

# Can central banks run out of ammunition? The role of the money-equities-interaction channel in monetary policy

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## Abstract

Many authorities claim that central banks 'have run out of ammunition', either because the central bank rate has dropped close to the zero lower bound or because of Keynes's liquidity trap. I argue first, that indefinitely large increases in the quantity of money remain possible even with the central bank rate close to zero, and, second, that increases in the quantity of money raise all asset prices, including the prices of quoted equities, not just bond prices. Bonds are an unimportant asset class in modern capitalist economies, relative to corporate equity and real estate. Meanwhile increases in equity prices always boost aggregate demand and output.

## KEYWORDS

asset prices, monetary policy, quantity of money, zero lower bound

## JEL CLASSIFICATION

E43; E52; E58

## 1 | INTRODUCTION

Much current financial commentary asserts that – when interest rates have dropped to levels near to zero – 'central banks have run out of ammunition' (e.g. Krugman, 2020). The argument

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here will be that such assertions are without foundation. Indeed, allegations of central bank impotence represent a misunderstanding of both the scope of monetary policy and the structure of its transmission mechanism. The argument will pivot on the proposition that changes in the quantity of money affect the equilibrium level of all asset prices and hence have powerful indirect effects on aggregate demand.<sup>1</sup> They are relevant, in particular, to the level of the stock market.

Section 2 explains that the central bank can always increase the quantity of money. Section 3 reviews the thesis that monetary policy might still be exhausted, despite this ability. The thesis depends for its authority on claims in Keynes's *General Theory* about the downward rigidity of bond yields in a so-called liquidity trap. Implicit here is the apparent belief that movements in bond yields are all-powerful in determining the future course of aggregate demand. This belief is unconvincing, to say the least. This is shown in section 4, where data from the USA are cited to illustrate and establish the main points. Section 5 is more specific, discussing the monetary behaviour of non-bank financial intermediaries, particularly long-term savings institutions, again in the USA. This serves as background to a detailed account of the 'money-equities-interaction channel', noting that it is closely related to the 'portfolio rebalancing channel' prominent in recent research on the effects of central bank asset purchases.<sup>2</sup> The description is stylised, in order to emphasise key features. Section 6 considers whether equity markets may overshoot their equilibrium values as portfolios are rebalanced. Finally, section 7 submits that, despite the stylised presentation in this article, the discussion of the money-equities-interaction channel is realistic. Indeed, the channel is basic to the working of monetary policy in a modern economy. By contrast, the relationship between changes in the quantity of money and bond yields is unimportant.

## 2 | CENTRAL BANKS CAN ALWAYS EXPAND THE QUANTITY OF MONEY

The term 'monetary policy' can be conceived in different ways. A modern approach is to define monetary policy as the setting of the central bank rate in the parsimonious three-equation model of New Keynesianism (Clarida, Gali, & Gertler, 1999). No attention is paid here to the quantities of either the monetary base or any money aggregate. This airbrushing of money quantities from the macroeconomic picture is arguably an injustice to the richness of the previous literature on the subject and the complex interdependencies found in real-world economies.<sup>3</sup>

All the same, many economists do not believe that the central bank can exert direct control over the quantity of money. Everyone accepts that the central bank is the monopoly issuer of its own liabilities, which are virtually the entirety of the monetary base, and that it necessarily controls the supply function of monetary base assets.<sup>4</sup> But much contention has arisen about the characterisation of this supply function. A prominent tradition of thought – promoted, for example, by Milton Friedman and other monetarist economists – held that the central bank can and should be concerned with the *quantity* of base assets. Further, it postulated that an increase in the quantity of the base had a roughly proportionate positive effect – via the 'base multiplier' – on the quantity of money.<sup>5</sup> On the other hand, most monetary economists nowadays believe that in practice central banks fix the *price* of central bank credit, in order to influence a spectrum of interest rates, with such operations having a less predictable bearing on the quantity of money.<sup>6</sup>

These debates are important as part of the background to this article, but they are not its focus. My assumption throughout is that the central bank not only can take steps that increase

the quantity of money, but also can calibrate them to increase the quantity of money by a particular amount.<sup>7</sup> Sure enough, transactions between itself *and the banking system* may sometimes have an inexact relationship with the quantity of money, which consists of money balances *held by private sector non-banks*. Circumstances can even be imagined in which operations that are expansionary in intent – to boost the monetary base assets held by commercial banks and/or to lower the central bank rate – have no effect on the quantity of money.<sup>8</sup> These circumstances are rare; they are likely to prevail only when the economy and financial system suffer from exceptional trauma.<sup>9</sup>

In any case, it remains open to the central bank – even in such extreme conditions – to pursue money expansion by other means. It can issue liabilities against itself – by, for example, adding to commercial banks' cash reserves – and using the proceeds to purchase assets from the non-bank private sector. When the purchases add to the non-bank private sector's bank deposits, the quantity of money rises dollar for dollar, euro for euro, or whatever. Leakages in the process can occur, but they do not cast doubt on the central bank's ability to expand the quantity of money (see Thomas, 2017). A positive effect on the amount of money, of a predictable size, is to be expected. That is so even if the central bank prefers to quantify the effects of its measures by reference to an interest rate.<sup>10</sup> In the rest of this article, it is taken for granted that the central bank can always expand the quantity of money and that such expansion is potentially unlimited. If central banks have run out of ammunition, the predicament is not due to an inability to increase the quantity of money.

### 3 | MONEY AND ASSET PRICES: BOND YIELDS IN KEYNES'S 'LIQUIDITY TRAP'

Money has a Janus-like quality. It facilitates two kinds of transactions, those in assets which are likely to survive for many future periods, and those in goods and services produced in the immediate past period. It must therefore have – simultaneously – an equilibrium relationship with the value of assets that constitute national wealth, and with the value of goods and services consumed and invested in the current period (and hence with national income, output and expenditure). Money-holders have to look both forwards and backwards for the information they need to balance money against other assets in their portfolios.

A wide variety of assets is relevant to the portfolio balancing decisions. Non-money assets can be divided into three main categories:

- those that pay a fixed income ('bonds');
- those that pay a variable income usually dependent on the success of the investment made ('equities' and real estate, which receive dividends and rents respectively), and
- those that give some kind of use value rather than a monetary return (consumer durables and personal chattels, including such items as works of art).

