Model Behavior: A Critical Review of Macroeconomic Models for Guaranteed Income & the Child Tax Credit

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Executive Summary

Economic policy in the United States stands at a crossroads. For the first time in decades, Congress is considering several big investments in our future, from fighting climate change to upgrading our physical infrastructure, to supporting our children. New approaches like cash transfers without work requirements and strict means testing are part of the debate.

This report—the third in a series from the Jain Family Institute—discusses possible macroeconomic effects from guaranteed income policies like these cash transfers. We use the new Child Tax Credit as our case study. The $110 billion (0.5 percent of GDP) per year expansion to the program gives all but the highest income families $300 per month for each child under age 6 and $250 per month for each child ages 6 to 17.[1] Since it has no work requirement and does not have a strict means test, the credit is largely comparable to a guaranteed income program for kids. The proposed Child Tax Credit policy promises to dramatically reduce poverty, and this paper does not suggest changes to that policy design, but rather draws on the example as the most significant guaranteed income-like policy yet implemented at a national level.

Our contribution to debates over extending the new Child Tax Credit is to provide insights from cutting-edge macroeconomic research on the possible effects on the overall economy. What differentiates macroeconomic studies from microeconomic studies is the emphasis on the feedback loops—referred to as general equilibrium effects—from the program.[2] Moreover, because it takes time for the economy to reach its new equilibrium, these are the longer-run effects of guaranteed income and not what we might expect in the first few years.[3] The new credit is a notable change in the income-support for families, so it is important to consider how its effects might ripple through the economy.

The choices that the parents who receive the Child Tax Credit make with respect to working, spending, and saving would likely set off a chain of feedback loops that affects others who do not receive the credit. Wages, prices, and interest rates could change, as

[1] See the piece by Elaine Maag and Nikhita Airi (2021) at the Urban-Brookings Tax Policy Institute for details of how the new Child Tax Credit compares with the prior credit.

[2] For more background on macroeconomic modeling, including what distinguishes general equilibrium models from other analysis tools, see: https://phenomenalworld.org/analysis/universal-basic-income-the-city

[3] In addition, the macroeconomic models in this report do not provide any insights on how the introduction of guaranteed income might affect inflation initially. These models focus on the longer-run effects, and the wages and interest rates in the model are adjusted for inflation.

well as business investment, employment, and GDP.[4] Macroeconomic models are simply a tool to add up the effects of the many individual decisions kicked off by the new program and express them in aggregate statistics. Adding up the decisions of hundreds of millions of Americans is a complex task. It should come as no surprise that macroeconomists often come to different conclusions about how a guaranteed income program would alter the U.S. economy.

To unpack the potential effects and understand the disagreements, we discuss six research studies that are representative of different types of macroeconomic models used to study guaranteed income and apply them to the new Child Tax Credit.[5] Taken together, the studies do not offer a clear picture of how the tax credit—or any guaranteed income programs—would otherwise affect the economy.[6] Two of the six studies predict that guaranteed income would, under some specific program details, boost economic growth. The other four studies are less optimistic about the macroeconomic effects.

The degree of abstraction and the number of assumptions that are required in the models mean that we should not lean too heavily on their predictions. Empirical, microeconomic studies of actual guaranteed income programs such as state-wide cash-transfer programs like the Alaska Permanent Fund (Jones and Marinescu, 2020) and small-scale pilots like those on Eastern Cherokee reservations in North Carolina (Akee et al, 2013) and Stockton, California (West et al., 2021) are likely more informative. That said, these empirical, microeconomic studies explore the localized effects of cash-transfer programs; without a prior national program, it is hard to reliably infer the macroeconomic effects. The goal of this report is to fill that gap.

Macroeconomic models are useful for broadening the debate and may highlight unintended consequences or factors attenuating positive effects that could be addressed

[4] As one example, if a parent uses their credit to pay for childcare and takes a new job, the childcare center then makes more money and hires more staff. The new employees spend more at the store, and so on. Over time, total employment and GDP would increase. The effects could work in reverse if a working parent decides instead to stay home.

[5] The six papers are Diego Daruich and Raquel Fernández (2021); Martin Lopez-Daneri (2016); Andre Luduvice (2021); Nana Mukbaniani (2020); Michalis Nikiforos, Marshall Steinbaum, and Gennaro Zezza (2017); and Penn-Wharton Budget Model (2018). The studies cover a range of financing schemes and other concurrent changes to existing safety net programs. We selected one scenario from each to illustrate the differences. See the appendix for all the scenarios in each paper.

[6] None of the studies examine a guaranteed program of the same size, in terms of total dollars of the program, as the new Child Tax Credit, so we scale the estimates from their scenarios in order to match the total cost. We also selected scenarios from each paper that use different financing assumptions. See the appendix for all the scenarios.

with other policies. That is, even with so much disagreement, these macroeconomic studies can help inform the current policy debates. Opening up the 'black box' of these complex models and comparing them across the six studies highlights key mechanisms behind possible macroeconomic effects.

We explore four mechanisms:

- The key (and most disputed) factor for the macroeconomic effects is the extent to which parents who receive the credit would change how much they work. Those decisions—which would be affected by the size of the transfer, as well as any work requirements or means testing—are the starting point for the feedback loops.

- If take-home pay changes more broadly due to feedback effects or program financing options like higher taxes, it could affect how much people (not only recipients) work, and with it aggregate output and income.

