

**Funding the Green New Deal and Stabilizing an Unstable Economy:  
Functional Finance Nominal Income Targeting**

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7/5/2022

JEL Codes: E63, Q54, H54

Keywords: Green New Deal, Functional Finance, Nominal GDP Targeting

ABSTRACT

The United States and the world face existential threats from climate change. To deal with this crisis, the United States must mobilize all its financial and human resources. To rise to this challenge, this paper proposes a functional finance program where the Fed would set the interest rate to 0% for all federal debt. Any level of investment or expense required for the Green New Deal could be financed by issuing new government liabilities that are rolled over at 0% interest forever. Green investments of all types would carry no financial cost under this program, providing for a green future based on abundant, free electricity. Moreover, this proposal would automatically provide a carbon dividend, as any carbon tax would be rebated lump sum to households. The government would then send out lump sum transfers to households. These transfers would be set at a minimum above the poverty line for households and would vary based on business cycles conditions to keep nominal income growth on a target path. Finally, a job opening guarantee would ensure that the Green New Deal is fully staffed. Not only would this proposal save the planet, but unemployment and poverty would be eliminated as well.

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## I. INTRODUCTION

The United States today faces many challenges, in particular the looming climate crisis. This will require extensive government action to decarbonize the American economy rapidly. Given the threats to human existence, we need to reorient our fiscal and monetary policies to a wartime footing (Levey, 2021). A Green New Deal has been proposed, to both provide a rapid green transition, as well as a more equitable and just economy (Aronoff et al. 2019, Galvin and Healey 2020, Pettifor 2020). Much of the opposition to the Green New Deal stems from concerns about the cost of the investments involved, which are misplaced (Nersisyan and Wray 2021). Humanity can always afford to survive, but humanity cannot wait for this view to become widespread enough to save the planet.

This paper proposes a post-Keynesian policy package that would solve many of the most salient problems facing this country, which could be applied fruitfully in other countries as well. As Forstater and Mosler (2005) and Wray (2007b) have argued convincingly, the correct interest rate is zero, not some arbitrary “natural” interest rate. Even for those concerned with the debt-to-GDP ratio, a permanent zero interest rate (PZIRP) policy would make any level of spending required for the Green New Deal to be sustainable. We should revive the use of functional finance to provide interest free financing for the investment necessary for a Green New Deal, with interest rates set at 0% for all maturity of U.S. Treasury debt. As the Federal Reserve will be primarily concerned with providing interest free government financing, the U.S. Treasury will adjust its disbursement of income to the public such that national income grows along a constant path, following an old Keynesian tradition of nominal income stabilization (Meade 1993 [1977]). Beyond macroeconomic stabilization, this proposal will automatically redistribute any revenues from green taxes in an equitable manner. This will provide a politically popular way to raise the price of carbon,

complementing the interest free financing of green investments that this proposal provides. An integral part of the Green New Deal is guaranteed employment to ensure a just transition for those in brown sectors that will be shut down, as well as to ensure that all the resources of the United States toward this essential objective. To this end, a job openings guarantee should be implemented to ensure multiple government job openings for every job seeker, which will also effectively end unemployment in the United States.

## II. FUNCTIONAL FINANCE

First, the macroeconomic program that will provide the scope for a Green New Deal should be outlined. Functional finance, as opposed to sound finance, puts the priority for fiscal and monetary policy on ensuring full employment and strong economic performance first, rather than concern for stabilizing the debt burden, as is the case with the dominant sound finance paradigm that endures today. Functional finance programs were popular in the 1940s, likely due to recent experience with monetary and fiscal policy coordination during the Second World War. Even Milton Friedman proposed a program that would eliminate the federal debt and would spend new money into the economy as an automatic stabilizer (Friedman 1948). The seminal source for functional finance programs is Lerner (1943), with later contributions by Forstater (1999), Nell and Forstater (2003), and Mason and Jayadev (2018), among many others, especially in the Modern Monetary Theory literature.

