapid recovery to pre-crisis levels of activity (for the full paper see Chadha, Corrado, Meaning and Schuler (2021)).

## The Covid-19 pandemic as a shock to velocity of money

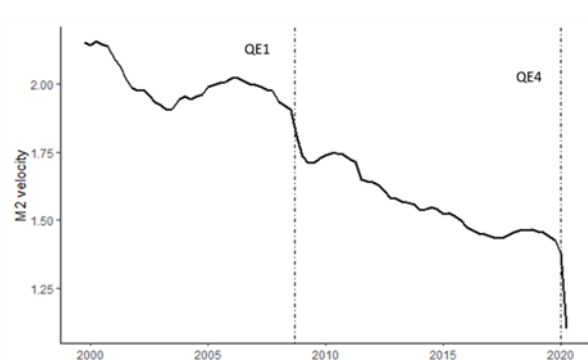
The pandemic led to some extraordinary movements in monetary aggregates, see **Figure 1**. The significant increase in the stock of money coupled with the substantial fall in GDP has meant that the velocity of money has fallen dramatically. Between the end of 2019 and the end of the second quarter of 2020 the ratio of quarterly nominal GDP to the quarterly average M2 money stock fell more than 30 basis points, from 1.43 to just 1.10. This was a significantly larger and quicker fall in velocity than during the global financial crisis of 2008-09 and was likely to deepen and persist as long as the Federal Reserve continued to expand the monetary base and economic output remained weak.

**Figure 1. Money measures for US economy**

(a) Money stocks



(b) M2 velocity of money



Source: Federal Reserve Bank of St Louis (FRED).

## Model framework

We now set out a simple framework for analysing extraordinary central bank and fiscal interventions during the Pandemic. We employ the model by Chadha, Corrado, Meaning and Schuler (2020). The central bank controls the stock of fiat money and banks create intra-private sector claims by the means of loans and deposits.

The private sector has three forms of assets: deposits held at banks, some fraction of bonds issued by the government and a fraction of total capital. The liabilities are loans, provided by banks, and current and future taxes. Capital lies on the assets side of household balance sheets because households own firms. The fiscal authority issues government bonds, which are recorded on its balance sheet as a liability in the form of outstanding public debt, and collects taxes. The commercial banks' balance sheet liabilities are deposits. Some fraction of liabilities is held as reserve assets with the central bank and the rest is lent to the private sector, for which the commercial banks need to employ monitoring work. The central bank holds assets in the form of a fraction of government bonds, and a fraction of capital, with liabilities determined by central bank money, which are bank reserves. The net assets of commercial banks and of the central bank are both zero.

**Table 1: Stylised balance sheets**

| Private Sector     |             | Fiscal Authority |             |
|--------------------|-------------|------------------|-------------|
| Assets             | Liabilities | Assets           | Liabilities |
| Deposits           | Loans       | Taxes            | Bonds       |
| $\gamma$ Bonds     | Taxes       |                  |             |
| $\gamma_k$ Capital |             |                  |             |

| Commercial Banks |             | Central Bank             |             |
|------------------|-------------|--------------------------|-------------|
| Assets           | Liabilities | Assets                   | Liabilities |
| Reserves         | Deposits    | $(1 - \gamma)$ Bonds     | Reserves    |
| Loans            |             | $(1 - \gamma_k)$ Capital |             |

From this flow of funds we can see the mechanism by which extraordinary policies operated in the pandemic. The central bank can implement QE which involves the expansion of its balance sheet through the issuance of bank reserves that are backed by increased holdings of either bonds or capital. The bank reserves are lodged with commercial banks against which the private sector, which has sold the bonds or capital to the central bank, has a deposit claim.

When the fiscal authority issues government bonds to finance its deficit this acts as cushion to the fall in GDP. Through bond purchases in the context of QE, the monetary authority can ensure the supply of government debt held by the private sector remains consistent with their monetary objective, despite independent increases in total supply.