- Likewise, changes in private savings or interest rates, due to the decisions of recipients, feedback effects, or program financing like deficit spending, could change how much businesses invest, which would affect the productive capacity of the economy.

- Finally, if take-home pay, which is one of the returns to education, changes, it could affect how much parents invest in their children's education or adults invest in their own education and training.

The details of the Child Tax Credit, including who is eligible, the phase in and phase out by income, how much the tax credit is, and how it is financed have implications for the longer-term effects of the program. Our goal is to draw attention to the potential feedback loops, though the direct effects on families with children are paramount in current policy debate. More broadly, discussions around guaranteed income programs would benefit from a macroeconomic lens.

The next section discusses behavioral responses to guaranteed income in the context of macroeconomic models. In the following section, we report the estimates of the effects of guaranteed income on aggregates like labor supply, business investment, and GDP. The conclusion offers suggestions for further study.

Individual Behaviors That Might Change

To understand the disagreements between the models on the macroeconomic effects, it is useful to start with the choices that people and businesses face when a guaranteed income program begins. The starting point for any discussion about how behavior might change should be the empirical evidence on how people respond to cash transfers and other income support programs. While the details of the guaranteed income program matter—such as who gets it, how much, and how often—it's people's reactions and the feedback loops from changes in behavior that determine the long-run macroeconomic effects. The United States has never had a national guaranteed income program, so it's impossible to say exactly what that would look like. Pilot studies and state-wide programs like the Alaska Permanent Fund can aid macroeconomists in creating their models, but the size, direction, and importance of those changes are hotly disputed. In this section, we discuss four main behaviors that guaranteed income could affect and how changes would feed through the economy.

Would people change how much they work?

The most common concern about guaranteed income is that it will lead people to work less and therefore decrease economic activity. In macroeconomic models, fewer aggregate hours in paid work, whether due to workers reducing their hours or leaving the labor force, reduces long-run GDP and overall income.

Level of work is a key determinant of the macroeconomic effects of guaranteed income, an issue that must be addressed with any income support program. In economic models, people face two choices: whether to work at all, referred to as the "extensive margin," and if so, how many hours to work, the "intensive margin." Specifically, individuals in the models must repeatedly decide, "Do I work one more hour for pay or not?" When the marginal benefit of the next hour (their hourly wage) exceeds the marginal cost (the enjoyment from not working), they work; if not, they stop. The modeling setup is an abstraction, since most workers in the real world do not exercise that much control over their exact number of hours. Still, the question captures a central tradeoff.

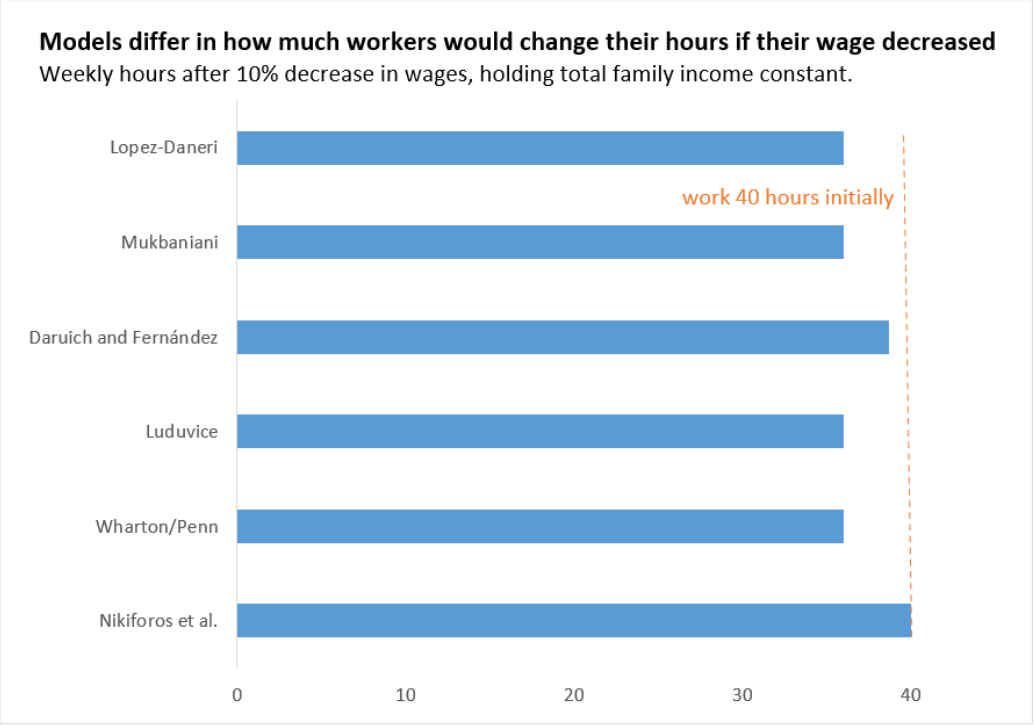
The next question follows: How do people feel about the costs and benefits of working? Would guaranteed income change how much they work? The incomes of those who receive the transfers would increase initially, fulfilling the purpose of the program. However, if a family could manage their expenses with their current income, they might decide to work less and have more free time. For example, a single mom working two shifts to pay the bills might cut back on her hours to spend more time at home.

Most economic models assume that, at least to some extent, people who receive more income would choose to work at least somewhat less and "consume more leisure." This response to extra income is referred to as an "income effect." In fact, Thorsten Veblen, an economist in the 19th century, famously predicted that as income rose the usual work week would fall dramatically. Hours worked per week are lower than the 19th century, but they have not fallen dramatically despite a substantial increase in income. It's clear, especially among high-income earners, that how much we work is determined by social norms, not just paychecks. But such considerations are uncommon in macroeconomic models, so they only incorporate assumptions about "income effects."