This paper proposes a specific form of functional finance to ensure that policy can be directed to ensure full employment and strong (and stable) economic performance. Interest rates are near historic lows and have been trending downward since the 1980s (at least). Rather than just being content with low nominal interest rates, the Fed should simply set a 0% interest rate for all

maturities on government debt from a few days to 100 years (or more). This would involve the Fed standing ready to buy all Treasury bonds such that they carry no interest, so if a bond that pays \$100 at maturity that trades at any price below \$100 would automatically trigger Fed purchases until the price returns to \$100. Interest on reserves would also be set back to 0% correspondingly. Since all bonds are equivalent under this policy, the Treasury could simply issue bonds at whatever maturity investors prefer, and any bondholder could always sell their bonds back to the Treasury or the Fed at their full value.<sup>2</sup> Now all government liabilities have the same price and can be interchanged at will depending on liquidity preferences. Importantly, there is now no interest expense for any government spending, no matter how large the budget deficit gets. Moreover, there is no difference between issuing reserves or new Treasury bonds when there are government outlays. Government debt can be rolled over costlessly forever.

The federal government then only needs to concern itself with a spending program to provide optimal economic performance and to provide for the needs of the people, and never needs to concern itself with the federal debt, no matter how large the debt to GDP ratio (or any other metric of debt burden) becomes. However, this still leaves open the need for a stabilization policy. What if this policy leads to high inflation? This is a valid concern, and given the radical nature of this proposal, there needs to be a plan for economic stabilization. Stabilization under this proposal is fairly straightforward given the functional finance set-up. Not only does this proposal provide for a better framework for implementing a Green New Deal, but also provides a superior way to stabilize the economy, making recessions a thing of the past.

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<sup>2</sup> This would also eliminate any liquidity issues like the disruptions to repo markets seen in 2019 (Afonso et al 2019).

### III. NOMINAL INCOME TARGETING

Nominal GDP Targeting or Nominal Income Targeting has a long history, dating back at least to Meade (1993 [1977]). He defined internal balance as a worthy goal and defined this goal as stability in national income. Tobin also discussed targeting nominal GDP, using the equation of exchange to target  $MV$  (money stock times velocity) rather than the direct targeting of monetary aggregates ( $M$ ) that was popular among monetarists and policymakers at the time (Tobin 1980). The simplicity of nominal GDP targeting as an objective is clear, as it would place equal weight on inflation and real income growth as concerns of monetary policy. Other benefits include stabilizing the financial system (Beckworth 2019a, Sheedy 2014), requiring less knowledge about the economy from policy makers (Beckworth 2017), helping to communicate stabilization to the public (Binder 2020), and myriad other benefits (Sumner 2014). The most strident supporters of NGDP targeting have come from a school called market monetarists, and this policy is seen as a modern and efficient way to implement a monetarist monetary policy.<sup>3</sup> To the best of my knowledge, all of these proposals mentioned above for nominal income targeting have been monetary policy frameworks. This is unsurprising, perhaps, given the current paradigm which assigns responsibility for stabilization to monetary policy. This proposal, instead, uses a functional finance strategy combining both fiscal and monetary policy to achieve a nominal income target.<sup>4</sup>

This program would be called functional finance nominal income targeting (FFNIT). There would be a baseline transfer accruing to all households in the form of monthly checks or direct bank deposits. This should be set to provide for a basic level of household income and should be set at or

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<sup>3</sup> The market part of the name is related to proposals to use market-based expectations of nominal GDP derived from futures markets to guide central bank policy (Sumner 1989, 1995, 2015).

<sup>4</sup> There are a few different ways to implement the target, where a level for nominal GDP would be targeted (perhaps based on a trend growth rate) or a growth rate itself would be targeted. This is left undetermined here.

above the poverty line.<sup>5</sup> Whenever nominal income growth falls below some target path, say 5% growth per annum, additional checks would automatically be mailed out to all households in equal amounts. If nominal GDP growth exceeds the 5% target, say because of inflationary pressures or the economy overheating, then the pace of transfers to households would be slowed, to ensure stabilization in the growth of nominal income. For example, if nominal growth was observed to be 2% in a year, an additional 3% of nominal income would be distributed in equal amounts to all households, while if nominal GDP growth was observed to be 6% in a year, distributions would be reduced by 1% of national income. To avoid having to explicitly debit households when nominal income growth is too high, tax levels should be set relatively high (which will reduce household income) as that will ensure a high level of transfers to households. While these transfers will fluctuate, a high baseline level of transfers are a way to implement a guaranteed income to all households in the United States and eliminate poverty in this country.