In an overwhelming majority of nations bonds are smaller in wealth totals than the sum of variable-income assets and use-value assets. However, economic theory has long been preoccupied by – indeed, almost fixated on – the relationship between the quantity of money and the price of bonds. The fixation has sometimes gone so far as to exclude discussion of the relationship between the quantity of money and assets other than bonds.<sup>11</sup>



Perhaps the most influential example of this trope was Keynes's (1936) *General Theory*, which introduced the liquidity preference theory of what he termed 'the rate of interest'. His interest-rate notion was in fact a bond yield. It was said to constitute a 'monetary phenomenon' in that it equilibrated the demand to hold money with the quantity of money created by the banking system (Keynes, 1936, pp. 165–74). In the key pages of the *General Theory*, the conceptual experiment at work was that the monetary authorities engineered a change in the quantity of money and thereby altered the pricing of long-dated bonds held by the non-bank public (1936, pp. 171–2, 196–7).

Keynes and his disciples regarded the liquidity preference theory of the rate of interest as a major innovation, and it was canonised – for example – in the LM curve of Sir John Hicks's IS–LM model. But some early critics, notably Dennis Robertson, attacked the liquidity preference theory because it overlooked the role of capital markets (and 'loanable funds') in setting bond prices and yields. In one vital respect *The General Theory* was in fact less general than its predecessor, the *Treatise on Money* (1930).<sup>12</sup> In the *Treatise* portfolio balancing was not between money and bonds, but between money and 'securities'.

The context of the late 1920s, when the *Treatise* was being written, must be recalled. In those years the surge in the US stock market was the focus of attention on both sides of the Atlantic. It was therefore unsurprising that Keynes should propose a theory to determine the price level of 'securities', where the word 'securities' included equities (1930, pp. 127–31). An extended account in chapter 10 of the *Treatise* noted that people had to make two choices. They had to choose how much of their income to consume rather than to save, and – once the level of savings had been fixed – they had to balance their wealth between 'securities' and money in the form of 'savings deposits'. A strong statement was ventured that

*The price level of securities as a whole, and hence of new investments, is the price level at which the desire of the public to hold savings deposits is equal to the amount of savings deposits which the banking system is able and willing to create. (1930, p. 129)*<sup>13</sup>

In other words, the price of the aggregate of all securities depends on the amount of money set aside (out of aggregate money) for investment portfolios and investors' desired ratio of such money to the value of securities. Moreover, the handling of the subject in the *Treatise* invited the interpretation that securities were principally equities.<sup>14</sup> If so, Keynes offered a monetary theory of the determination of the combined value of the stock and bond markets before he confined himself in the *General Theory* to a narrower theory which focused on bond yields.

Why was the *General Theory* more limited in this respect? What caused Keynes to change direction? He knew that the speculative element in the *General Theory*'s liquidity-preference theory was similar to the degree of 'bullishness' (or 'bearishness') in the *Treatise*. Indeed, a section of the *General Theory* said as much (1936, pp. 173–4). The suspicion has to be that he was all too aware of the empirical improbability of his suggestion of absolute liquidity preference, that is, of a 'liquidity trap' in which the demand for money became infinitely interest-elastic and money injections could not lower bond yields.<sup>15</sup> Bluntly, if investors are allowed to balance money against equities in their portfolios, the risk of chronic stagnation because of the liquidity trap becomes incredible.

At a banal level, when savers commit funds to a long-term savings institution, the institution's job is to invest the money in a diverse range of assets. If long-term savings institutions – pension funds, life insurance companies and so on – let their money inflows pile up on their balance sheets, they would become indistinguishable from banks. That is not their purpose in

life. Sure enough, such institutions do vary their ratios of money to assets, but they do not let these ratios approach 100 per cent.

If it is accepted that long-term savings institutions with substantial portfolios of equities and other variable-income assets are an abiding element in modern capitalist economies, and if it is also taken for granted – realistically – that they will never allow their cash to become more than a low fraction of their assets, then large-scale money creation by the state must have a positive effect on asset prices. Despite this, a substantial literature on the liquidity trap has burgeoned over the decades. Increasingly the phrase has ceased to refer to the specific problem highlighted by Keynes, in which perverse expectations about a future capital loss on bond holdings might play havoc with monetary policy. Instead, it has become a convenient peg on which critics of profit-seeking financial systems can hang their denunciations of the entire capitalism system (Mann, 2019, pp. 232–4).

#### 4 | THE RELATIVE IMPORTANCE OF BONDS AND OTHER ASSETS IN NATIONAL WEALTH

The textbook preoccupation with the liquidity preference theory of bond yields might be defensible if bonds were by far the most important asset class in modern economies. But the data show that this is not so. For the sake of illustration, the composition of household wealth in the USA at the end of 2019 is given in Table 1. (The USA is unlikely to understate the relative importance of bonds, as it is usually seen as having a lower ratio of bank intermediation to national income than comparable Asian and European nations.) Table 1 demonstrates that variable-income assets were far more important in household wealth than fixed-income. Bonds in direct ownership represented only 4.1 per cent of gross assets, whereas assets that were undoubtedly variable-income – that is, real estate, unquoted business equity and equities – were no less than 56.3 per cent of gross assets. With use-value assets (consumer durables) and other

**TABLE 1** Constituents of household wealth in the USA at end-2019

Asset	\$ billions	% of gross assets	% of net worth
Real estate	33,517	25.0	28.6
Unquoted business equity	12,343	9.2	10.5
Bonds	5,548	4.1	4.7
Life insurance & pension assets	29,602	22.1	25.2
Equities (inc. mutual fund shares)	29,602	22.1	25.2
Money held by households	13,606	10.2	11.6
Consumer durables	5,753	4.3	4.9
Other assets	3,914	2.9	3.3
Gross household wealth	133,885	100.0	114.1
Total liabilities	16,549	12.4	14.1
Household net worth	117,335	87.6	100.0

Note: Personal disposable income in fourth quarter 2019 at annual rate was \$16,645bn

Sources: Board of Governors of the Federal Reserve System (2020, p. 138); author's estimates



assets a further 7.2 per cent of wealth, it is plain that fixed-income securities were far from being the pre-eminent asset type in the USA at this date.