The models examined here vary in their assumptions of the income effect's size. For example, the Penn-Wharton models assume a large income effect based on their reading of the empirical study by Jones and Marinescu (2020) on the Alaska Permanent Fund. As with most empirical studies, the paper includes a range of findings on hours worked ("intensive margin") and whether to work or not ("extensive margin"). The Penn-Wharton model uses the largest estimate from the Alaska Fund study on income effects in their macroeconomic model, even though the authors of the Alaska study summarize their findings as having "no effect on employment, and only a modest increase in part-time work." The fact that the macroeconomists using the Penn-Wharton model draw different inferences than Jones and Marinescu shows how contentious the potential employment effects are. Other papers, like Nikiforos, Steinbaum, and Zezza (2017) assume a much smaller income effect, more in line with Jones and Marinescu's interpretation of their findings. Such disagreements about what empirical studies show and what assumptions, in turn, should be included in the models are key drivers of the differences in predicted macroeconomic changes.

Hours might also change if an increase in income or payroll taxes is used to pay for the guaranteed income, thus lowering after-tax wage rates. Depending on how sensitive workers are to changes in their wage rate—holding their total family income constant—they might choose to work fewer hours. Working is onerous, so if people are paid less, they may choose instead to spend that hour relaxing, choosing more leisure and

less work. That change is referred to as the "substitution effect." In this scenario, taxes would increase and the take-home wage rate would decrease for all workers, so the change is not limited to workers who receive the guaranteed income. The assumption about how large the reaction to wage changes would be is captured in models with the "Frisch labor supply elasticity." As an example of the effect, suppose a worker had been working 40 hours per week at $25 per hour—roughly the average hourly wage for production and nonsupervisory workers—and then their after-tax hourly wage is cut by 10 percent to $22.50. The cut could be due a tax increase, the removal of work requirements, or stringent means testing that excludes them from part of the benefit. Holding the worker's family income from any sources constant, the researchers here make a wide range of assumptions about the response. At one end, they assume that workers keep working 40 hours per week (Frisch elasticity of 0). At the other end, workers cut their hours to 36 per week (Frisch elasticity of 1).



Source: Assumption about how workers react to a change in their wages from each research study. Note: Initial hours are 40 and the decrease in the hourly wage rate is 10 percent, so new hours depends on Frisch labor supply elasticity, which holds income constant. The change is referred to as the "substitution effect."

The differing assumptions determine the expected changes in the macroeconomy due to guaranteed income, which potentially affects all workers and not just those whose families receive the transfer income. Note that the studies that assume large income or

substitution effects are the same ones above that show large declines in GDP. Evidence from empirical macroeconomic studies often finds that the elasticity is close to one, while microeconomic studies find elasticities closer to zero. Assuming one versus zero has profound implications for predicted macroeconomic effects.[7] Of course, equilibrium employment is determined by the interplay of supply and demand. In response to a decrease in labor supply, employers may raise wages or other non-wage benefits that are outside of these models to keep some of those workers .

Many models, moreover, assume that less work leads to lower GDP, but this path does not encompass all the ways that working less may affect the economy. For example, parents who spend more time with their children,[8] young adults who obtain higher training, and older adults who care for their health might become more productive workers and produce more output despite working fewer hours. In contrast, some view the "culture of work" as necessary for a well-functioning US economy and worry that those who work less would use their time unproductively and diminish their career prospects. The debates about guaranteed income echo those around other income support programs, such as unemployment insurance, Earning Income Tax Credit, and Temporary Aid for Needy Families. While important, these additional considerations of other income support debates are beyond the scope of this report. The behavioral scope and assumptions about work in the macroeconomic models serve as a useful starting point.

Would families change how much they save?

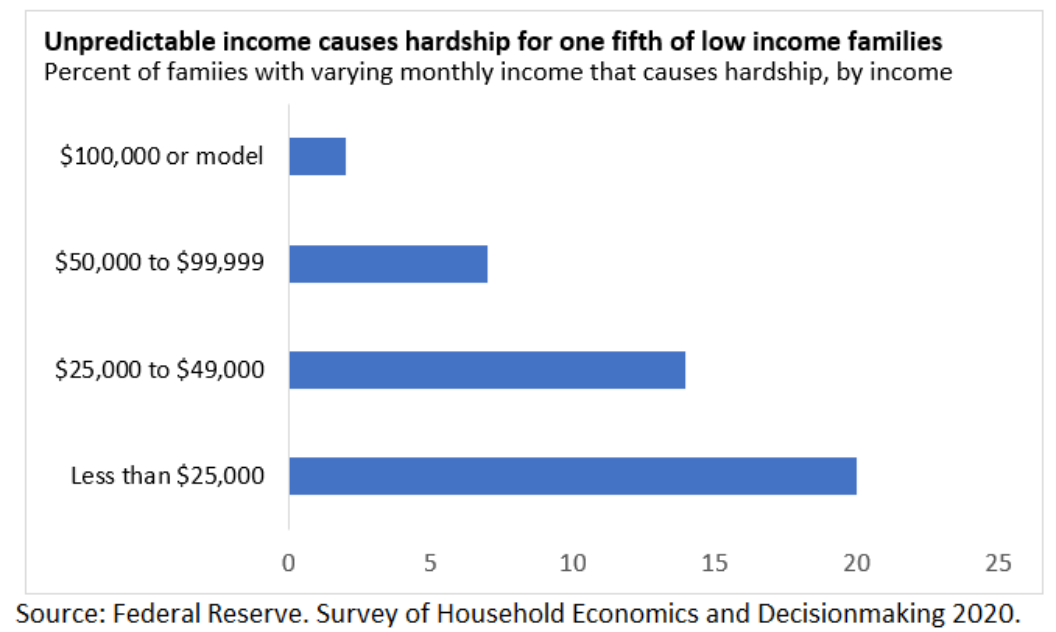
A key purpose of guaranteed income is to provide families with a predictable source of income which would allow them to handle unexpected expenses or income losses. Borrowing is not always an option, even when families are likely to earn more income in the future. This is referred to as an "incomplete market." Since banks will not help people