Obviously, the stance of this policy would depend strongly on the rate of nominal income growth to target. A rate of 4-5% has been proposed by market monetarists, based on recent trend growth in nominal GDP in the 2010s, consistent with approximately 1-2% inflation and 2-3% Real GDP growth. Under FFINT, the inflation rate is, by definition, the opposite of the real interest rate, and so higher inflation rates will make real interest rates more negative. As the FFINT framework will always ensure a hot economy, raising the inflation target will not have the same effect of reducing unemployment as it would under the current policy framework as unemployment would already be eliminated. On balance then, the existing inflation target of 2% would seem to be a reasonable compromise. As for Real GDP growth, we should not expect it to be as slow as it had

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<sup>5</sup> These transfers should be combined with a program to provide for basic services, like a Medicare for All program.

been in an age of secular stagnation.<sup>6</sup> In the transition between the current framework and FFINT, we would see a large increase in employment, as the job opening guarantee provides employment to everyone in the labor force. This would tend to push up the growth in real output. Buoyant and stable demand conditions would encourage increased (and stable) investment rates, as well as the adoption of new technologies, increasing the growth rate permanently. For that reason, the nominal income target should be based on a moving average of the Real GDP growth in previous quarters, so that nominal income growth (and thus aggregate demand) can provide an environment where strong investment and rapid productivity growth drive living standards higher.

Naturally, this proposal would be a fairly radical change from current operating policy in the United States. Fiscal policy is limited by the pervasive belief that public spending must be limited. While there are certainly other reasons cited, public debt concerns loom large. Even for those that unnecessarily concerns themselves with the public debt, this program would fully address these concerns, as any level of public debt would be sustainable. Moreover, there are serious limitations to monetary policy under the current framework, given interest rates at the zero-lower bound. It is unclear that a nominal GDP target can be hit given current circumstances. Indeed, all QE programs have occurred during recession or during weak recoveries where nominal GDP growth is much slower than it had previously been. However, while these low interest rates limit the scope of monetary policy, they permit an easier transition to a 0% interest rate framework for all federal debt. This functional finance approach to nominal GDP targeting is always able to hit any nominal income target quickly and effectively.

As an additional benefit, recessions would be a thing of the past, as this functional finance program would automatically and quickly offset any business cycle fluctuations. Indeed, one could

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<sup>6</sup> This idea, pioneered by Hansen (1939) and Steindl (1976) had been revived (and later seemingly abandoned) by Summers (Summer 2016, Backhouse and Boianovsky 2019).

see this program as a supercharged version of the proposal by Sahm to automatically distribute checks to households. Sahm would use her eponymous rule to identify a recession based on increases in the unemployment rate previous months, which is a reliable indicator of a recession (Sahm 2019). However, unemployment is a lagging indicator, and in the 2020 COVID recession, unemployment spiked rapidly and reached double digits before the Sahm Rule was triggered. With this proposal, additional transfers would occur automatically, even before a recession is announced. As soon as nominal economic growth slows, additional checks would be mailed out to completely stabilize the path of nominal income and avoid any significant downturn.

We have seen from the 2021 American Rescue Plan that poverty was vastly reduced by direct financial transfers, and these transfers can and should be expanded to eliminate poverty in the United States (Wheaton et al. 2021). Expanding transfer payments to ensure all households are above the poverty line will increase the growth rate of national income, and so will require an increase in taxation to offset the increased outlays by the government. However, even taxes like a value-added tax that would be regressive on their own become automatically progressive on net as they will provide for larger lump-sum transfers to households, though more progressive taxes also can work well, and would further reduce inequality.

#### IV. CARBON TAXES

FFNIT provides some additional benefits for green policies which are not investment based. It also automatically provides a green dividend for any carbon tax. As the federal government removes income through the carbon taxes, this would put nominal income growth below the target, which would then automatically induce additional transfers to households in lump sum. While lower income groups spend a larger share of their income on products like gasoline that use carbon, higher

income groups spend more on carbon-producing consumption in total dollar terms. This means that carbon taxes would be regressive on their own but can be progressive on net if the revenues are rebated in a lump sum to all households or individuals (Boyce 2018, Fremstad and Paul 2019). Obviously, this policy could be implemented under the current policy framework, but with FFNTI then a carbon dividend is automatic and guaranteed, and so it cannot be clawed back, or the revenue redirected to other uses like business subsidies. This will help provide political support for a carbon tax, as carbon taxes will now benefit help lower income groups on average, which is hardly guaranteed for carbon taxes passed today. For example, if a new carbon tax raises 1% of national income, with more of the tax falling on higher income groups, this would tend to reduce private nominal income by about 1%, and so this revenue would automatically redistribute 1% of national income equally to all, reducing inequality and ensuring that low-income groups are not burdened by higher prices on carbon.

