A Kinder Egg on MMT*

rough draft - comments are welcome

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Abstract

This note on Modern Monetary Theory (henceforth MMT) is three things at once: 1) a note on basic government debt arithmetic, 2) a condensed summary of what MMT is and how it relates to mainstream economics, and 3) an essay on my view on the policy questions debated in relation to MMT.

My main conclusions are that the proponents of MMT bring no new important theoretical or empirical arguments to the table, do not provide any causal empirical evidence of their claims even when opposing evidence exist, and downplay or hide important trade-offs, especially in the long-run. The MMT motto that "anything that is technically feasible is financially affordable" [Wray, 2015, p. 209] clearly ignores real-world incentive constraints. Basically, MMT does not have any model of the real side of the economy. At the same time, however, I also argue that many of the policy proposals supported by MMT can be defended rigorously from a mainstream point of view accounting for the relevant trade-offs.

Compared to deficit hawks and market fundamentalists believing that government regulation and investment can almost never be of any good, and that all unemployment is voluntary, I am on the same side as proponents of MMT. I argue for aggressive fiscal policy in recessions, the importance of public regulation of and investment in infrastructure, research, education and market design, and extensive support for the under- and unemployed, both financially and in terms of help in keeping or regaining a connection to the labor market. However, I reach these conclusions from a very different perspective.

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1 Government debt accounting[1]

Define the following variables:

1. Y_t: Real GDP in period t (e.g. a year)
2. G_t: Real consumption (including investments)
3. T_t: Total nominal taxes
4. D_t: Stock of one-period government bonds (beginning-of-period)
5. M_t: Money base (currency and reserves, beginning-of-period)
6. P_t: Price level
7. i_t: Nominal interest rate

The total expenses of the state[2] is the sum of its consumption and its interest payments, $P_tG_t + i_tD_t$. The total income of the state is the sum of the taxes it receives and the money it "prints" (physically or electronically), $T_t + (M_{t+1} - M_t)$. The state's debt therefore evolves as:[3]

$$D_{t+1} = D_t + [P_tG_t + i_tD_t] - [T_t + (M_{t+1} - M_t)]. \tag{1}$$

Note, that this equation is a budget *identity* (even-though it is sometimes called a *constraint*). The equation is true by definition. One way to think about it is that the state first chooses its level of consumption, how much to raise in taxes, and how much money to "print". The debt of the state in the next period then take the adjustment so that the equation holds.

The ratio of the debt of the state to nominal GDP can now be written as[4]

$$b_t \equiv \frac{D_t}{P_{t-1}Y_t}. \tag{2}$$

and the ratio of the money base to nominal GDP can be written as

$$m_t = \frac{M_t}{P_tY_t} \tag{3}$$

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[1] This section relies on chapter 6 in Groth [2017], chapter 4 in Walsh [2017] and chapter 12 in Romer [2012].

[2] I use the terminology that the state consists of a government and a central bank.

[3] In principle, the real world is more complicated because the government issues debt with varying maturity and the central bank might pay interest on reserves, and this might differ across different kinds of reserves. I have seen no arguments why this should change the fundamental insights derived from the simpler approach taken here. Money is here a zero-return fully liquid assets

[4] The time convention might seem a bit odd, but it makes sense. See chapter 6 in Groth [2017].

Balanced evolution Let us now consider a balanced evolution of the economy, where the nominal interest rate is kept at i, real GDP grows with a rate g and the inflation rate is π; economists call this a long-run analysis.[5] Define the primary surplus relative to nominal GDP as

$$s_t \equiv \frac{T_t - P_t G_t}{P_t Y_t}, \tag{4}$$

and the growth rate of the money base as

$$q_t \equiv \frac{M_{t+1} - M_t}{M_t}. \tag{5}$$

Finally, also define the real interest rate, r, by

$$1 + r = \frac{1 + i}{1 + \pi}. \tag{6}$$

Then the budget identity in equation (1) can be written

$$b_{t+1} = \frac{1}{1 + g} \left[(1 + r)\, b_t - s_t - q_t m_t \right], \tag{7}$$

where the income from printing money, $q_t m_t$, is called seigniorage.
In addition, the money to nominal GDP ratio is

$$m_{t+1} \equiv \frac{1 + q_t}{(1 + \pi)(1 + g)} m_t. \tag{8}$$

The minimum requirement for a sustainable plan for the primary surpluses and seigniorage is that neither the debt-ratio nor the money-ratio go towards infinity:

$$\begin{gathered} \text{A minimal requirement for sustainability is} \\ b_t < \infty, m_t < \infty \text{ for } t \to \infty \end{gathered} \tag{9}$$

Stability of the money base ratio requires $q_t = \pi + g + \pi g$, if $q_t > \pi + g + \pi g$ then $m_t \to \infty$ for $t \to \infty$. Assume that the growth rate of money is fixed at $q_t = \overline{q}$, the money-ratio is stable at $m_t = \overline{m}$, and that there is some government debt initially, $b_0 > 0$. Then there are two possible cases with a constant primary surplus:

1. If $r > g$ then minimal sustainability is only possible with $s > (r - g) b_0 - \overline{qm}$, i.e. budget surpluses net of seigniorage.

[5] Such a state of the world obviously never exists. If you specify volatile paths for each of the involved variables, similar results can, however, be stated in terms of their average behavior. But the math becomes much more cumbersome.

2. If $r < g$ then minimal sustainability is always fulfilled but

$$b_t \to \frac{s + \overline{qm}}{r - g} \text{ for } t \to \infty,$$

i.e. the debt-ratio is increasing in the deficit.

Figure 1 shows some alternative paths for government debt when varying the underlying parameter choices. Note, that the debt-ratio stabilizes when $r < g$, but accelerates when $r > g$. If the primary surplus is time-varying, similar results holds for an appropriately defined average primary surplus.

Beyond accounting All the results above comes from pure accounting. Economic models typically add two important elements:

1. A money demand function[6], where the demand for the supply of real money balances, $M_t/(P_t Y_t)$, is a decreasing function of the nominal interest rate, $L(i)$, and the real interest rate is determined (almost) independently of the equilibrium in the money market.[7] This implies that choice of $\overline{q}$ and $\overline{m}$ are tied closely together, and it can be showed that seigniorage, $\overline{qm}$, has an upper bound. We can think of inflation as the policy choice (with the nominal interest rate being implied from eq. 6). If money demand then is

$$L(i) = e^{\alpha - \beta i}, \beta > 0 \tag{10}$$

it follows that

$$\overline{qm} = [(1+\pi)(1+g) - 1]\, e^{\alpha - \beta[(1+r)(1+\pi)-1]} \tag{11}$$

which has a maximum at

$$\pi = \frac{-\beta g r - \beta g + g + 1}{\beta(g+1)(r+1)} \tag{12}$$

as shown in Figure 2.