[7] Another recent example in which this Frisch labor elasticity plays a pivotal role is the study by Kevin Corinth, Bruce Meyer, Matthew Stadnicki, Derek Wu (2021). In a simulation, which uses an elasticity of one, they argue that the lack of a work requirement in the new Child Tax Credit would induce 1.5 million parents to leave work. Moreover, they estimate the credit would not reduce deep poverty. If they used an elasticity close to zero, the reduction in poverty would be close to the direct effects of the extra income, reducing child poverty by 34 percent and deep child poverty by 39 percent. The policy implications are dramatic for a highly contentious behavioral assumption.

[8] If parents who receive guaranteed income are able to spend more quality time with their children is one way the program might increase the education of those children and their subsequent labor market outcomes. In fact, that is one of the channels in the Daruich and Fernández (2021).

insure themselves against bad economic surprises, it leaves a role for the government to help.[9]

Unpredictable income is a real hardship for millions of families. The problem is especially acute among lower-income families, affecting one-fifth of those with less than $25,000 in annual income. The current Child Tax Credit would add $3,600 per child to annual income, a meaningful sum for families living in poverty.



Source: Federal Reserve. Survey of Household Economics and Decisionmaking 2020.

Variable work schedules with unpredictable weekly hours that workers do not control are one important source of unexpected changes in income (Williams et al., 2018). Guaranteed income would set a floor on the income that families receive each month and help them pay regular bills like rent or child care even when their income declines temporarily.

Despite the benefits, the extra income security could mean that families have less of an incentive to save. With the government as a backstop, they may not need as big of a rainy day fund, and thus, the safety net from guaranteed income could have adverse effects on macroeconomic growth.

[9] For more on the implications of incomplete markets for the safety net and its composition see our second entry in this series, "Reweaving the Safety Net: The Best Fit for Guaranteed Income."

But this prediction rests on the assumption that families have savings to reduce. In reality, millions of families live paycheck to paycheck. Marginalized groups often have the thinnest financial buffers. The median wealth among Black families is only $24,000 or about one-eighth that of White families (Bhutta et al., 2020a). During the Covid-19 crisis, we learned that income support from the government can substantially increase financial stability and close racial gaps. Specifically, Bhutta et al, (2020b) found that the relief in the CARES Act could cover six months of basic expenses for nearly all families across race and ethnicity.

Would businesses change how much they invest?

A guaranteed income can indirectly affect business investment, and with it, overall GDP. First, a guaranteed income program, regardless of how it is financed, increases government spending. However, that increase in spending, which is part of GDP, might lead to a change to investment. A voluminous literature in macroeconomics offers a wide range of answers to the question: Does an increase in government spending increase GDP over time at least one for one or is it offset by reductions in private spending and investment? Conditions in the economy appear to affect the answer, as argued by Auberbach and Gorodnichenko (2012). They find that an increase in government transfers increases GDP even more than the amount of the transfers during recessions. But during expansions, private investment offsets some, maybe even almost all, of any extra transfers. Most models in this paper assume that the economy is operating at its full potential, so “crowding out” occurs. In contrast, the Nikiforos (2017) assumes that the economy is operating below its potential before guaranteed income, so there is no crowding out. In fact, the guaranteed income increases GDP more than one for one.

If guaranteed income is financed with federal government deficits then a second channel exists to affect investment. More borrowing by the government could lead to higher interest rates for the US Treasuries that would then raise interest rates on most bank loans to increase. Finally, most economic models assume that businesses would invest less when their borrowing costs rise. But it’s debatable how important interest rates, which have been falling for decades despite rising federal debt, are to investment. For example, Abel and Eberly (2011) argue that cash flow (including expected sales revenues) and not financing costs primarily determine business investment. Guaranteed income would likely increase consumer spending, which would improve potential sales and encourage more investment. The positive effects of greater potential cash flow could be an offset to the negative effects of higher interest rates.

What happens to investment is important to long-run growth. A change in investment in one year has persistent effects on output in the future. Investments today help us produce more today and business investments like in new machinery and buildings help us produce more output in the future too. Investment makes workers more productive. Investments in research and development could raise productivity of both labor and capital. Higher productivity is a key ingredient to long-run growth. The extent to which guaranteed income indirectly changes investment is important to the macroeconomic effects.

Would people change how much education they obtain?

Many supporters of guaranteed income argue that the additional money would allow parents to invest more time and money into their children's education and increase the fraction of adults with postsecondary training and degrees. If that were the case, more education would benefit the individual and their family, due to benefits from higher wages, better health, and greater financial security. It would also benefit the overall economy via higher productivity of workers. In the past, periods when educational attainment increased, such as after World War II with the GI Bill, were also times of fast economic growth. Gains in education among historically marginalized groups could be a substantial boost to macroeconomic growth.