## Simulating a non-QE counterfactual

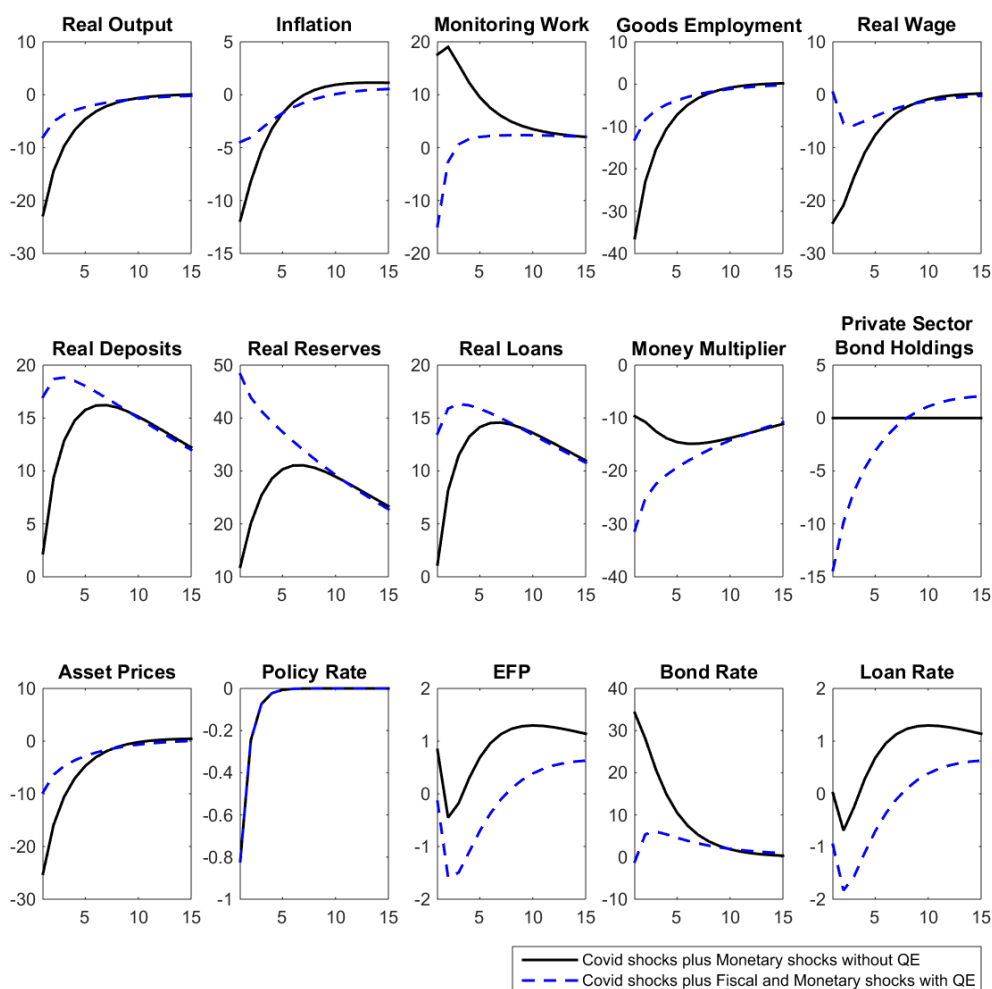
In order to study the impact of monetary interventions the combined effect of the lockdown shock and the shutdown shock as well as the fiscal support is calibrated to the impact of the Covid-19 pandemic shocks in the United States (see **Figure 2**). We compare the case, where the Federal Reserve deploys QE to respond to these

shocks (dashed line) with the counterfactual that involves no deployment of asset purchases to respond to macroeconomic shocks (solid line). The combined shock in the case of no QE intervention has a strong effect on real output and goods employment which drop by more than 20% and 30%, respectively. Asset prices plummet by almost 25%.

While the fiscal stimulus mitigates some of the fall in macroeconomic variables, without monetary accommodation via QE, the expansion of government debt would add to the increase in the bond rate. While the lending spread (external finance premium, EFP) reaches 1% on impact, it drops temporarily due to intervention, and stabilises at 1% in the long run. The policy rate reaction, which mimics the rate cut by the Federal Reserve, completely mitigates this initial increase in the lending spread (EFP). As loans increase while collateral is falling, given strongly reduced asset prices, monitoring work would jump by 20%. Thus, monetary accommodation via QE reduced lending costs stabilising private sector collateral, acts as a substitute for costly monitoring activity and amplified the impact of supportive fiscal policies.

These effects allow loans to expand with positive effects on activity and inflation. Goods employment and real wages are to a large extent stabilised. Through the stabilization of wages, the effect on inflation is also mitigated to an average drop of 1.5% in the first year after the shocks.

Figure 2: Combined Covid-19 shock with fiscal and monetary response



Notes: All interest rates are shown as absolute deviations from the steady state, expressed in percentage points. All other variables are percentage point deviations from the implied steady state value. EFP means external finance premium. QE means quantitative easing.

The results show that if the Federal Reserve had not intervened, output would have fallen by more than 10 percentage points more on impact and in the following quarter. Real wages would have fallen by 15 percentage points more and unemployment would have increased by more than 20 percentage points. Wages would be 20 percentage points lower than with QE. As a result, inflation would fall by substantially more, and the recovery would probably have taken up to twice as long than without the intervention.

## Conclusions

The analysis shows that, by increasing the supply of reserves and reducing interest rates in the economy, the large-scale purchases of government debt helped to stabilise the economy in light of the pandemic-induced economic shock. Our work also shows that this policy acted as a complement to the fiscal support that occurred concurrently, avoiding increases in interest rates that would have been incompatible with monetary policy objectives. ■

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