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[6] Demand for money is typically thought of in terms of demand for money aggregates such as M1, M2 or M3, not base money per se. These are certainly not proportional to base money in the short run, but are endogenous to the choice of banks and households. Modeling of endogenous money is a fascinating subject, see e.g. McLeay et al. [2014] and Keister [2016] for descriptions of how banks create money, and Bernanke and Blinder [1988] (explained in Groth [2016]), Rivero Leiva and Rodríguez Mendizábal [2018], Rodríguez Mendizábal [2019] and Jakab and Kumhof [2019] for various modeling attempts. I have, however, never seen a model where continued growth of base money in excess of nominal GDP did not result in inflation.

[7] In models with neutrality of money the real side of the model is independent of the money supply in the long-run. In models with super-neutrality of money, the level of the inflation rate has real effects (e.g. through portfolio re-balancing and transfers of seigniorage). Ramsey-type models often have super-neutrality, but overlapping-generations models typically does not. Deviations from super-neutrality are, however, typically, quantitatively small (see e.g. chapter 18 in Groth [2017] and Reis [2016]).

Figure 1: Debt simulation

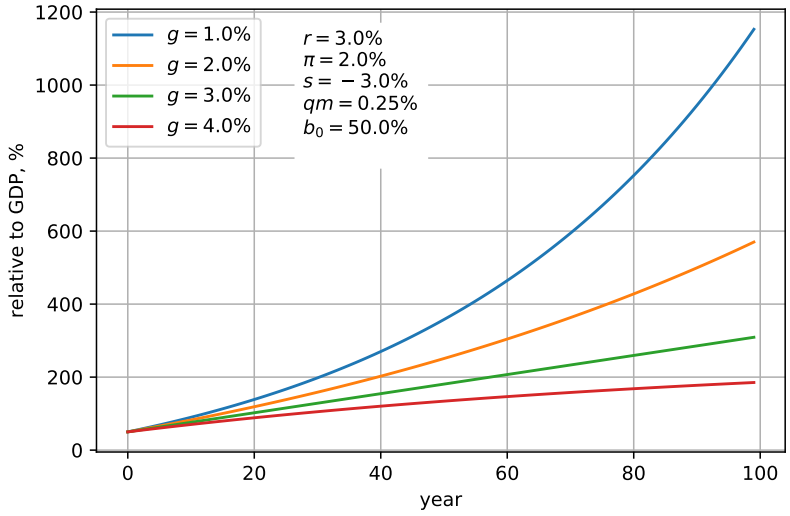
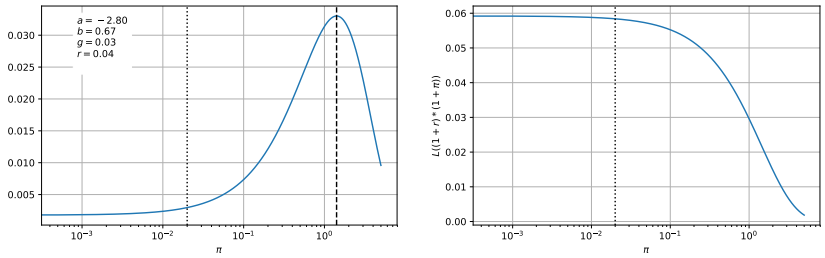


Figure 2: Seigniorage

(a) $\overline{qm}$ (b) $\overline{m}$



2. The interest rate, r, and the growth rate, g, are endogenous parameters. Many economic models implies that r increases as government debt increases because it lowers capital accumulation increasing the marginal productivity of capital. In models with long-run uncertainty it might be very dangerous to accumulate a large debt when there is a small risk of $r > g$ in the future. Economic policy might also affect both r and g through affecting incentives (social security, taxation, market design etc.) or investment (infrastructure, education, research etc.). The government thus have some control over the long-run real interest rate, but it can not choose it independently of the debt level it chooses. If it chooses a high debt level implying a high interest rate above the growth rate, it will be forced to run primary surpluses on average to avoid an exploding debt ratio.

2 MMT

2.1 The basics

I find it very hard to pin down exactly what proponents of MMT are saying. General expositions are available in Tymoigne and Wray [2013] and Wray [2015], but in my view they are vague on many points.[8] Short explanations of what MMT is *not* can be found in Harvey [2019] and Wray [2019]. Let me nonetheless try to summarize the main points of MMT:

1. The state should be viewed as a whole. Any separation of the government and the central bank is a self-imposed political constraint.

2. Sovereign states with its own currency give the currency value by requiring taxes to be paid in it.

3. Sovereign states with its own currency can buy anything which is for sale with a price tag in this currency and can always pay interest and installments on any debt denominated in its own currency. States with its own currency can therefore not be forced into bankruptcy if they only have debt in their own currency.

4. Sovereign states with its own currency have full control over the short nominal interest rate for their own currency and can set it to any not-too-negative value.

5. The budget identity in equation (1) is accepted, and so by extension, under the stated assumptions, is equation (7).[9]

6. In a situation with unused capacity (not full employment), the government should increase government consumption (including investment) until there is no more excess capacity. Inflation is the only constraint. Government spending can, ultimately, only be financed by printing money (see Kelton [1998]).

7. The government should follow a policy of a permanent zero nominal interest rate policy (ZIRP) and a job guarantee (JG) program.[10] The job guarantee is that everyone can get a state-paid job at some specified wage. This job should not replace either other government workers or produce something to compete with private sector workers. The wage of the job guarantee jobs becomes an effective

[8] For a list of MMT papers see `www.neweconomicperspectives.org/mmt-scholarship`. For my Danish readers see Voldsgaard [2018] for a short introduction, and Voldsgaard [2019] for some concrete policy proposals. I should note that no papers on MMT has been published in the mainstream journals relied upon at all the top universities in the world.

[9] See e.g. chapter 2 in Wray [2015] and Fullwiler [2017].

[10] See e.g. Wray et al. [2018].

minimum wage, and the income the fired workers get in a recession acts as an automatic stabilizer.