Granted, a significant proportion of life company and pension fund assets would have been in bonds, and households would therefore have held much more in bonds on an indirect basis. But, given that their claims on life insurance companies and pension funds were under a quarter of gross assets, this point cannot alter the main message of Table 1. Variable-income assets – and even equities by themselves – account for a significantly higher share of household wealth than fixed-income assets. It does not necessarily follow from this fact that the effect of changes in the quantity of money on variable-income assets has greater implications for behaviour than the effect of such changes on fixed-income assets, but a strong presumption in that direction is surely sensible.<sup>16</sup> In fact, studies of the impact of balance sheet developments on consumer spending sometimes ignore household bond holdings altogether, being concerned instead with the contrasting effects of changes in housing and stock market wealth.<sup>17</sup> In view of the widely acknowledged (albeit controversial) thesis that government bonds are not part of a nation's net wealth, this neglect of bond wealth is easier to defend (Barro, 1974). At end-2019 households' holdings of government securities were \$1,896 billion, leaving other bonds at \$3,652 billion or a mere 2.7 per cent of gross wealth.

A protest might be registered that movements in bond yields affect the valuation of all assets, because bond yields determine the rate of discount that investors apply to the valuation of future income streams from equities and real estate.<sup>18</sup> But three counter-arguments can be made. First, the historical record in the USA in the post-war period is that in some years the value of bonds held by households has changed in the opposite direction to the value of other assets. In the 74 years from 1946 to 2019 inclusive, there were 15 such years.<sup>19</sup> Changing inflation expectations may have had different impacts on bonds, with their fixed nominal return, and on other asset classes, where nominal returns ought to adjust upwards with the general price level. Second, many investors hold only money and equities. Frankly, they are just not interested in bonds or bond yields. As some equity investors put the matter rather unkindly, "bonds are for wimps".<sup>20</sup> Given that at least a proportion of investors are of this type, it is unclear why bond yields should drive the rate of discount on equities rather than the other way round. Surely a more sensible view is that there is mutual interaction. Third, changes in the value of debt securities held by the household sector were small compared with changes in the value of equities similarly held. Disregarding sign, the average value of the annual change in bonds held by households in the 1946–2019 period was 0.35 per cent of the value of all household wealth at the end of the previous year. The comparable figure for equities was 2.23 per cent, more than six times higher.<sup>21</sup>

Defenders of macroeconomists' concentration on bond yields might object that the emphasis on the household sector's wealth in the last paragraph is incorrect. They might say that bond yields have a more important effect, as far as the wider economy is concerned, via the corporate sector and particularly because bond yields affect investment. This is a large area of debate, where the matters at issue cannot be resolved in the space available in this article. Nevertheless, corporate investment decisions are undoubtedly affected by both corporate bond yields and the 'cost of equity'. A sharp rise in equity valuations is likely to boost corporate investment, just like a fall in bond yields, as Keynes conceded when he wrote his *General Theory*. A footnote in chapter 12 gives the game away. In his words,



*a high quotation for existing equities involves an increase in the marginal efficiency of the corresponding type of capital and therefore has the same effect ... as a fall in the rate of interest. (1936, p. 151)*

## 5 | THE MONETARY BEHAVIOUR OF LONG-TERM SAVINGS INSTITUTIONS IN THE USA

In the real world, equities are owned by a variety of investors. Of course, individuals and companies hold equities, as well as long-term savings institutions. Table 2 shows the composition of holdings of US equities at the end of 2019. US-based long-term savings institutions were only slightly more important than American households as investors in US stocks, but it is likely that the bulk of the foreign holdings – which amounted to almost 15 per cent of the total – were in the hands of institutional investors. On this basis a reasonable generalisation is that long-term savings institutions – mostly mutual funds, pension funds and insurance companies – are representative holders of US equities.

This facilitates analysis and discussion, because ample data are available on the money holdings kept by such institutions. Undoubtedly, these holdings have been lodged almost entirely in investment portfolios and have the ultimate purpose of improving the returns to ultimate beneficiaries (pensioners, those insured by life policies and so on). They correspond virtually in their entirety to ‘savings deposits’, as that term was used by Keynes in his *Treatise on Money*. Of course, many households also keep money balances that are available for investment in equities, but such balances (to serve the ‘speculative demand for liquidity’, in Keynes’s terminology in his *General Theory*) are not readily distinguished from transactions and precautionary balances. A merit of tracking long-term savings institutions’ money balances is their almost exclusive commitment to portfolio investment, which obviates the need to make a distinction between Keynes’s different money-holding motives.

As already noted, long-term savings institutions hold a diverse range of assets. Both life insurance companies and pension funds have a significant proportion of their assets in bonds, partly to meet regulatory requirements. However, some funds available to the retail investor are committed wholly to equities. This is particularly true in the mutual fund industry. At the end of 2019

**TABLE 2** Holders of US corporate equities at end-2019

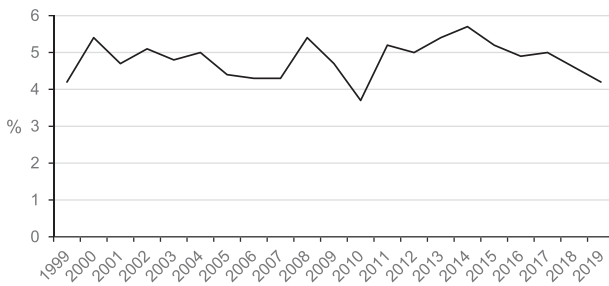
	Value in \$bn	Per cent of total
Long-term savings institutions*	22,670.7	41.2
Households	21,287.4	38.7
Rest of the world	8,196.8	14.9
Non-financial corporate business	2,308.7	4.2
Banks, and brokers and dealers	314.4	0.6
Government	206.4	0.4
TOTAL	54,984.4	100

\*Include property-casualty insurance companies, life insurance companies, private pension funds, Federal government pensions funds, state and local-government pension funds, mutual funds, closed-end funds and exchange-traded funds.

Note: Over two-thirds of (\$38,470.6bn) of US corporate equities were publicly traded at end-2019.

Source: Board of Governors of the Federal Reserve System (2020, p. 130)





**FIGURE 1** US mutual funds liquid assets ratio, 1999–2019

Note: In this period total assets increased at a compound annual rate of 6.3%, but the ratio of liquid assets to total assets was the same at the end as at the beginning.

Source: Investment Company Institute (2020)

total funds managed in mutual funds were \$24,593 billion and over half of the total (\$14,126 billion) was represented by equity-only funds (Investment Company Institute, 2020, p. 202).<sup>22</sup>

What is the relationship between their money holdings and mutual funds' total assets? The annual data prepared by the Investment Company Institute since the late 1950s are one source of information, although a much larger body of statistics for a wider range of institutions is available in the Federal Reserve's flow-of-funds data going back on a quarterly basis to 1952. Figure 1 shows the mutual funds' ratio of liquid assets to total assets from 1999 to 2019. (Liquid assets would have been dominated by money as such.)