## V. GREEN INVESTMENTS

It may seem that an interest rate of zero is not very different from a low interest rate, and indeed, interest rates have been low and have gotten lower over past decades, despite recent reversals. However, getting Treasury interest rates all the way to zero has a particular benefit for many green programs. Take electricity production based on renewable sources like solar or wind power. These involve very high fixed costs but have negligible operating costs after being constructed, as opposed to fossil fuel production which involves more expensive operating costs (Reguant 2019). If the fixed costs of construction can be financed costlessly due to the 0% interest rate policy, then green electricity is effectively free. The only cost would be the opportunity cost of

the human and natural resources devoted to this sector (if insufficient excess capacity or spare labor is available).

Naturally, there are issues with storage of green electricity to overcome the problem of intermittency. However, batteries have their own environmental costs, but we will likely see them being used if we are not willing to spend on the right investments at the national level. Notice, however, that battery storage similarly has very high fixed costs and negligible ongoing operating costs after construction, so this proposal provides for a way to finance electricity storage without any financial cost. Pumped hydro is another solution, which stores energy by pumping water to a higher elevation, so it can be used to generate electricity later (Rehman et al. 2015). Upgrades to distribution infrastructure for electricity also have high fixed costs and low operating costs (and can save on maintenance for gaining infrastructure) and so similarly can be undertaken without any financial cost. These require large investments at a national scale, something that is unlikely given our current fiscal policies based on sound finance. Moreover, nuclear power also has large, fixed costs for construction, though the operating costs are higher than for most renewables due to safety issues, but this would be another solution to the intermittency problem. The next section will outline an alternative proposal to deal with the intermittency issue.

Given the potential for effectively free electricity, not only does this proposal provide a way to produce carbon-free electricity, but a world of abundant and free electricity as compared to the costly system we have now based on dirty production methods for electricity. Unlike criticisms of environmental policies as reducing the standard of living of regular people due to restrictions on consumption on carbon or polluting products, this proposal would provide for veritable cornucopia of free, clean electricity, a major boost to American standards of living and productivity. This abundant electricity will both directly eliminate carbon production in producing electricity as well as

allowing electrification of other sectors that use fossil fuels like heating, automobiles, transportation, home appliances, cooking, and many more.

## VI. OVERBUILDING SOLAR AND CARBON CAPTURE

Naturally, many approaches to green investment are available, but let me propose one, based on Perez (2014). He proposes the overbuilding of solar to address the intermittency issue. Given low and declining costs of solar panel installation, solar can simply be overbuilt, and then turned off when not needed. A large construction project over the entire American southwest, rich in solar resources, would provide a reliable source of electricity. The geographic dispersion of solar generation over such a large geographic area would reduce the risk of excessive cloud cover over smaller areas and would also cover multiple time zones. This would require an extension network of transmission lines to bring to the rest of the country of course, but this is another fixed cost with a low operating cost. Even under assumptions of a sound finance program, Perez finds this is the lowest cost method to decarbonize the electrical network of the United States. Given 0% financing, this would provide a financially costless decarbonized electrical network in the United States. But given the excess surplus electricity during peak times that overbuilding implies provides an additional opportunity. Rather than turning off solar generation to avoid overburdening the system, we can use the surplus electricity to capture carbon dioxide from the air. Not only does this allow for the reduction of the amount of carbon in the atmosphere, but hydrocarbon fuels can be produced, which then can be substituted for new hydrocarbon production.

While electrical production can be decarbonized easily, decarbonizing air travel is much more difficult, with no current alternatives that avoid producing carbon. While future technological breakthroughs could allow electric jet engines, current technology already exists to capture carbon

dioxide to produce jet fuel and other petrochemicals like ethylene, propylene, and butenes (Yao et al. 2020). This permits the substitution of hydrocarbon production away from new mined sources that add carbon to the atmosphere, instead permitting the production of hydrocarbons by reducing atmospheric carbon. While current methods of carbon capture are too expensive, FFNIT provides for an abundant, free source of electricity. This would make carbon capture-based methods likely the lowest cost methods of hydrocarbon production, which would put the fossil fuel industry out of business.