8. Fine-tuning should be avoided. Lowering interest rates in recession or increasing them in booms has a limited effect on the economy.[11] Management of demand (combating inflation) should instead be done in terms of either changes in government consumption or taxes or even regulation of e.g. prices and introduction of credit controls (on the borrowing of firms and households).

9. Few, if any, of the advanced economies has been close full capacity since the second world war. Inflation has not come from a general excess of demand, but from excess of demand in bottleneck sectors and due to cost-push shocks (see e.g. Fullwiler et al. [2019]).

10. The minimum requirement for sustainability given by (9) is acknowledged under full employment. Under full employment seigniorage is a limited source of income because printing money leads to inflation because it pushes up demand.[12]

2.2 Why is the debate on MMT so confusing?

I believe that a lot of confusion around MMT stems from the following four sources:

1. A lot of their observations, arguments and conclusions are completely mainstream, but are presented as novel (e.g. that sovereign states can always pay debts in its own currency, the government budget is radically different from a household budget, automatic stabilizers are important etc.).

2. The vocabulary of proponents of MMT, and their definition of some terms, differ from the mainstream. They rarely state this explicitly resulting in incomprehensible discussions.

[11] In a IS-LM model this implies an almost vertical IS curve.

[12] Harvey [2019] e.g. write: "5. Financing the deficit by printing money can't cause inflation. FALSE. Nope, they didn't say this either. If the economy is at full employment and we continue to stimulate demand, then, regardless of how we finance it, of course prices are inflated. Supply cannot keep up with demand. That was precisely our problem in WWII. With unemployment around 2%, we spent in massive deficit and had to introduce rationing and price controls. Every MMT scholar is well aware of this and it has been mentioned many times." Wray [2019] also ridicules the idea that MMT is about "advocate using the Federal Reserve's balance sheet to fund expansive new government program". On the other hand, Tymoigne and Wray [2013] write: "Like most heterodox approaches, MMT rejects the quantity equation explanation of inflation. In our view, inflation would result if the relation between government spending and taxing were wrong, not because the ratio of money supply (however measured) and GDP were wrong. In that, we follow the traditional "endogenous money" view that the ratio of money stock to national output is an uninteresting residual."

3. The proponents of MMT rarely clarify whether they are talking about the short-run (defined as a situation with less than full capacity utilization) and the long-run (defined as situation with full capacity utilization). Some argue that the long-run is a series of short-runs, but if their policy stabilizing the the economy works with a permanent state of full employment, a description of how the economy is expected to develop is necessary.

4. The proponents of MMT have not formulated the central mechanisms in their theory in the form of mathematical models, and have not provided causal empirical evidence on e.g. the effect of interest rates on demand (point 8) or the lack of any demand pull inflation (point 9).[13]

One example of the, from a mainstream point of view, weird MMT vocabulary is the statement that government spending can, at least ultimately, only be financed by printing money. Kelton [1998] write:[14]

> "Indeed, the entire process of taxing and spending must, as a matter of logic, have begun with the government first creating (and spending) new government money. How, after all, could a population settle its tax liabilities using the government's money (HPM) before the government had made its money available? In other words, the government's purchase of goods and services using newly-created money must first have supplied the citizens with the means with which to pay taxes. Thus, taxes can be conceived as the means by which the government directs real resources from private to public domain. If this theory is accepted, taxes are used to create a demand for the government's money, not to "finance" the government's spending."

The mainstream vocabulary instead is to look at equation (1) and say: If the government spends more in a given year, and do not raise taxes, it need to either sell bonds or print money. It therefore has three different options for financing government spending; tax financing, bond financing, and money financing. As an example, consider a government

[13] For a mainstream perspective on these empirical questions see e.g. chapter 1 of Walsh [2017]. Some work from an MMT perspective have been done indicating a weak link between the level of government debt and the interest rate on the debt for monetary sovereign states [Sharpe, 2013].

[14] Also in Wray [2015]: "... sovereign governments don't need to borrow their own currency in order to spend! They offer interest-paying treasury securities as an instrument on which banks, firms, households, and foreigners can earn interest. This is a policy choice, not a necessity. Government never needs to sell bonds before spending and indeed cannot sell bonds unless it has first provided the currency and reserves that banks need to buy the bonds. It provides currency and reserves either by spending them (fiscal policy) or lending them (monetary policy).

So, much like the relation between taxes and spending – with tax collection coming after spending — we should think of bond sales as occurring after government has already spent or lent the currency and reserves." (p. 4)

not creating new money, but running a balanced budget. When such a government increases spending it also increases taxes. In the mainstream vocabulary the source of financing therefore increase. In the MMT vocabulary, on the other hand, the source of financing is fixed (previously printed money), but it finance more spending! Ultimately, however, if the budget identity in equation (1) is accepted, the way we talk about it is not that important.[15]

Their definition of *full employment* is also not completely clear to me. Mainstream economists talk about full employment, as the level of employment compatible with price stability (typically in relation to the concept of non-accelerating inflation rate of unemployment, NAIRU). If the government pushes demand further up, it might increase employment at first, but then inflation will increase. If the government continues to push up demand, employment will increase even less, but inflation will continue to increase.[16]

Some times proponents of MMT seem to acknowledge this view:

> "At full employment, increasing government spending will be inflationary; before full employment government can cause bottlenecks and inflation of the prices of key inputs." [Tymoigne and Wray, 2013]

At other times, full employment seems to be defined as a situation where everybody who wants can get a job at a policy determined minimum wage:

> "The PSE program would play a complementary role by offering paid work at a living wage of $15 per hour with a basic package of benefits that would include healthcare provided through an expansion of Medicare. It would ensure full employment in the sense that the program would supply a job to anyone ready and willing to work. Jobs would be provided in every community—taking workers where they are, providing an economic boost to every community in the country." [Wray et al., 2018]

It is not clear why the two definitions should coincide if there are various market failures in the labor market.

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[15] Some proponents of MMT also argue that government spending is always financed by printing money because the institutional arrangement is such that the government first debits its account at the central bank, and the central bank then afterwards sterilizes the effect on the money supply, by selling bonds. Such an institutional arrangement does not, and need not, exist everywhere and at all times. To some degree, it can, however, be relevant to talk about financing differently at different horizons. If the debt level is kept constant in the long-run, bond financing is financing using not current but future taxes. Mainstream economists talk about Ricardian equivalence when the timing of taxation doesn't matter (but in practice it does).

[16] This is the story in the basic AS-AD model. See e.g. Sørensen and Whitta-Jacobsen [2010]. But similar dynamics are present in more advanced New Keynesian models.