The stability of the ratio is noteworthy. Although the ratio does vary somewhat, the variations have a much smaller effect on changes in assets than changes in their liquid assets. The stability being highlighted here recalls that of the income velocity of circulation, a phenomenon often observed by Milton Friedman and other exponents of the quantity theory of money.

## 6 | THE MONEY-EQUITIES-INTERACTION CHANNEL IN MORE DETAIL

In order to illustrate the working of the money-equities-interaction channel, a schematic example is now developed. Although an abstraction from reality in order to emphasise the key points, the material in section 5 shows that the discussion has a basis in fact. Suppose that

- long-term savings institutions are the only holders of equities in the economy under consideration;
- long-term savings institutions hold equities and no other assets; and
- all equities are publicly traded.

It is evident that the equilibrium value of the assets of the  $n$  long-term savings institutions is equal to

$$A_n = M_n/m$$

where  $M_n$  is the quantity of money held by long-term savings institutions and  $m$  is these institutions' average ratio of money to assets. Further, with long-term savings institutions holding only equities and their assumed status as the exclusive holders of equities,  $A_n$  is also the value of all the publicly traded equities in the economy.



The proposition being made is clearly in the spirit of Keynes's ruminations in the *Treatise* about the value of an economy's stock of securities.  $M_n$  is analogous to his notion of "the amount of savings deposits which the banking system is able and willing to create", while  $m$  expresses "the desire of [the relevant members of] the public to hold savings deposits". (In this section so far the relevant members of 'the public' are the long-term savings institutions – and only these institutions. But other types of economic agent will soon come into the story.)

Some numbers can be offered to illustrate the money-equities-interaction channel in practice. Suppose that the total quantity of money in an economy is \$20 trillion, that a tenth (\$2 trillion) of this is held by the long-term savings institutions reflecting households' equilibrium desire to commit funds to institutional investors, and that the long-term savings institutions' equilibrium preferences are to maintain a ratio of money to equities of 4 per cent. Then the equilibrium value of publicly traded equities in this example is \$50 trillion.

Let an exogenous monetary shock to the economy now be imagined, with central bank asset purchases from the non-bank private sector which – in a very short period of perhaps only a few days or weeks – push up the quantity of money from \$20 trillion to \$23 trillion.<sup>23</sup> Let it be conjectured that, in a notional first round of transactions, \$1 trillion of the extra \$3 trillion of money balances is in the hands of long-term savings institutions. Plainly, our formula argues that – if the institutions adhere to the usual 4 per cent cash ratio – the equilibrium value of equities has to jump by 50 per cent. This is perhaps surprising, given that the aggregate quantity of money has risen only 15 per cent. As will emerge, it is important to distinguish between the equilibrium of the long-term savings industry – which might be seen as a partial equilibrium – and the general equilibrium of the economy as a whole, when households and companies are introduced as well.

The change from a stock market worth \$50 trillion to another worth \$75 trillion – or, in jargon, the comparative-static adjustment – is unlikely to happen overnight. Suppose that the extra \$1 trillion of institutions' money is split evenly among them in proportion to their funds under management. Then the actual money-to-assets ratio for the industry averages 6 per cent and a majority of institutions are likely to have money-to-assets ratios of above 5 per cent. Hence, many or all of them are out of equilibrium, with the industry having an excess supply of money. Institutions A, B and C in a second round of transactions make net purchases of \$200 billion equities, at prices higher than those prevailing before, from institutions D, E and F. The effect is to drive up the equity market by 10 per cent. The 10 per cent rise in prices lowers the industry's actual money-to-assets ratio from 6 per cent to under 5.5 per cent.

Institutions D, E and F hold the extra money received both earlier from asset sales to the central bank and the \$200 billion from their recent sales in the market. So they now have money-to-assets ratios of well above 6 per cent, against the long-run target of 4 per cent. In a third round of transactions institutions D, E and F therefore become net buyers of equities to the tune of \$250 billion, again at higher prices than before. \$250 billion of money is partly returned to institutions A, B and C and also is acquired by institutions G, H and J. The excess demand for equities enhances prices by another 10 per cent and cuts the industry's money-to-assets ratio to under 5 per cent. On the assumption that the long-term savings institutions are the only holders of equities in the economy, some institutions will be net buyers in one round of transactions and in another they will be net sellers. However, because of our assumptions, transactions between the institutions are within a closed circuit and cannot change the amount of money held by the industry as a whole. The industry's equilibrium is restored – with the resumption of a 4 per cent money-to-



assets ratio, after a sequence of transactions rounds – by a rise in equity prices of 50 per cent, from \$50 trillion to \$75 trillion.<sup>24</sup>

In the real world the adjustment process takes time in what might be called, following Irving Fisher, a ‘transition period’.<sup>25</sup> To make the story more realistic, our assumptions can be relaxed. During the transition period rising equity prices stimulate responses which spread the new money balances around the economy. For a start, allow the household sector to own some equities in the initial situation. As households see the institutions chasing equity prices higher, they sell some of their holdings to the institutions. The institutions’ money holdings are thereby lowered and partly transferred to households. Further, let the institutions have more diversified portfolios. As they see the bull market in equities taking valuations to levels not justified by ‘corporate fundamentals’, they begin to acquire bonds as an alternative to equities. If they invest in bonds newly issued by the corporate sector, their money balances are reduced and companies’ money holdings increase.

Finally, imagine an economy with a mixture of publicly traded equities and unquoted, privately held businesses. Whether assets are quoted on the stock market or not is determined largely by the increase in value that arises from having a quotation, relative to the costs of obtaining and maintaining a quotation. If values in the quoted market move far ahead of those in the unquoted market, the owners of privately held businesses may be tempted to seek a quotation. The issue of new shares to the institutions again has the effect of transferring money balances from the financial sector to the household and corporate sectors.