Even so, the few existing microeconomic studies of how cash transfers affect children's education are mixed. Lerner (2019) found that the cash transfers from the Alaska Permanent Fund had no discernible effect on high school completion rates. He did not examine post-secondary education where the financial costs may be more of a barrier than high school. In contrast, Bastian and Michelmore (2018) found that the income support from the Earned Income Tax Credit has improved education outcomes.

Two of the macroeconomic models in this report shed light on what might be driving the divergent results. Both start with the (strong) assumption that people only obtain education or training because it leads to higher wages. If guaranteed income reduces the benefits of working, either because the after-tax wage falls or because the cash transfers make labor income less necessary for financial security, then it could also reduce the benefits of education. Likewise, an increase in wages and other incentives to work would lead to more education.

There are several ways to model choices about education. Daruich and Fernández (2021) assume that parents invest in their children's education, and more educated parents tend to have more educated children. Prior research on the intergenerational transmission of income, as summarized by Solon (1997), has largely found that higher income of fathers is associated with higher lifetime earnings of their sons. The connection across generations creates a powerful feedback loop which would, over time, reinforce any initial changes in education that guaranteed income might cause. Increased skills and education raises a person's productivity at work, their potential wage, and their income security. In this model, any change in the benefits of working changes educational attainment, the effects of which ripple through the macroeconomy over time.

Luduvice (2019) explores a different mechanism for building skills via on-the-job training. In his model, more training leads to more productivity and thus to higher wages, but an individual must work to gain skills. So once again, the incentive to work is a key channel to developing one's human capital, that is, one's skills and education. His focus on training and not higher education is useful, since advocates of guaranteed income often focus on individuals who currently do not have the financial resources to obtain skills beyond a high school education. Even with the monthly transfers, attending college may not be the most cost effective route to more human capital.

Both of the macroeconomic studies abstract from the non-wage benefits of increased education, such as better health outcomes, access to good neighborhoods, and greater social standing. These additional channels outside of the macroeconomic models could encourage people to gain education even if the wage-benefits decrease some. Moreover, children from marginalized groups are more likely to lack these non-wage benefits. Fixing that inequity could move the economy closer to its full potential output. Non-wage benefits of education could be large enough to overcome the negative incentives to pursue education resulting from lower wage benefits associated with guaranteed income. Regardless of the reason, if education increases, higher worker productivity should also boost long-run growth.

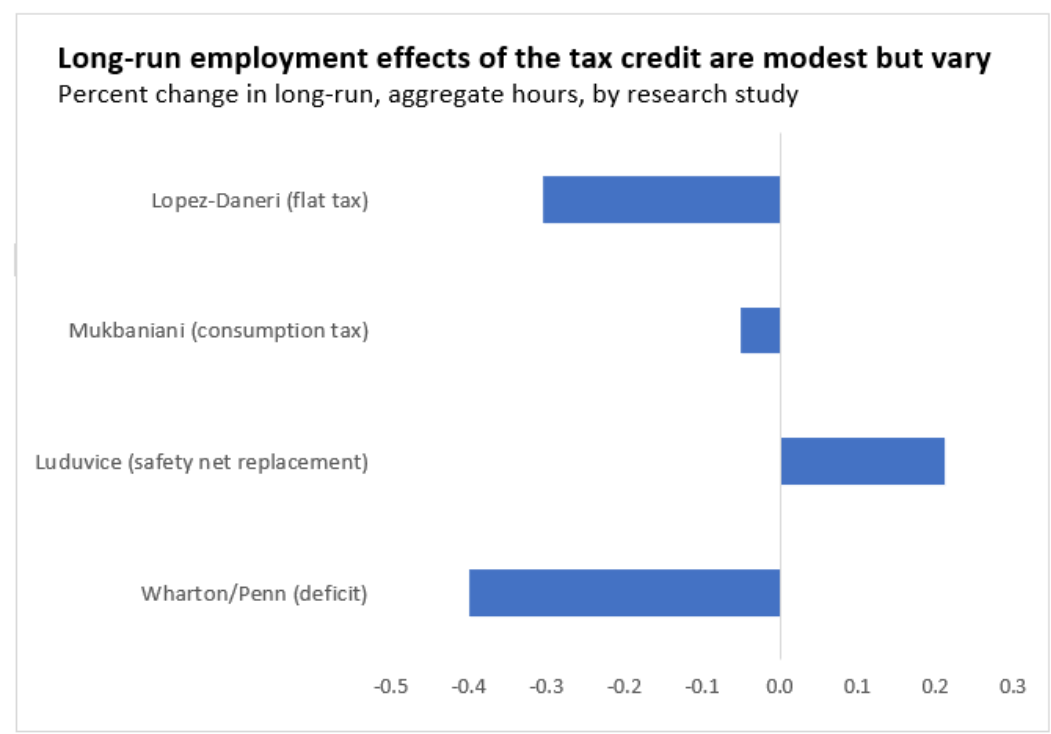
Macroeconomic Effects

The studies we review offer substantially different predictions for the long-run macroeconomic effects of guaranteed income. The underlying behavioral assumptions, discussed in the previous section, are generally more important than the modeling techniques. We use the new $110 billion annual Child Tax Credit expansion as the scenario to compare results across the six studies. To do so, we must scale the estimates across the studies. More commonly, the authors use their models to simulate larger programs like $500 or $1,000 per month to all adults. Therefore, the results in this section are our approximations and not the authors'.