2.3 Debt sustainability

Wray [2015] first seems to acknowledge the basic debt accounting laid out in Section 1:

> "James Galbraith laid out the typical model used to evaluate sustainability of deficit spending. The key formula is:
>
> $$\Delta d = -s + d * [(r - g)/(1 + g)]$$
>
> Here, d is the starting ratio of debt to GDP, s is the "primary surplus" or budget surplus after deducting net interest payments (as shares of GDP), r is the real interest rate, $*$ means multiply, and g is the real rate of GDP growth (...)
>
> This is wonky but the key idea is that (given a relation between the primary surplus and starting debt - both as ratios to GDP) so long as the interest rate (r) is above the growth rate (g), the debt ratio is going to grow. (...)
>
> Still, the wonky economists are correct that for some assumed relations among interest rates, growth rates, and primary deficits the government's debt ratio will explode. Surely that is unsustainable if carried to the infinite hereafter?" (ibid., p. 64-65)

But he has some objections:

> "Here are some possible consequences of a persistent deficit that grows fast enough to imply rising interest payments and debt ratios" (ibid., p. 65)

Lets take them one by one:

1. "Inflation: this tends to increase tax revenues so that they grow faster than government spending, thus lowering deficits. (Many, including Galbraith, would point to the tendency to generate "negative" real interest rates.) In other words the (nominal) growth rate will rise above the interest rate, and reverse the dynamics so that the deficit ratio declines and the debt ratio stops growing. (...)" (ibid., p. 65)

It is correct, that if the tax system is not invariant to inflation changes in inflation can change real taxes, but if that removes the deficit, we are no longer studying the effect of a persistent deficit, but only a temporary deficit. If inflation increases the nominal growth rate naturally increase, but Wray seems to assume that the nominal interest rate is kept fixed implying that the real interest rate is falling permanently. In all economic models I know of this is not possible because it would not be consistent with the return on private investment. Accumulating debt normally implies a higher real interest rate due to reduced capital accumulation. If Wray belive the government simultanously lower the real interest rate and increase debt, he needs to state this clarly, and explain how.

2. “Austerity. government can try to adjust its fiscal stance (increasing taxes and reducing spending to lower its deficit). (...) Of course, it takes “two to tango” – raising tax rates might not change the government’s balance, as it could lower growth rates, and thereby actually increase the rate of growth of the debt ratio. Raising tax rates will reduce deficits only if the nongovernment sector reduces its surpluses (spending more to keep growth up).” (ibid., p. 65)

This does not make sense. Naturally, there will be no problem with a persistent deficit if the fiscal policy is changed such that there is no persistent deficit.

3. ”The private sector will adjust its flows (spending and saving) in response to the government’s stance. If government continually spends more than its income, it will be adding net wealth to the private sector, and its interest payments will add to private sector income. It is not plausible to believe that as the government’s debt ratio goes toward infinity (which means that the private sector’s net wealth ratio goes to infinity) there is no induced spending in the private sector. That is usually called the "wealth effect". In other words, government debt is private wealth and as private wealth grows without limit this will eventually cause spending to rise relative to private sector income, reducing government deficits as tax revenues rise.” (ibid. p. 65)[17]

This does also make no sense. Government debt need not increase the net wealth of the private sector.[18] If the private sector buys government bonds instead of investing in capital the net worth is unchanged, and income is unchanged because the interest income on the government bonds just replaces the return the private sector would have earned on its real investment. This is what happens in a basic overlapping generation models before accounting for changes in the real interest rate. Other dynamics might

[17] A similar argument is made in Wray [2015].

[18] Wray, mistakenly, also sometimes seems to think that saving for a rainy day can only be done with financial saving: “The most "unsound" budgetary policy is mindless pursuit of some- thing called a "balanced budget" - meaning one in which tax “revenues” exactly match government spending over a stated period (usually a year). If that outcome is achieved, it means that all the government’s currency supplied through its spending Will have been “returned” in tax payments so that the nongovernment sector has nothing left - no extra funds to set aside for the proverbial “rainy day”. As we will see in the next two chapters, if the government runs a “balanced budget”, it will have made no net contribution to the financial wealth of the nation. It is hard to see why anyone would advocate such a crazy goal.” (Wray [2015], p. 8) In fact, the economy as a whole can only save for a rainy day by real saving accumulating more resources for use in the future. In other places Wray acknowledges this: “In most of the discussion that follows we will be concerned with financial assets and liabilities but will keep in the back of our minds that the value of real assets provides net wealth at both the individual level and at the aggregate level. Once we subtract all financial liabilities from total assets (real and financial) we are left with nonfinancial (real) assets, or aggregate net worth.” (ibid. p. 10)

be possible, but then it is up to Wray to show this formally.[19]

4. "Government deficit spending and interest payments could increase the growth rate; it can be pushed above the interest rate. This changes the dynamics and can stop the growth of the debt ratio." (ibid., p. 66)

Yes, if the the govenment can increase the growth rate, the story is completely different. But this is also accepted by mainstream economists, who are just sceptical that this is possible in general, except for specific investment projecets.

After his four point list, Wray continues with a statement where he is clearly assuming that the *real* interest rate is controlled by the government:

> "The interest rate is a policy variable (as will be discussed below). Ignoring the dynamics discussed in the previous points, to avoid an exploding debt ratio all the government needs to do is to lower the interest rate it pays below the economic growth rate. End of story; sustainability achieved." (ibid., p. 66)

Nowhere in his books does he explain how the government control the real interest rate. The closest is his discussion of functional finance. Wray here makes the argument that the "correct" deficit is the one that achieves full employment, and that the "correct" government debt ratio is the one consistent with achieving the desired interest rate:

> "Lerner rejected the notion of "sound finance" - that is, the belief that government ought to run its finances as if it were like a household or a firm. He could see no reason for the government to try to balance its budget annually, over the course of a business cycle, or ever. For Lerner, "sound" finance (budget balancing) is not "functional"; it does not help to achieve the public purpose (including, e.g., full employment). If the budget were occasionally balanced, so be it; but if it never balanced, that would be fine too. He also rejected any attempt to keep a budget deficit below any specific ratio to GDP, as well as any arbitrary debt to GDP ratio. The "correct" deficit would be the one that achieves full employment.
>
> "Similarly the "correct" government debt ratio would be the one consistent with achieving the desired interest rate target. (Contrast that with the conventional views of "sustainability" of deficit and debt ratios discussed earlier.) This follows from his second principle: if government issues too many bonds, it has by the same token issued too few bank reserves and cash. The solution is for the Treasury and central bank to stop selling bonds, and, indeed, for the central bank to engage in open market purchases (buying

[19] On p. 16-18 he makes some vague states on behavioral relations between income and spending, but these are very informal.