The initial exogenous shock to the quantity of money was assumed to be 15 per cent (from \$20 trillion to \$23 trillion) and to be registered disproportionately in the financial sector, where the long-term savings institutions’ money balances leapt 50 per cent from \$2 trillion to \$3 trillion. This appealed to reality, in that central bank asset purchases (mostly of government bonds in practice) tend to be predominantly from the financial sector. Our discussion of the money-equities-interaction channel showed how the excess money held by the institutions would tend to lift equity prices, as they tried to bring their actual money-to-asset ratios down towards the ‘normal’ figure of 4 per cent. In one sense a 50 per cent increase in equity prices would bring back equilibrium, in that the institutional savings industry would return to the 4 per cent ratio and hence to its equilibrium money-holding pattern.

However, a range of suggested behavioural adjustments in the transition period implied that during it money balances would leave the financial sector, and move to companies and households. The circulation of money balances between the economy’s sectors and agents would have the effect that, over time, the increase in money holdings registered by all of them would come near to the aggregate figure of 15 per cent. Equity prices might overshoot for some months or quarters, but – when the extra money had been dispersed evenly around the economy – the gain in equity prices would also be closer, in a new ‘general equilibrium’, to 15 per cent.

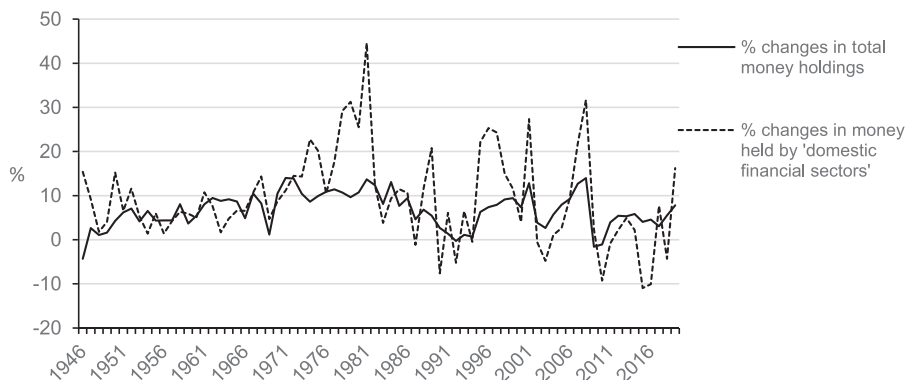
The discussion in the last few paragraphs recalls numerous treatments in recent academic literature about the ‘portfolio rebalancing channel’.<sup>26</sup> Descriptions of this channel note that in their asset purchase programmes central banks tend to focus on relatively safe assets, such as government bonds. This is supposed to push down yields on safe assets and to encourage substitution into higher-risk assets, which might initially be corporate bonds, and then on to equities and real estate.<sup>27</sup> Some papers propose that central bank asset purchases work partly through stimulating new bank lending to the private sector. However, an obtrusive fact is that the implementation of quantitative easing (QE) programmes in the five years from late 2008 was associated with contractions in the stock of such lending in several leading economies. An alternative



view is that QE found its core rationale in the need to counter the destruction of money balances, with this money destruction arising from the effect of banks' sharply raised capital requirements on their portfolios of risky loan assets (Congdon, 2017, 2018). On this basis, the beneficial results of QE for economic activity may have been to a significant extent caused by the positive impact of central bank asset purchases on asset prices, including the prices of equities. The wealth effects of changes in the quantity of money become a central element in the transmission mechanism.

## 7 | 'OVERSHOOTING' IN THE TRANSITION PERIOD

The account of the money-equities-interaction channel in section 5 was simplified in order to demonstrate key features of the adjustment processes at work. One part of the example may have seemed stilted, this being the contrast between the 15 per cent increase in aggregate money and the 50 per cent increase in the money balances held by the long-term savings institutions. But the example was consistent with historical experience, as a repetitive feature of the cyclical behaviour of money is that fluctuations in the growth rate of money held in the financial sector have greater amplitude than fluctuations in the growth rate of aggregate money. This is a huge topic that cannot be analysed in depth here, but some evidence for the USA is presented in Figure 2.<sup>28</sup> The figure shows that percentage rates of change, in the year to the fourth quarter, of aggregate money and money held in the 'domestic financial sector', of which the long-term savings institutions are a major component, from 1946 to 2019. The marked ups and downs of financial sector money in the 63-year period are evident. The standard deviation of the changes in financial sector money, at 10.46, was more than two-and-a-half times higher than that of the changes in aggregate money, at 4.02.<sup>29</sup> If it is assumed – plausibly – both that long-term savings institutions keep stable ratios of money to total assets and that rates of increase in aggregate money were correlated with those of nominal national income, the high volatility of the institutions' money balances would tend to motivate fluctuations in equity prices that had greater amplitude than fluctuations in nominal national income. This is in fact a salient characteristic of modern capitalist economies.<sup>30</sup>



**FIGURE 2** The contrasting volatility in the USA of aggregate money and money held in the financial sector  
Source: Board of Governors of the Federal Reserve System (2020, pp. 113–15)



I argued at the start that central banks can always expand the quantity of money. It has now been shown that the likely results of sudden accelerations/decelerations in money growth are

- more pronounced accelerations/decelerations in the growth of money held in the financial sector, including that belonging to long-term savings institutions, and
- over-shooting of equity markets, in both directions, as the institutions try to cope with the excess (or deficient) supply of money.

Admittedly, in the real world money is not trapped in the financial sector. The departure of equity markets from their long-run equilibrium values motivates behavioural responses from companies and households which cause money to leave the financial sector when equity prices are high, and to be injected into it when they are low. Nevertheless, these transfers of money between sectors in no sense qualify the argument that major fluctuations in equity markets can be a by-product of central bank operations. On the contrary, they illuminate the processes at work and help to explain why these fluctuations can have profound impacts on wider macroeconomic outcomes. These impacts tend to be much larger, and also more systematic and reliable, for a particular quantum of central bank asset purchases (and of course sales, when policymakers want to slow the economy) than those which stem from changes in bond yields.

