Price Level and Inflation Dynamics in Heterogeneous Agent Economies

Based on BFI Working Paper 2023-92, "Price Level and Inflation Dynamics in Heterogeneous Agent Economies," by Greg Kaplan, University of Chicago, and Georgios Nikolakoudis, Princeton, and Giovanni L. Violante, Princeton University

This work offers new insights into the effects of persistent fiscal deficits on US inflation, revealing that targeted income redistribution during COVID increased short-term inflation significantly. The largest sustainable primary deficit is 4.6% of GDP, or 40% higher than current levels, dependent on how deficit spending is distributed.

To counter the negative economic effects of the COVID pandemic on the US economy, Congress enacted six COVID-19 relief laws in 2020 and 2021 totaling about $4.6 trillion.[1] That extraordinary infusion, along with continued deficit spending that will likely extend into the foreseeable future, has raised questions about the link between fiscal spending and inflation.

For economists and policymakers who depend on models to run approximations of economic activity, test hypotheses, and make predictions, such persistent deficit spending raises thorny theoretical challenges. Many prevailing economic models feature a representative agent (RA) economy, which means that there is only one decision-maker in the model that represents all agents of a certain type, whether consumer, business, banks, and so on. These models are difficult to apply when governments run persistent deficits – like the situation in the US today. The reason is that RA households have no reason to hold government debt if the government is not generating the surpluses that allow it to pay positive real interest on the debt.
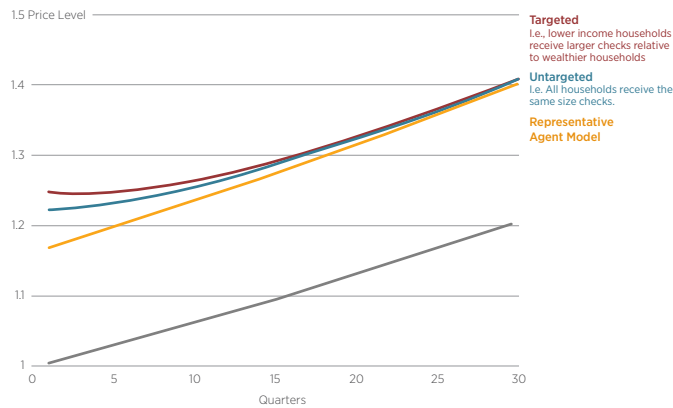
Heterogeneous agent (HA) models resolve this problem because households in these models continue to hold government debt even when real interest rates are negative; that is, households are willing to *pay* the government interest, which finances the deficit. Households engage in such saving behavior as a precaution—in times of persistent deficit spending, US government debt is still the safest port in a storm.

HA models are also useful because they can be used to examine cases in which deficits are delivered heterogeneously across households, as occurred

Figure 1 • US Primary Surpluses and Deficits

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[1] US Government Accountability Office (Feb. 28, 2023). "COVID-19 Relief: Funding and Spending as of Jan. 31, 2023," (GAO-23-106647), gao.gov/products/gao-23-106647#:~:text=Six%20COVID%2D19%20relief%20laws,for%20pandemic%20response%20and%20recovery.

Figure 2 • Fiscal Helicopter Drop

Note: This figure plots impulse responses to a targeted and untargeted helicopter drop, aggregated at the quarterly frequency, and reveals the short-run inflation effects of a fiscal helicopter drop. The helicopter drop is a one-time issuance of 16% of total government nominal debt, issued at t = 0. Only households in the bottom 60% of the wealth distribution receive the issuance in the targeted experiment (red line).

during COVID when the US government made transfer payments to households based on income levels. Such targeted efforts deliver heterogeneous effects.

In order to examine the role of redistribution in shaping inflation dynamics in a time of persistent deficits, this work develops a model with three features:

- a fiscal authority that issues nominal debt to finance real expenditures and transfers to households;

- a monetary authority that sets the short-term nominal interest rate on government debt; and

- heterogeneous agents and incomplete financial markets, so that households have a precautionary motive to save to self-insure against idiosyncratic income risk.