> treasuries by crediting the selling banks with reserves). That will allow the overnight rate to fall as banks obtain more reserves and the public gets more cash." (ibi.d p. 200)

It is not clear to me, whether this is a statement about the nominal or the real interest rate. When the government chooses the target for the nominal interest rate it basically ties down the amount of money which should exist. If the government then runs a deficit (in excess of the seigniorage income) it needs to issue government bonds. The level of the debt ratio is therefore implied by the deficit, and the level of debt is not important for implementing a nominal interest rate target. As discussed above, the debt-ratio is important for the real interest because it affects private capital accumulation, but choosing the real interest rate in this way does not allow the government to freely use the government deficit to ahieve full employment. Wray seems to be squaring the circle.

Finally, Wrays last defense is that the government can just print the money:

> "Finally, and this is the most contentious point. Suppose none of the dynamics just discussed come into play, so the government's debt ratio rises on trend. Will a sovereign government be forced to miss an interest payment, no matter how big that becomes? The answer is a simple "no". (...) government spends using keystrokes, or electronic entries, on balance sheets. There is no technical or operational limit to its ability to do that. So long as there are keyboard keys to stroke, government can stroke them to produce interest payments credited to balance sheets.
>
> And that finally gets us to the difference between perpetual private sector deficit spending versus perpetual government sector deficits: the first really is unsustainable while the second is not.
>
> Now, we need to be clear. We have argued that persistent government budget deficits that increase government debt ratios and thus private wealth ratios will lead to behavioral changes. They could lead to inflation. They could lead to policy changes. Hence they are not likely to last "forever". So when we say they are "sustainable" we merely mean in the sense that sovereign government can continue to make all payments as they come due - including interest payments - no matter how big those payments become. Government might choose not to make those payments. And the mere act of making those payments will likely cause changes in growth rates and budget deficits and growth of debt ratios."

Beyond "its complicated" I can not understand what the last paragraph is saying. Maybe it is just a redifnition of the meaning of the term "sustainable". If the government increase the growth rate of money to pay for the deficit then inflation will eventually increase and the deficit relative to nominal GDP is back where we started, and the government would need to increase the growth rate of money even further. To avoid an exploding debt ratio, the only alternative is an exploding money ratio, which seems

to be unsustainable. If this is inccorret, Wray should show exactly how to implement his policy.

In sum, I am perplexed by what the proponents of MMT are actually saying. Do they think government debt relative to GDP can be increased forever? Do they believe that $r < g$ (interest rate lower than growth rate) is the only relevant scenario? Do they accept that high government debt at full employment can crowd out private capital accumulation increasing the long-run real interest rate, r? Do they accept that high government debt gives an incentive to the sitting government to create surprise inflation to pay it off without raising taxes and that this could result in an inflation risk premium?

The only quantitative forecast of implementing an MMT policy, I know of, is Wray et al. [2018]. They use the old-style Keynesian Fair model (see Fair [2013, 2018]), but the underlying assumptions are not made clear[20], and their forecast horizon is only 10 years. Such a short horizon is very problematic, especially when the type of model used is known to have a very slow rate of convergence to long-run behavior.[21] Finally, their policy experiment imply a budget deficit in excess of 1 percent every year thus implying substantial debt accumulation (though this is not shown), and it might thus not be a long-run sustainable policy.

In a recent opinion piece in The Huffington Post titled "We Can Pay For A Green New Deal" leading proponents of MMT first indicate that large public investment projects can be undertaken without taxation or borrowing by the government, but then ad the condition that this only goes as long as we are not a full employment basically making it a standard keynesian argument when the multiplier is sufficiently large:

> "To save the planet and fix historical inequities (...) we must change the way we approach the federal budget. We must give up our obsession with trying to "pay for" everything with new revenue or spending cuts. (...)
>
> The federal government can spend money on public priorities without raising revenue, and it won't wreck the nation's economy to do so. That may sound radical, but it's not. It's how the U.S. economy has been functioning for nearly half a century. That's the power of the public purse. (...)
>
> In other words, Congress can pass any budget it chooses, and our government already pays for everything by creating new money.
>
> This is precisely how we paid for the first New Deal. The government didn't go out and collect money — by taxing and borrowing — because the economy had collapsed and no one had any money (except the oligarchs). (...)

[20] They cite a "forthcoming" paper by Scott Fullwiler titled "Simulating a Large Job Guarantee Paying Above Poverty-Level Wages Plus Benefits", but this does not seem to be available yet. He has not responded to my inquires to obtain a copy of this paper.

[21] In the Annual Danish Aggregate Model (ADAM) crowding out of public employment takes decades through higher wages and lower exports, `https://www.dst.dk/extranet/AdamMultiplikatorer/2017jul/muleks17.html`.

> Despite lawmakers' stated fears, larger public deficits are not inherently inflationary. As long as government spending doesn't cap out the full productive capacity of the economy — what economists call "full employment" — it won't spin prices out of control." [Kelton et al., 2019]

In a follow-up piece on Bloomberg.com titled "How to Tell When Deficit Spending Crosses a Line" a bit more details is provided:

> "But what if we wanted to add tens of billions, say, for free college or hundreds of billions for a federal job guarantee? Does the economy have the resource capacity to safely absorb that much new spending, or would it wreak havoc as we strain our productive capacity, running out of workers, raw materials and the like?
>
> The answer is, you can't know until you do the analysis. A program like a federal job guarantee would involve hiring 15 million or so people and paying them $15 an hour plus benefits, including health care. It would cost around $350 billion a year.
>
> That might sound like too much to spend in the current environment. Maybe it isn't. In fact, research [Wray et al., 2018] suggests that it could be done with minimal inflationary consequences, since the program boosts overall growth and because some of the new spending is offset by lower spending in other categories of the budget — for example, on unemployment compensation, food stamps, Medicaid and so on.
>
> Now, if you tried to tie all of these jobs to a Green New Deal that aims to spend trillions, transforming the entire U.S. economy into a fossil-free zone in a matter of 10 years, then all bets are off. There is almost certainly no way to avoid an inflationary meltdown without careful planning and at least some offsets to make room for a WWII-style mobilization to combat climate change.
>
> Anyone thinking seriously about how to pull off something like this in the modern era should go back and read John Maynard Keynes' 1940 book, "How to Pay for the War." You might assume, judging by the title, that Keynes was laying out a prescriptive plan to raise the money that would be needed to fight and win the war. That wasn't it at all.
>
> The book was a careful exposition of what it would take to transform the economy away from one that was oriented around production for consumers to one that was oriented around production for the war effort. It was a book about how to carefully reorient industries and occupations in a way that would minimize dislocations and inflationary pressures.
>
> If we're going to war against climate change — a war that will touch almost every part of the U.S. economy: energy, housing, transportation, agriculture and so on — something like this will need to be done to manage the