Another complication is that the researchers do not report the same set of macroeconomic outcomes—the level of GDP is the only common outcome across all papers. The financing schemes vary across deficit spending and consumption, income and corporate taxes, and income taxes alone. Finally, each paper simulates several scenarios, so we choose a representative set in this section to show the different predictions from the macroeconomic models. Our goal is to provide an overview of the effects, focusing on the direction and relative magnitudes of the effects, not the exact numbers. See the appendix for the exact scenarios and estimates in the papers.

Hours of Paid Work and Labor Supply

The overall amount of labor supplied, in terms of aggregate hours worked, is a key input to overall economic activity. We see considerable disagreement across the papers which report long-run changes in hours from a guaranteed income program the size—about 0.5 percent of GDP annually—of the current Child Tax Credit expansion.



Source: Estimates from each research study. Note: To make the estimates comparable across the studies, report's author scaled their estimates for different guaranteed income scenarios to an annual budget cost of new Child Tax Credit, which is $110 billion or 1/2 percent of annual GDP.

In these scenarios, three of the four models predict a decline in aggregate hours between 0.05 percent and 0.4 percent. The reduction is due to fewer people working and fewer hours among those working. Note, the highest estimate is large relative to the size of the program (0.5 percent of GDP). Larger programs like a $1,000 per month per adult (at a cost 17 percent of GDP) guaranteed income would lead to even larger reductions in hours, ranging from 2 to 14 percent.

The reductions in hours occur in these models regardless of whether the program is financed by higher deficits, as in the Wharton-Penn model, or by higher taxes, as in the Lopez-Daneri and Mulbaniani models. Not surprisingly the magnitude of the decline in hours correlates closely with the assumption about how responsive labor is to changes in the after-tax wage rate, as captured in the Frisch labor supply elasticity. Again, the central role of this parameter—for which no consensus exists on its value—is not unique to guaranteed income programs. It is pivotal in the results from macroeconomic studies on a wide range of income support programs.

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In contrast to the above studies, Luduvice predicts an increase in aggregate hours of 0.2 percent when the new program is financed by replacing current means-tested programs, because the work disincentives from means-tested programs are larger than from guaranteed income programs. After-tax wages increase with the change in the income support programs, and Luduvice assumes that workers are highly sensitive to wage changes (with a Frisch elasticity of 1). The increase in aggregate hours here shows that the substitution effect can be positive from guaranteed income. In another scenario, he considers a guaranteed income program that is financed by higher taxes (and leaves the means-tested programs in place) and predicts a decline in hours of 0.3 percent.

The two remaining papers which do not report aggregate hours show mixed results. Nikiforos et al. is the only study that uniformly predicts an increase in work from a guaranteed income program, reported as the employment to population ratio. The increase occurs regardless of whether the program is financed with deficit spending or an increase in taxes. The model is fundamentally different from the others in this report, particularly in its assumption that the economy is operating at all times below its potential. The additional income from the guaranteed income program helps stimulate demand for workers.

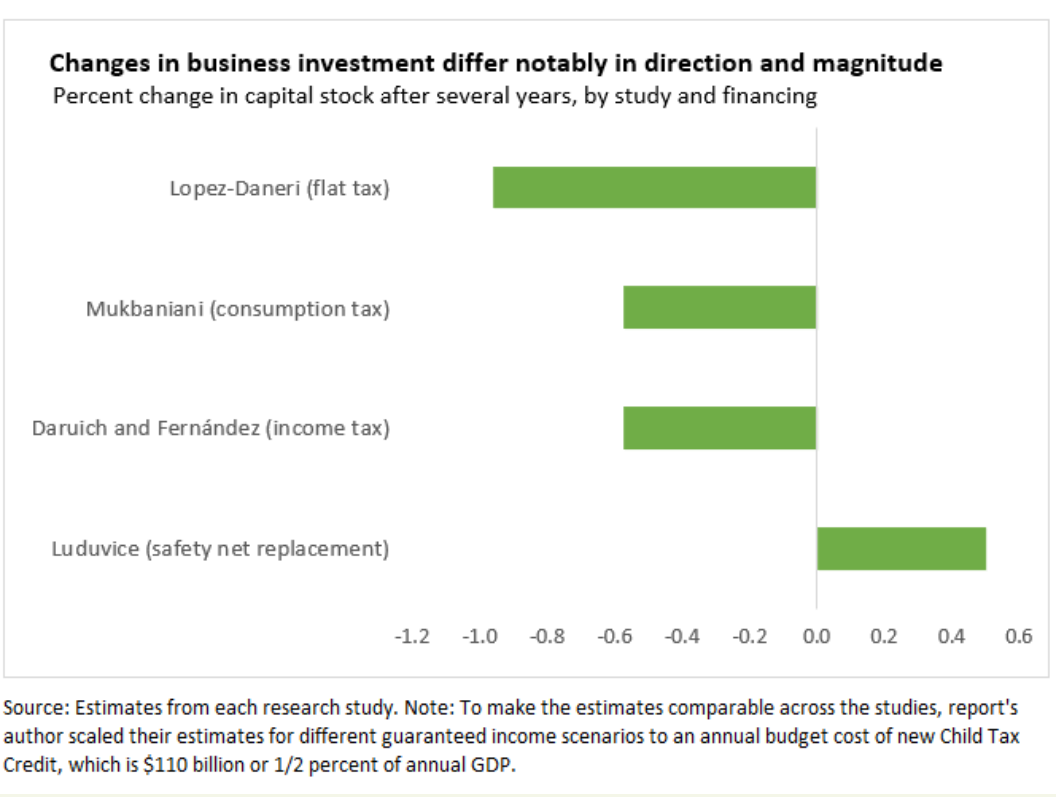
Finally, Daruich and Fernández report the long-run change in hours separately for the college- and non-college educated. The hours of people with a college degree would decline less than 0.1 percent and for those without a college degree 0.2 percent. The disincentive to work stems from both the income effect of the extra income and the increase in after-tax wages which affects all workers regardless of education. Moreover, the return to work is lower among non-college educated workers, so they reduce their hours somewhat more.