With their model in hand, the authors run a number of quantitative experiments that deliver several lessons for policy, including:

On the effects of permanently increasing deficits:
If the government permanently increases lump sum transfers to households without raising taxes, the largest sustainable primary deficit is 4.6% of GDP, or 40% higher than current levels. However, *how* the government distributes funds is key. The more redistribution there is in the tax and transfer system (for example, its degree of progressivity), the less scope there is for the government to increase deficits in the future. The reason is that more social insurance precludes the need to save, which lowers household demand for government debt. Therefore, more progressive tax systems reduce fiscal space.

On the effects of a fiscal helicopter drop: When governments increase the money supply, either by printing money or through a temporary expansion or tax cut without raising taxes to pay for it, economists refer to this as a "helicopter drop." Such drops can be targeted, that is, different households receive different amounts, or untargeted. The authors consider a helicopter drop of around 16% of annual GDP, roughly the size of the fiscal expansion in the United States over the course of the COVID-19 pandemic. When such an experiment is run with representative agent models, a 16% spike in inflation is generated. More money equals an equivalent rise in prices.

However, what happens in a heterogeneous agent world? The authors' heterogeneous model finds *an additional 30 percent increase* in short-run inflation than in an RA model. Why? When a low-income household receives a $1,000 check and then loses purchasing power due to inflation, they actually end up better off - the amount of wealth that is inflated away is small relative to the check they received. But a high-income household ends up worse off because they check is small relative to their lost wealth from inflation. The low-income household is therefore inclined to increase spending, while the high-income household is inclined to cut spending. But these two effects do not "zero out." In total, the increased spending among lower-income households would be larger than the decreased spending of wealthier households and, overall, prices would rise.

Now imagine a *targeted* helicopter drop, where lower-income households receive larger checks relative to wealthier households. In such a case, the higher marginal propensity to consume (MPC) among lower-income households is amplified because lower-income households receive even more funds than they would have with an untargeted drop.

On the effects of purely redistributive policy that hold both debts and deficits constant: In this world, budget neutral redistribution is also inflationary. The authors run numerical experiments in which the government levies a one-time wealth tax on households in the top percentiles of the wealth distribution, and redistributes the proceeds lump-sum to households in the bottom half of the wealth distribution. As noted above, real redistribution toward high MPC households places upward pressure on consumption, which leads to a jump in the price level. Further, and policymakers take note: If the central bank does not react accordingly, and if deficits become higher over time, then persistently higher inflation will likely follow.

The authors' methodology also allows for an exploration of other economic phenomena. For example, recent years have seen the rise of what many call "secular stagnation,"

which is a term used to describe the relatively moribund US economy (stagnation) over a long period (secular, as opposed to cyclical or short term). Characteristics of secular stagnation include a dearth of private investment, driven in part by IT efficiencies that decrease the need for capital investment. The kicker is that monetary policy is neutered in such a world; low interest rates, even those hovering at zero or that are effectively negative, are ineffective at generating economic activity. By showing how persistent deficits drive down real interest rates, this work offers a novel explanation for secular stagnation.

Bottom Line: At a policy forum sponsored by the European Central Bank in September 2021, Federal Reserve Chairman Jay Powell called the effects of supply-side constraints on inflation during COVID a "surprise," adding: "It's not that our inflation models are wrong, although they are certainly not perfect, but just the scope and persistence of the supply-side constraints were missed."[2]

Although Powell was not talking about the link between inflation and income redistribution via a progressive tax policy, which is the subject of this paper, his comment does make one highly relatable and salient point: Models matter, and when models miss their mark, policy can suffer. This work improves upon existing models to offer a new theoretical framework that better approximates economic activity in the real world, offering novel insights into the effects of persistent fiscal deficits on inflation.

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[2] Arnold, Martin and Colby Smith (Sept. 29, 2021), "Fed's Powell warns inflationary supply chain snags may persist," Financial Times, ft.com/content/90fc98ad-d69b-44c5-8902-b93c4f952805. See also, "ECB Forum on Central Banking 2021: Beyond the pandemic: the future of monetary policy," ecb.europa.eu/pub/conferences/html/20210928_ecb_forum_on_central_banking.en.html.

ABOUT OUR SCHOLAR ————

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