> inflation risk along the way. The financing is the easy part. The hard part is managing the inevitable upheaval through the transition." [Kelton, 2019]

The question any economist would ask is: Didn't the war reorganization of the economy cause a lot of inefficiency because it replaced prices and quantities determined in the market with government regulation of prices and rationing? Of course, such inefficiency might be necessary to reorient the economy to a urgent task such as fighting a war. In principle, it is a legitimate argument that the climate crisis is similarly urgent, but this should be stated upfront. Wray also argues for rationing and price controls to combat inflation:

> "In addition, other wages and prices might be increased through spill-over effects if a new government program is so big that it sets off a general bidding war for labor and other resources. For example, during a major war like WWII, government not only conscripts workers into the military, but it also redirects resources to production for the war effort. Without rationing and wage and price controls, this can lead to a general price and wage inflation. Note that it does not take a major war for this to happen. If government spending pushes the economy to, and beyond, full employment it is likely that inflation will result even without a major war. " (p. 195)

One thing is to argue for such measures in urgent situations, wars and crisis, but the MMT argument seems to be that they should be permanent measures in response to permanent deficits.

To fully analyze what the MMT proposals are, and what underlying assumptions they build on, the proponents of MMT should formulate a quantitative model illustrating the basic mechanisms. Optimally, this model should have clear implications for the micro-level data (the distribution of balance sheets of firms and households). The minimum is a long-run forecast of aggregate variables such as:

1. Output
2. Government spending and taxes
3. Government debt
4. The stock of money
5. The nominal interest rate
6. The inflation rate
7. The capital stock owned by the private sector
8. Wages and return on capital

9. Private consumption and investment

The next-step would then be to explain why the implied private sector behavior is meaningful.

Some proponents of MMT argue that their theory cannot be formulated mathematically. I have not seen any argument why this should be the case. Mainstream economics typically use models where households and firms are intentional and forward looking, but a first step could certainly be something much simpler, e.g. based on reduced-form aggregate response functions.

2.4 Job guarantee

The prime MMT policy proposal is the job guarantee (henceforth JG). In their own words:

> "The national government agrees to provide wages (and some non-wage funding) to employ anyone who is ready and willing to work at the program wage (plus non-wage benefits). We leave to the side a full discussion of the setting of the compensation, but wherever that is set, it will become the de facto minimum compensation level since private employers would have to at least match it to retain employees. To minimize (temporary) disruption to the structure of private wages, government can set the JG at the current legal minimum wage." [p. 46 in Tymoigne and Wray, 2013][22]

They argue this is very different from fine tuning:

> "MMT does not promote fine tuning, but rather recognizes the role of a "rightly distributed" demand in addition to the right level of aggregate demand (Keynes 1937), and aims at combating the inherent instability of market mechanisms. More importantly, MMT does not rely on increasing aggregate demand in order to reach full employment; it disconnects full employment from economic growth." (ibid., p. 45)

They instead argue that the point is to develop a pool of employable labor:

> As we will show, the JG program does not focus on stimulating aggregate demand to move the economy to full employment. Nor does it see government spending as a "perfect substitute" for private spending. Rather, the JG is targeted spending that is designed to improve the structure of the labor market by developing a *pool of employable labor* while at the same time ensuring continuous employment of those ready and willing to work." (ibid., p. 45)

[22] See chapters 8 and 9 in Wray [2015] for a similar expoisition of the job guarantee proposal.

No arguments are given why unemployed working in the public sector are more available for the labor market than unemployed getting financial support on a similar level and getting help to search for a new job or re-educate themselves to get the competencies demanded by the labor market. This is the approach taken in e.g. Scandinavian welfare states. One argument could be that the JG jobs are more meaningful, than normal job training jobs, but this is far from obvious, as they will probably also be temporary positions with a lot of turnover and under a different system than regular public sector workers.

Next, they turn to the question of whether the JG program will cause inflation:

> "The JG program is explicitly a "rightly distributed" spending program in which government spending is directed precisely to those who want to work. This places no direct pressure on wages and prices because the workers in the program were part of the "surplus" or "redundant" labor force and are still available for private employers (at a small mark-up over the JG program wage—the minimum wage). For that reason, employing workers in the JG program is no more inflationary than leaving them unemployed." (ibid., p. 46-47)

I cannot make sense of this. The workers in the JG program must be getting more income than before the introduction of the program because they later argue "that with a JG, the government's budget would be made more strongly countercyclical" (ibid., p. 48). This both imply that their outside option is better (i.e. they will rationally reject some private sector jobs they would have accepted before), and they will demand more goods from the private market, though they do *not* contribute any more goods to the private market. How this cannot be inflationary is beyond me. If we are talking counter-cyclical fiscal policy this is of course not a problem, but the JG program is presented as a long-run proposal.

In a later paragraph, they seem to acknowledge that the JG program is inflationary in the long-run:

> "However, let us imagine that the JG program is extremely successful at creating jobs and income, so much so that the economy moves from slack to full employment of all productive capacity, resulting in rising prices. The presumed problem is that while JG workers get wages (and thus consume) they do not contribute any production that is sold (hence, does not absorb wages). The "excess" wages from newly employed workers induces spending to rise. What could government do? It would have at its disposal the usual macroeconomic policy tools: raise taxes, lower government spending on programs other than the JG, and tighten monetary policy. Indeed, this is what it would do in the absence of the JG if the private sector achieved full employment through creation of 10 million new minimum wage jobs in the private sector." (ibid., p. 47)

But why would this decrease in aggregate demand not create unemployment? The explanation seems to be that these unemployed will also be employed in the JG program:

> "The only difference is that government would not be able to fight inflation by increasing unemployment—because the macro policies used to fight inflation would dampen demand but any worker losing a job could turn to the JG program for work." (ibid., p. 47)

But this job would be a lower paid job than the one they had before they were fired. Financially this is consequently fully equivalent with compensation from unemployment benefits. Instead of getting help to search and re-educate themselves they are just working in the public sector for a very low wage. It is not clear that this improves either the short-run or the long-run welfare of the unemployed.