More polemically, widespread enthusiasm for Keynes's liquidity preference theory of the 'rate of interest', and the textbook orthodoxy that it is the linchpin of monetary policy, are misguided. A careful reading of his *Treatise on Money*, and indeed of certain passages in *The General Theory*, suggests that Keynes was well aware of the relationship between money growth and equity markets. It is puzzling that some accounts of the portfolio rebalancing channel pay exclusive attention to the effects of central bank asset purchases on bond yields, when such effects are a sideshow to the much more important channel working through the equity market (and in fact via other asset markets, including real estate).<sup>31</sup>

## 8 | CONCLUSION: MONETARY POLICY IS NOT DEFINED BY THE INTEREST RATE ALONE

We have seen that many economists – perhaps even a majority of those involved in macroeconomic analysis and commentary – believe that the important effects of monetary policy operate entirely through interest rates, either the central bank rate itself or the government bond yield. They further consider that – when these rates are close to zero or have even gone negative – monetary policy has been exhausted and central banks 'have run out of ammunition'. According to Lord Turner (2020), former chairman of the United Kingdom's Financial Services Authority, in a debate with Paul Tucker:

*The Covid-19 crisis will confirm that when a major shock threatens the world economy, central banks acting alone are now almost powerless to stimulate nominal demand and economic growth, or to stop inflation falling below target.*

Turner noted that QE had been used in 2008 and 2009 to "drive down long-term yields in line with short-term policy rates" and so to counter the Great Recession, but in his judgement

*the impact on real business investment was minimal: when companies can already borrow at historically low rates, cutting the interest rate further makes little difference to capital expenditure plans.*

These remarks seem extraordinary, even preposterous, in view of the major advances in stock markets that followed QE announcements – by central banks on both sides of the Atlantic – in the crises of 2009 and 2020.<sup>32</sup> Three points have surely been made clear by the sequels to those announcements. Central banks can always increase the quantity of money by purchasing assets from non-banks; the money balances thereby injected into the economy boost asset prices and household wealth; and increases in asset prices support household consumption and facilitate corporate investment. The wider ramifications are stimulus to spending, output and employment. Monetary policy exhaustion is a curiosum of economic theorists, deluded by a few sentences on a supposed ‘liquidity trap’ in Keynes’s *General Theory*. In the real world central banks – with their power to create at nil cost unlimited amounts of high-powered money and bank deposits – can never run out of ammunition.

Keynes’s liquidity preference theory was and remains an interesting contribution to economic theory, but its empirical significance must be viewed sceptically. Bonds are of course a major asset class in modern economies. But they are only one type of asset, and quantitatively they have a smaller weight in household wealth portfolios than equities and real estate. According to Dennis Robertson in the debates that followed the publication of *The General Theory*, Keynes’s book overstated the role of ‘the rate of interest’ which had been “elevated to a position of commanding theoretical importance”. Robertson noted sarcastically that

*nothing was ever allowed to happen – money was not allowed to affect prices, wage-rates were not allowed to affect employment, I had almost added, the moon was not allowed to affect the tides – except through the rate of interest: it became, as never before, the keystone of the whole theoretical arch. (Fletcher, 2000, p. 357).<sup>33</sup>*

Perhaps a standard university macroeconomics course should spend more time on the interdependence of monetary policy and equity market valuation, and less on the liquidity preference theory of bond yields.

## NOTES

<sup>1</sup> In his well-regarded *Economic Theory in Retrospect*, Blaug (1985) distinguished between the direct and indirect effects of changes in the quantity of money. The emphasis in this article on the indirect mechanisms via assets and asset prices is not in any way to decry the direct mechanism.

<sup>2</sup> For the USA and internationally, see Brett Fawley and Christopher Neely (2013) and Saroj Bhattari and Neely (2016). The Bhattari and Neely paper has a reference to the portfolio balance channel on page 1 and a section on the effect on equity markets on pages 18–20. For the UK, see Jonathan Bridges and Ryland Thomas (2012).

<sup>3</sup> Charles Goodhart and Boris Hofmann (2005) found – like other authors – that the evidence for the IS curve was unimpressive, and that appeals had to be made to wealth and money aggregate variables to restore the usual understanding of its working. David Laidler is well-known for his insistence that the quantity of money matters to macroeconomic analysis. See, for example, Laidler (2003).

<sup>4</sup> The monetary base includes the coin issue, usually a liability of the mint, which is separate from the central bank.



- <sup>5</sup> Milton Friedman and Anna Schwartz's classic *A Monetary History of the United States* (1963) has an Appendix B, on the 'Proximate Determinants of the Nominal Stock of Money', in which changes in high-powered money (or 'the monetary base') are seen as determining the quantity of money.
- <sup>6</sup> The argument has appeared in many places, particularly in work from the post-Keynesian school. See, for example, Moore (1988, pp. 263–5).
- <sup>7</sup> The UK authorities in the early 1980s varied the pace of sales of government debt outside the banking system in order to keep money growth closer to target. See Goodhart (1984, ch. 4).
- <sup>8</sup> The author has proposed the concept of a 'narrow liquidity trap' in which central bank operations to expand the monetary base have no effect on the quantity of money. See Essay 4 in Congdon (2011), particularly pages 67–71.
- <sup>9</sup> The narrow liquidity trap (see note 8) can arise either because banks do not want to expand their earning assets despite ever-increasing cash holdings or because the private sector suffers from such financial trauma that even at a zero central bank rate it does not want to increase its bank borrowings. The latter case was noticed in the early 1930s by Ralph Hawtrey in his idea of a "credit deadlock". See Sandilands (2010).
- <sup>10</sup> Bernanke (2020) discussed the effect of central bank asset purchases without any reference to the quantity of money. He concluded nevertheless that QE plus forward guidance could, in the right circumstances, act as "new monetary tools" which "are capable of adding about 3 percentage points worth of policy space [i.e., a cut in Fed funds rate], relative to traditional policies" (p. 974).
- <sup>11</sup> In Blaug (1985) the indirect mechanism always involves the rate of interest, and often the relationship between Wicksell's concepts of the market and natural rates of interest. See the reference here in note 1, and to Blaug (1985, pp. 161, 648–50). Blaug made no mention of the effect of changes in the quantity of money on the value of corporate equity.
- <sup>12</sup> Don Patinkin (1976) noticed this.
- <sup>13</sup> The sentence is picked up almost hundred pages later, in a discussion of the American stock market, on page 224: "Thus, the actual level of security prices is, as we have seen in chapter 10, the resultant of the degree of bullishness of opinion and of the behaviour of the banking system."
- <sup>14</sup> "If the [central] bank increases the volume of bank money so as to avoid any risk of the financial circulation stealing resources from the industrial circulation, it will encourage the 'bull' market to continue, with every prospect of a rising value of [the price level of new investment] which will lead to over-investment later on" (1930, p. 227).
- <sup>15</sup> Robertson hinted at Keynes's lack of confidence about his ideas. See Fletcher (2000, p. 371).
- <sup>16</sup> The author used Federal Reserve flow-of-funds data (particularly, page B.101) to obtain data on household wealth from 1946 and obtained from the Bureau of Economic Affairs website series for the change in real household consumption and the consumption deflator. He prepared relevant data on annual changes to the fourth quarter over the 1948–2019 period, with 72 observations. He conducted a least-squares regression of the change on household consumption in real terms on changes in the value of household holdings of real estate (mostly residential housing), consumer durables, money, corporate equities including mutual funds, life insurance and pension assets, equity in non-corporate business and other assets, with the value in both nominal terms (as if agents were subject to money illusion) and in real terms (i.e. after adjustment for the consumption deflator, as if agents were not subject to money illusion), in both cases without lags. For the equation using the change in nominal-value wealth items (which had a *r*-squared of 0.35), the only independent variables to meet the usual significance test with a *t* statistic of above 2 were 'real estate' (with a *t* statistic of 3.54 on the regression coefficient of 0.23) and 'corporate equities including mutual funds' (with a *t* statistic of 3.04 on the regression coefficient of 0.05). (The *t* statistic on the 'debt securities' [or bonds] term was 0.44 on a coefficient of 0.01.) For the equation using the change in real-value wealth items (which had a *r*-squared of 0.47), independent variables to meet the usual significance term with a *t* statistic of above 2 again included 'real estate' (with a *t* statistic of 2.22 on the regression coefficient of 0.15) and 'corporate equities including mutual funds' (with a *t* statistic of 2.30 on the regression coefficient of 0.03). (The *t* statistic on the "debt securities" [or bonds] term was 1.45, also on a coefficient of 0.03.) Much more work could be done, but the