The main takeaway from most of the models is that people would work less under a guaranteed income program, which reduces output in the economy. However, work is onerous—less work on its own boosts well-being. Whether overall well-being increases depends on the net effect of the changes in all the macroeconomic outcomes.

Business Investment and the Physical Capital Stock

Physical capital stock, such as machinery and buildings, is a key input to the production of GDP, along with hours worked and productivity. Capital increases when businesses invest and savings (income that is not spent) finance investment. Guaranteed income reduces the

incentive to save and so, on its own, would reduce investment and the capital stock. In addition, in models where people work less, they also have less income from which to save. Recall that these models do not incorporate investment driven by anticipated growth in demand as described in Abel and Eberly (2011).



Source: Estimates from each research study. Note: To make the estimates comparable across the studies, report's author scaled their estimates for different guaranteed income scenarios to an annual budget cost of new Child Tax Credit, which is $110 billion or 1/2 percent of annual GDP.

In these scenarios, three of the four models predict a decline in aggregate hours between 0.6 percent and 1 percent. These are large percent declines considering that the Child Tax Credit is 0.5 percent of GDP. Moreover the declines in capital are larger than the declines in aggregate hours worked. Luduvice's scenario, which replaces the current means-tested programs with guaranteed income, is the only one that shows an increase in the capital stock. Means-tested programs create a strong disincentive to save, since benefits end if families accumulate a certain level of savings, which in existing programs is a fairly low amount. Even though guaranteed income creates some disincentive to save, that negative effect on savings is outweighed by the positive effect of ending means testing.

While the Wharton study does not report the *level* of the capital stock, it does estimate the change in capital *services*, which is the contribution of capital to production in each period.

They find that capital services would decrease whether financed by deficit spending, payroll taxes, or an external source of financing. Unlike the other models, the Nikiforos et al. model does not have a production function for GDP, so it does not estimate an effect on the capital stock.

Labor Productivity via Education and Skills

Another important input to GDP is labor productivity—how much output, on average, a worker can produce per hour. Productivity can depend on education and skills. Two of the studies—Daruich and Fernández and Luduvice—investigate how guaranteed income might affect education and training, and thus productivity. A higher level of productivity would lead to more output and could potentially overcome the negative effects of less work and investment. However, in the scenarios considered here, guaranteed income reduces educational attainment and skills, leading to a less productive labor force. The models assume that the only reason that people attain education and training is to earn higher wages. But a guaranteed income program reduces after-tax wages and thus reduces the rewards from education. As a result, the overall level of education declines.

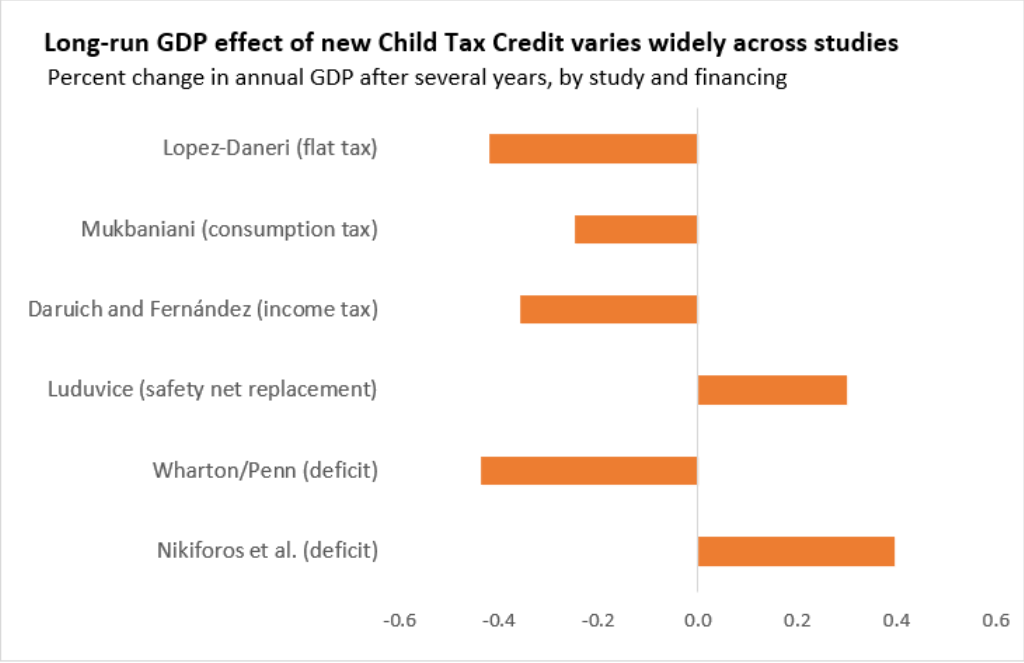
In Luduvice's study, people start work with varying degrees of skills. This is the model's only assumption about how people differ, but it could be consistent with the differences in level and quality of education among people before seeking work. After that, people primarily gain skills through on-the-job training. If someone does not work, they do not gain further skills. While aggregate hours increase somewhat when guaranteed income replaces means-tested programs, fewer people decide to work due to the extra income. Workers who were already more productive, such as those born with more skills, are more likely to stop working than less productive workers. With fewer people gaining skills on the job and more productive workers dropping out, overall labor productivity falls.