Finally, they suddenly argue that JG stabilize aggregate demand and that otherwise fine-tuned discretionary policy can just be used. This seems to completely contradict their own position a few pages back!

> "Note also that with a JG, the government's budget would be made more strongly countercyclical, as government spending increases in the slump when workers move from higher-paid employment to the JG; the process is reversed in a robust expansion, where when the private sector hires out of the JG pool. These stabilizers might be enough to stabilize aggregate demand. After all, most unemployment in developed countries is cyclical in nature so unemployment is due to a lack of aggregate demand. The JG pool raises this demand and will encourage hiring. If not, government can use discretionary policy interventions" (ibid., p. 48)

To sum up, the argument for why JG can increase long-run employment rest on a easily disputed claim that it increases long-run labor supply for the private market, or it results from a redefinition, where we start calling unemployed who are put to work in the public section at a low wage, compared to regular public sector workers, for employed.[23]

[23] In some cases JG is presented as unavoidable due to a persistent lack of aggregate demand created by taxation: "The problem with a monetary economy (you can call it capitalism) is that from inception, imposition of taxes creates unemployment (those looking for money to pay taxes). If we scale this up to our modern, almost fully monetized economy (you need money just to eat, watch TV, play on cell phones, etc.), we get everyone looking for money (and not just to pay taxes). It is sheer folly to then force the private sector to solve the unemployment problem created by the government's tax. The private sector alone will never provide (never has provided) full employment on a continuous basis. JG/ELR is a logical and historical necessity to support the private sector. It is a complement to, not a substitute for, private sector employment." [Wray, 2015, p. 246] The reasons why taxation should apply a lack of aggregate demand is never explained.

3 Mainstream economics[24]

3.1 Agreement

Mainstream economics already accept, or can be used to argue for, many of the conclusions proponents of MMT draw. Some times without any qualifications, sometimes with some important ones:

1. Yes, any separation of the government and the central bank is a self-imposed political constraint. In some cases, as in equation (1), it is certainly best to look at the consolidated balance sheet of the state.

2. Yes, sovereign states with its own currency can not be forced into bankruptcy if they only have debt in their own currency. Taxes, probably, play a major role in anchoring the purchasing power of money in modern economies.[25]

3. Yes, sovereign states with its own currency have full control over the short nominal interest rate. The actual implementation of monetary policy can vary hugely from country to country and over time; in some cases monetary policy is conducted through open market operations, in other cases through payments on reserves.

4. Yes, in a situation with unused capacity (not full employment), the government should take action to increase demand until there is no more excess capacity. Using automatic stabilizers is an important part of counter-cyclical fiscal policy.[26] Unemployment is a very painful experience, and from a social welfare point of view a reform lowering unemployment might be worthwhile even if it also lowers long-run output (if it increase it and does not make unemployment more unpleasant its a win-win). Unemployment, both in the short-run and the long-run, is mainly involuntary. In the short-run market arrangements can be such that real wages do not fall enough to make it beneficial for the firms to employ the unemployed, or the unemployed will, due to mismatch problems, be forced to take huge reductions in their welfare if they search for jobs outside their profession and/or far from the place they live. Making unemployment a more painful experience also reduces the outside option of employed workers putting downward pressure on the real wage.

[24] This section lacks references. I hope to provide those in a future revision. Until then, Google Scholar is your friend.

[25] I will not go into the question of the origin of money because I do not think it is important for the policy questions of today. While money might not have grown out of an exchange economy due to the double coincidence of wants, this mechanism is helpful in explaining why money is a very productive technology.

[26] Enhancing automatic stabilizers through counter-cyclical unemployment benefits (wrt. the amount or the duration) is one idea.

5. Yes, macro-prudential policies, such as changing regulatory collateral requirements for mortgaging borrowing or changing capital requirements for banks, can be useful to dampen fluctuations in the housing market and financial markets in general. To limit decision lacks and time-inconsistency problems, delegation to an autonomous authority (e.g. the central bank) with a clearly specified mandate is often beneficial.

6. Yes, fine-tuning of fiscal policy should be avoided due to e.g. decision and implementation lags. In large recessions, where responses to monetary policy is too weak, or the interest rate is at the zero lower bound, active fiscal stimulus is absolutely necessary. If the spending multiplier is sufficiently large, bond-financed government consumption might not even increase the the public debt-to-GDP ratio. Making contingency plans beforehand for how to increase government spending (and in particular investment) during recessions is a god precautionary measure. Policies targeted towards low-liquidity households can be particularly effective. Non-standard monetary policy, such as various forms of quantitative easing (whose effect is still hotly debated) are additional possibilities. In principle, so-called "helicopter money", where everybody just get some extra money in their bank account is also a possibility.

7. Yes, unemployed should receive state-sponsored unemployment benefits. Both because it stabilizes aggregate demand and because it provides insurance of idiosyncratic risk (and thus reduces inequality). Unemployed should also receive help to find a new job through some combination of counseling, re-education and job training. The best way to help unemployed find a job is an open issue. Given them monetary incentives is only part of the answer. Differentiating between short-time unemployment and long-term unemployment is also central. To solve problems with long-term unemployment re-education is probably necessary, and this should be supported for the same reasons education in general should be supported. We don't know when we are at full employment because measures of the output gap are very uncertain. But historically, we have seen many episodes where increasing government spending did not increase employment, but only inflation. To lower unemployment in such cases, structural reforms using either carrots (supporting re-education and mobility) or sticks (lowering benefits forcing the unemployed to search more and broader) are needed. Evidence of policy changes regarding the size and duration of unemployment benefits are mixed, but many show rather small effects, and long-term costs in terms of worse matches and discouragement can be hard to identify.