statement in the text seems legitimate. Contact the author at [timcongdon@btinternet.com](mailto:timcongdon@btinternet.com) for further details of the statistical work.

- <sup>17</sup> John Muellbauer of Nuffield College, Oxford, has authored and co-authored several papers on the relationship between wealth and consumption. See, for example, Chauvin and Muellbauer (2018). The general finding is that housing wealth is the most important type of wealth in determining changes in consumption. Empirical work sometimes finds a role for corporate equities (as in this article, but bonds directly held by households never figure in the analysis).
- <sup>18</sup> Keynes in the *General Theory* made this point, as emphasised in Axel Leijonhufvud (1969), and discussed below and see Keynes (1936, p. 151).
- <sup>19</sup> Contact the author at [timcongdon@btinternet.com](mailto:timcongdon@btinternet.com) for further details of the statistical work.
- <sup>20</sup> “We’ve heard it all: Bonds are boring. Bonds are for wimps. Bonds are losers” (Farrell, 2003).
- <sup>21</sup> See note 16 for the source of the calculation. Note that the change in the value of assets held reflected both net saving and revaluations. The revaluations would nevertheless be the dominant influence on the annual changes in most years. It should be noticed that changes in the value of real estate (housing, mostly) were often larger than changes in the value of equities.
- <sup>22</sup> The total value of mutual funds exceeds that held by US households, because some holdings are outside the USA and others belong to US resident corporates. Of the \$14,126bn of equity-oriented mutual funds’ assets at end-2019, over a third (\$4,830bn) was directed to non-US equity markets.
- <sup>23</sup> A remarkable jump in US financial sector money occurred in the first quarter of 2020 (of 35.7%, from \$842.1 billion to again \$1,142.6 billion). In part the first-quarter 2020 increase is likely to have been attributable to the heavy Federal Reserve purchases of securities in the week from Monday 16 March. These followed an announcement on the evening of Sunday, 15 March, that the Fed would in short order acquire \$500 billion of government securities and \$200 billion of agency-backed mortgage securities.
- <sup>24</sup> The argument here follows the same lines as that in a monograph (Congdon, 2005, pp. 38–9) by the author.
- <sup>25</sup> According to Barber (1997, p. 9), Fisher “recognized that ‘transition periods’ – in which adjustments to disturbances were being worked out – typified economic reality”.
- <sup>26</sup> Perhaps this is the time to notice that it also recalls a much larger and longer-established literature on the many non-neutralities to be observed in the cyclical short run after changes in the quantity of money. The literature goes back to Hume and Cantillon in the 18th century, but the current work on the portfolio rebalancing channel was also foreshadowed in “the tentative sketch” in Milton Friedman and Anna Schwartz (1969, pp. 229–34).
- <sup>27</sup> The literature is extensive and far from conclusive. For an example, see Goldstein, Witmer, & Yang (2018).
- <sup>28</sup> For the UK evidence, see Congdon (2005, pp. 30–7).
- <sup>29</sup> In a regression of the annual changes in financial sector money on the annual changes on aggregate money, the estimated regression coefficient was 1.54 with a *t* statistic of 6.25. Again, contact the author at [timcongdon@btinternet.com](mailto:timcongdon@btinternet.com) for further details of the statistical work.
- <sup>30</sup> The point has been much emphasised by Robert Shiller in several places. See, for example, Shiller (2012 p. 185), with the remark, “excess volatility is most apparent for the aggregate stock market”.
- <sup>31</sup> According to Kuttner (2018, p. 142), the correct research message is that “quantitative easing functions primarily through the removal of duration risk from the market”. Kuttner’s paper makes no reference to the effect of QE on any recognised quantity-of-money aggregate, although it does mention banks’ cash reserves.
- <sup>32</sup> See note 24. In the month from 16 March – following the Fed’s announcement on Sunday, 15 March – the S & P 500 index rose by 16.6%; in the three months from 16 March it rose by 28.5%. In the UK the Bank of England announced on 5 March 2009 that it would initiate operations with the Asset Purchase Facility that had already been created. (Bank of England, 2009, pp. 69, 81–6). The FTSE 100 share index hit a six-year low of 3,512 in early March. By the end of the year it had risen by 54% (Scott, 2009).
- <sup>33</sup> Fletcher’s quotation was from a 1949 paper by Robertson in the *Three Banks Review*.