As electrical production increases and hydrocarbon usage decreases as electrification proceeds, the government could provide a small bounty for carbon capture hydrocarbons, refilling the strip mines and oil fields with the hydrocarbons that had created the climate crisis in the first place. While electrification provides a way to reduce gross production of carbon to 0 at best, we will need some carbon capture technologies to be able to reduce carbon levels. In that way, we can one day reduce the additional carbon humanity has put into the atmosphere since the Industrial Revolution, returning the planet to normalcy and reversing some of the environmental damage resulting from human activity.

## VII. JOB OPENING GUARANTEE

The Green New Deal includes a guarantee of employment for everyone, similar to previous proposals for an Employer of Last Resort (ELR) or a Job Guarantee (JG).<sup>7</sup> There are many benefits to a job guarantee, with the main benefit being the elimination of the social scourge of

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<sup>7</sup> The literature on ELR and JG is vast. See Mitchell (1998), Murray and Forstater (2003), Sawyer (2003), Seccareccia (2004), Mitchell and Wray (2005), Sawyer (2005), Wray (2007), Kaboub (2009), Paul et al. (2018), Tcherneva (2018), Wray et al. (2018), and Tcherneva (2020), *inter alia*.

unemployment, which has meant misery for millions (Tcherneva 2013, 2019). A job guarantee could also serve as a macroeconomic stabilizer, by anchoring wages and providing a labor reserve for the private sector that would act countercyclically (Mitchell 2001, Fullwiler 2005, 2007). Here, a job guarantee would be particularly useful to ensure true full employment and put all the human resources of the United States to work to address the issues facing the nation, including climate change. The cost of the JG would already be low under current conditions, given a relatively low unemployment rate, but this proposal would make the financial cost zero (Tymoigne 2014). In designing a JG program, the details of implementation matter a great deal, to avoid the JG becoming a low-wage and/or make-work program (Tymoigne 2013). I would recommend a job opening guarantee (JOG) where the federal government would open so many vacancies that every worker would have many vacancies to apply for, no matter the state of the economy. Vacancies would be more plentiful in disadvantaged regions as well, helping to provide more employment in areas with poor job prospects. Some prime candidates for jobs with this additional public employment would be solar panel installation and retrofitting to reduce carbon emissions from buildings. While not directly essential for a Green New Deal program, this would help provide a transition for areas depending on producing carbon, such as coal mining regions of Appalachia and Wyoming (Murray 2012).

Naturally, there is only so much solar panel installation or retrofitting that can occur in these areas. However, providing a safety net for these regions will provide additional political support for a Green New Deal by ensuring that workers in carbon producing sectors are not hurt. The FFNIT program also provides for easy financing of other needed social safety nets, like free universal health care from a Medicare for all program that will ensure no one is left behind in the green transition. The job opening guarantee will also not distinguish between regular government employment and “guarantee” employment. This would remove any stigma effects from this kind of employment

program (which were real for WPA workers during the New Deal (Margo 1991)). Moreover, this would allow for the hiring of highly skilled workers and managers with higher salaries than a minimum wage. This program could also staff extensive R&D labs to invest in new green technologies, that could be shared at no cost with other nations to coordinate carbon reductions across the globe.

## VIII. CONCLUSION

This paper has proposed a novel operating framework to better implement a Green New Deal. This framework involves using functional finance to set a 0% interest rate on all federal Treasury debt and ending the payment of interest on reserves. This allows policy to focus on ensuring optimal public policy objectives without concern for the federal debt. In the context of a Green New Deal, the lack of any interest payments combined with the high fixed costs and low operating costs of many necessary green investments effectively makes these investments costless, as the debt needed to pay for them can be rolled over costlessly forever. I proposed a specific policy of overbuilding solar generation capacity, which can also provide for carbon capture to produce hydrocarbon fuels using carbon dioxide, providing the possibility to reduce carbon levels back to levels experienced prior to the Industrial Revolution.

This proposal also provides for an automatic carbon dividend, ensuring the net effect of any carbon taxes is progressive, and can even fund a universal basic income. As an ancillary benefit, the stabilization of the growth path of nominal income will end recessions through automatic income transfers to all households. This functional finance program will also provide for guaranteed employment vacancies to marshal all human resources toward decarbonization of the American economy, ending the social ill of unemployment. Automatic transfers to households would also be

set at a level to bring all households above the poverty line, eliminating poverty as well. This, combined with costless financing for essential social services like Medicare for All will provide a just transition for regions dependent on carbon production and other “brown” industries. The functional finance nominal income targeting program will provide for a means to finance a massive research and development program for new technologies that can be shared across the globe, extending the benefits of the American Green New Deal program to decarbonize the world.

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