8. Yes, large public investment projects (in infrastructure, education, research, social security or market design) might affect both the long-run level and the growth rate of GDP. When interest rates on government bonds are low and financing costs therefore are low, such projects are more likely to be welfare enhancing. If the investment projects are very effective they might imply small or even no

increase in the debt-to-GDP ratio. There are probably some hysteresis effects on both labor supply and productivity from to weak monetary and fiscal responses to bad shocks resulting in long recessions.[27] Especially, in relation to the financial crisis, it has been argued that such effects were large, though the evidence is still debated. In terms of equation (2) this implies that larger government consumption and investment (lower s_t) might have not just a short-run positive effect on the growth rate (g) as argued in traditional short-run Keynesian models, but also on the medium growth rate. Public investment in infrastructure, education, social security or design of better market structures might also increase the growth rate in the medium-run or even also the long-run. To which degree this is the case is an open question. In the case of the climate crisis, lack of public investment could result in grave damage to our planet (and therefore our economy), which indicate a possibility for a very lucrative investment. Similar arguments could be made for investing in the integration of immigrants or supporting the development of poor countries.

The above bullets are probably not something all mainstream economists can agree on, neither academically oriented economists nor policy oriented economists. Some believe, based on the available evidence that spending multipliers are small, unemployment is mostly a supply-side problem and few public investment projects can provide substantial welfare gains. Detailed empirical and theoretical debates in the mainstream revolve around these questions. The opposing views regarding policy often held by scholars in the same field is clear evidence that the mainstream approach does not lead to a single conclusion.

3.2 Differences

But let us now focus on the deeper differences between MMT and the mainstream approach:

1. Interest rates affects aggregate demand. With stickiness in prices and wages, changes to the nominal interest rate is therefore a powerful tool. An independent central bank with a politically decided dual mandate for keeping inflation low and employment high is good for the credibility of monetary policy.

   This conclusion is based on careful empirical analysis of how the economy behave in response to quasi-exogenous changes in the nominal interest rate.[28] Theoretically, interest rates can effect aggregate demand by various channels. Some stress the importance of substitution effects where consumption increase today when the

[27] See e.g. the discussion in Blanchard [2018].

[28] See chapter 1 in Walsh [2017].

interest rate falls because consumption tomorrow becomes relatively more expensive. Others, stress cash-flows where borrowers with high marginal propensities to consume get more liquidity when the interest rates on e.g. their mortgages fall. Empirical evidence suggests that countries moving to arrangements with an independent central bank experience obtain lower and more stable inflation rates.

2. Controlling inflation with e.g. tax policy is problematic. Firstly, many argue for important benefits of stable tax rates so that households and firm can plan ahead ("tax smoothing is better than debt smoothing"). Secondly, there are long lags in both parliaments deciding upon and implementing tax changes, or other policies to curb aggregate demand. Lags and credibility are very important because inflation expectations, and consequently inflation, can be very hard to control, if inflation suddenly falls or rises unexpectedly. Inflation targeting and swift policy responses are therefore typically favored by mainstream economists.

3. The level of public debt relative to GDP does matter even in the long-run, also if $r < g$. If the government sells bonds, some households must be the ultimate purchasers (though perhaps through e.g pension or investment funds). A no arbitrage argument implies that the interest rate on these bonds must equal the risk-adjusted return on stocks. More importantly, when the households save in government bonds, it can crowd out their saving in stocks (again, perhaps indirectly hold through pension or investment funds). Lower capital accumulation, will naturally lower private sector production and normally increase the real interest rate (because capital becomes more scarce) and lower the wage rate (because labor becomes less productive). The size of these effects depend very much on the specific economic model considered. So does the effect for the welfare of society. In many economic models (in particular those with over-lapping generations), $r < g$ is a sign of dynamic inefficiency, where a market failure imply that private capital is over-accumulated, and the social optimum contains less accumulation of private capital. A low interest rate on government bonds is therefore typically not just a sign of low financing costs of public investment, but also a sign of low welfare costs of public investment.[29] In mainstream economics, more public investment projects therefore becomes beneficial when the interest rate on government debt is lower, but it is never a free lunch, and which investments projects to undertake should be chosen with care.[30]

4. A high level of public debt imply a risk for inflation due to the risk that a government up for election might decide to pay interest payments through printing money instead of by raising taxes or increase the debt even further. Because the inflation response is typically lagged this might furthermore only become clear to

[29]See Blanchard [2019] for detailed discussion of this issue.

[30]See the policy discussions in Krugman [2019] and Funman and Summers [2019]

the general public after the election. The higher the debt level is, the harder it becomes for the government to stay credible, and this can increase the risk premium it pays on government bonds. Control of the short term nominal interest rate is not the same as controlling the interest rate on government bonds if these are perceived to be risky.

5. The "job guarantee" put forward by MMT proponents have many weaknesses. From a mainstream point of view, this is simply universal unemployment benefits, with the add-on that the unemployed should do some work, which is beneficial for society. Proponents of MMT sometimes argues that this creates demand after the labor which is in excess and that it is therefore not inflationary. This is wrong. If the unemployed under a JG program does get a higher income than otherwise, and they therefore demand more goods and services, but does not produce anything which is sold to the producers of these goods and services, it is inflationary. (Note that in a recession, this might not be problem.)

   Proponents of MMT also argue that the JG program implies that workers will not get discouraged because of the lack of job experience and psychological trauma of unemployment. This might certainly be true, and is the rationale behind e.g. Scandinavian job training programs. Alternatives, such as help with searching for and applying for jobs, and re-education, might, however, be just as good in battling discouragement. No empirical analysis done by proponents of MMT make the case that a job guarantee is better than such alternatives. Neither in terms of stabilizing aggregate demand or avoiding hystersis effects from discouraged workers. In cases with mismatch unemployment, where the previous occupation of the unemployed e.g. has been automatized, re-education is the only possibility. Increasing demand for their labor is not a viable long-term solution. It can, however, be argued that because mismatch unemployed are not responsible for sudden changes in technology making their skill-set obsolete, they should not suffer economically from it.

4 Conclusions

Summing up, and as also pointed out by Jayadev and Mason [2018], it seems as if MMT and mainstreams economics are not fundamentally different in terms short-run policy. The same goals of full employment and stable prices are shared, and the tools proposed by MMT, though different from what most mainstream economists propose, can be fully analyzed in a mainstream setup. In my view, the mainstream view is supported by much more precise and detailed models of the economy, and has be validated empirically much more carefully. To change the mainstream view, proponents of MMT should put forward quantitatively precise analysis and sound empirical documentation moving beyond simple correlation patterns. Additionally, the long-run implications of MMT proposals should also be spelled out in much more detail.

Compared to deficit hawks and market fundamentalists believing that government investment can never be of any good, and that all unemployment is voluntary, I am on the same side as proponents of MMT. But I reach these conclusion from a very different perspective.

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