## REFERENCES

- Bank of England (2009). Markets and operations. *Quarterly Bulletin*, 49(2), pp. 68–87. <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2009/quarterly-bulletin-2009-q2> (accessed 9 December 2020).
- Barber, W. (Ed.) (1997). *The Works of Irving Fisher*, vol. 4. *The Purchasing Power of Money*. London: Pickering & Chatto.
- Barro, R. (1974). Are government bonds net wealth? *Journal of Political Economy*, 82(6), 1095–1117.
- Bernanke, B. (2020). The new tools of monetary policy. *American Economic Review*, 110(4), 943–983.
- Bhattari, S., & Neely, C. (2016). A Survey of the Empirical Literature on US Unconventional Monetary Policy. Working Paper 2016–021A. St. Louis, MO: Federal Reserve Bank of St. Louis.
- Blaug, M. (1985). *Economic Theory in Retrospect* (4th ed.). Cambridge: Cambridge University Press.
- Board of Governors of the Federal Reserve System (2020). *Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts. Second Quarter 2020*. <https://www.federalreserve.gov/releases/z1/20200921/z1.pdf> (accessed 9 December 2020).
- Bridges, J. & Thomas, R. (2012). The Impact of QE on the UK Economy – Some Supportive Monetarist Arithmetic. Working Paper No. 442. London: Bank of England.
- Chauvin, V. & Muellbauer, J. (2018). Consumption, household portfolios and the housing market in France. *Economie et Statistique / Economics and Statistics*, No. 500-501-502, 157–178.
- Clarida, R., Gali, J., & Gertler, M. (1999). The science of monetary policy: A New Keynesian perspective. *Journal of Economic Literature*, 37(4), 1661–1707.
- Congdon, T. (2005). *Money and Asset Prices in Boom and Bust*. London: Institute of Economic Affairs.
- Congdon, T. (2011). *Money in a Free Society: Keynes, Friedman, and the New Crisis in Capitalism*. New York: Encounter Books.
- Congdon, T. (2017). The debate over ‘quantitative easing’ in the UK’s Great Recession and afterwards. In T. Congdon (Ed.), *Money in the Great Recession: Did a Crash in Money Growth Cause the Global Slump?* (pp. 57–77). Cheltenham, UK, and Northampton, USA: Edward Elgar Publishing.
- Congdon, T. (2018). Sir Charles Bean on the UK’s decade of super-low interest rates: Comment. *Economic Affairs*, 38(2), 257–264.
- Farrell, P. (2003). A raging bond-market bull. *MarketWatch*, 4 March. <https://www.marketwatch.com/story/raging-bond-market-bull-sees-78-annual-returns> (accessed 9 December 2020).
- Fawley, B., & Neely, C. (2013). Four stories of quantitative easing. *Federal Reserve Bank of St. Louis Review*, 95(1), 51–88.
- Fletcher, G. (2000). *Understanding Dennis Robertson: The Man and His Work*. Cheltenham, UK and Northampton, USA: Edward Elgar Publishing.
- Friedman, M., & Schwartz, A. (1963). *A Monetary History of the United States, 1867–1960*. Princeton, NJ: Princeton University Press.
- Friedman, M., & Schwartz, A. (1969). Money and business cycles. In M. Friedman (Ed.), *The Optimum Quantity of Money and Other Essays* (pp. 189–235). London and Basingstoke.
- Goldstein, I., Witmer, J., & Yang, J. (2018). Following the Money: Evidence for the Portfolio Balance Channel of Quantitative Easing. Staff Working Paper 2018–33. Ottawa: Bank of Canada.
- Goodhart, C. (1984). *Monetary Theory and Practice: The UK Experience*. London: Macmillan.
- Goodhart, C., & Hofmann, B. (2005). The IS curve and the transmission of monetary policy: Is there a puzzle? *Applied Economics*, 37(1), 29–36.
- Investment Company Institute (2020). *Investment Company Fact Book* (60th ed.) Washington, DC: Investment Company Institute. [https://www.ici.org/pdf/2020\\_factbook.pdf](https://www.ici.org/pdf/2020_factbook.pdf) (accessed 9 December 2020).
- Keynes, J. M. (1930). *A Treatise on Money. Vol. I: The Pure Theory of Money*. In E. Johnson & D. Moggridge (Eds.), *The Collected Writings of John Maynard Keynes* (Vol. V). London and Basingstoke: Macmillan Press for the Royal Economic Society (1971).
- Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. In E. Johnson & D. Moggridge (Eds.), *The Collected Writings of John Maynard Keynes* (Vol. VII). London and Basingstoke: Macmillan Press for the Royal Economic Society (1973).
- Krugman, P. (2020). Can the Fed and friends save the economy? *New York Times*, 3 March.

- Kuttner, K. (2018). Outside the box: unconventional monetary policy in the Great Recession and beyond. *Journal of Economic Perspectives*, 32(4), 121–146.
- Laidler, D. (2003). Monetary policy without money: Hamlet without the ghost. In C. Goodlet, D. Longworth, & J. Murray (Eds.), *Macroeconomics, Monetary Policy and Financial Stability: A Festschrift in Honour of Charles Freedman* (pp. 111–134). Ottawa: Bank of Canada.
- Leijonhufvud, A. (1969). *On Keynesian Economics and the Economics of Keynes*. Oxford: Oxford University Press.
- Mann, G. (2019). *In the Long Run We are all Dead: Keynesianism, Political Economy and Revolution*. London: Verso.
- Moore, B. (1988). *Horizontalists and Verticalists: The Macroeconomics of Credit Money*. Cambridge: Cambridge University Press.
- Patinkin, D. (1976). *Keynes' Monetary Thought: A Study of its Development*. Durham, NC: Duke University Press.
- Sandilands, R. (2010). Hawtreyan 'credit deadlock' or Keynesian 'liquidity trap'? Lessons for Japan from the Great Depression. In R. Leeson (Ed.), *David Laidler's Contributions to Macroeconomics* (pp. 335–371). London: Palgrave Macmillan.
- Scotte, P. (2009). FTSE 100 rallies 22% in 2009. *This is Money*, 31 December. <https://www.thisismoney.co.uk/money/markets/article-1686401/FTSE-100-rallies-22-in-2009.html> (accessed 9 December 2020).
- Shiller, R. (2012). *Finance and the Good Society*. Princeton, NJ: Princeton University Press.
- Thomas, R. (2017). UK broad money growth and nominal spending during the Great Recession: An analysis of the money creation process and money demand. In T. Congdon (Ed.), *Money in the Great Recession: Did a Crash in Money Growth Cause the Global Slump?* (pp. 78–100). Cheltenham, UK, and Northampton, USA: Edward Elgar Publishing.
- Turner, A. (2020). Are central banks now impotent? *Prospect*, 23 March. <https://www.prospectmagazine.co.uk/magazine/are-central-banks-now-impotent-coronavirus-pandemic-monetary-policy-economy> (accessed 9 December 2020).

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