Daruich and Fernandez's model predicts an even larger decline in education and the productivity of labor. Guaranteed income gives people more income security and reduces the need to earn higher wages. A college education is the main path to higher earnings, so fewer people choose to attend college. Likewise, parents invest less time and resources into increasing their children's skills. Finally, there is a feedback loop across generations: parents obtain less education due to disincentives from the guaranteed income program and then pass fewer skills onto their children at birth. Over the long-run, the reduction in education from this intergenerational feedback loop is sizable.

GDP

The changes in labor, capital, and (in some cases) productivity come together to produce predictions about the guaranteed income's effects on long-run GDP. Since most of the studies found reductions in labor and capital, they also predict lower GDP. In the two studies where labor and capital increase, GDP increases as well. The effect on productivity is mixed. In the Luduvice study, GDP still increases even though labor is less productive. In the Daruich and Fernandez study, the reduction in education amplifies the effect of reduced hours on GDP.

GDP is a way to summarize the effect of possible changes in employment and investment on overall economic activity. Unsurprisingly, given the divergent predictions of its inputs, the predictions of GDP differ substantially. Two of the studies predict an increase in GDP by 0.3 percent to 0.4 percent. In contrast, the other four predict a decrease by -0.2 to -0.4 percent.[10]



Source: Estimates from each research study. Note: To make the estimates comparable across the studies, report's author scaled their estimates for different guaranteed income scenarios to an annual budget cost of new Child Tax Credit, which is $110 billion or 0.5 percent of annual GDP.

[10]The six papers all examine other scenarios often with different financing schemes and other program features. The exact predictions vary, but the disagreement across studies remains.

Plus or minus one-half percentage point may not sound like much, but any change in GDP year after year would add up over time. In addition, the Child Tax Credit's cost of roughly 0.5 percent of GDP is small relative to other guaranteed income proposals.[11]

Conclusion

The goal of our report is to empower policymakers and analysts with information they need to critically evaluate the existing research, as well as draw attention to potential feedback effects that might not be obvious, given what we know from empirical research on the short-run effects. While the studies in this report are inconclusive on the direction and magnitude of the long-run macroeconomic effects of guaranteed income programs, they allow us to trace how cases vary in their effects on economic activity. The existing research is a starting point and is far from definitive.

We see room for several new studies. First, it would be extremely useful for research teams to explicitly test varying behavioral assumptions in their models. For example, it is clear that the sensitivity of hours worked to changes in wages is a crucial parameter. But none of the papers studied here present results for differing labor supply elasticities. Second, more research could investigate how guaranteed income, particularly for children, would affect education and training. Intergenerational linkages are complex, and the two papers that model human capital development use very different pathways. It would be best to anchor the approach in empirical studies of cash transfers and education. Finally, more research is needed on the distributional effects of guaranteed income. Aggregate GDP is a poor way to assess the long-run economic costs and benefits. In the past decade, macroeconomic models have increasingly examined heterogeneity across people. These models allow us to understand the differential effects of programs for low- versus high-income families, for example, and how distributional differences feed into aggregate outcomes.

It is difficult to find the correct balance between the need for new policies and the need for new research to inform them. Research is never definitive, and the differing assumptions in the models we review stem from decades of careful empirical and theoretical studies. The current state of the research on long-run effects of guaranteed income is not as well developed, but it is grounded in a voluminous literature on the economic effects of income

[11] For example, $1,000 per month to all adults would cost around 15 percent of GDP and are likely, as a result, to have considerably larger effects on the economy—between a 15 percent lower and 15 percent higher GDP.

support programs. Policymakers cannot wait on economists to come to a consensus. That said, policy deliberations about guaranteed income programs would benefit from more research. Congress has already enacted and may soon extend the new Child Tax Credit, which is essentially a UBI for kids. It might seem that policy is 'running ahead' of research, particularly around considerations of macroeconomic effects, but evidence does exist, and more studies on the actual programs could inform changes to the Child Tax Credit in the future.

The Child Tax Credit with regular monthly payments to families with children likely passes the cost-benefit analysis of economic policy. Even if that guaranteed income lowers macroeconomic outcomes like GDP, it offers potentially transformative effects for millions of children, who currently receive no income support from social safety net programs. Children living in deep poverty are a lost opportunity for our economy. The Child Tax Credit, if administered well and with other programs to incentivize education, appears to be an effective policy for families and the macroeconomy. Of course, the new program for children must be studied carefully, and its effectiveness and equity reassessed regularly.

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Appendix: Summaries of the Studies

The appendix provides a summary of each paper. The format is 1) contributions of the paper relative to the other ones in the report; 2) policy scenarios studied 3) methods and key assumptions in the model; and 4) key findings.

Michalis Nikiforos, Marshall Steinbaum, and Gennaro Zezza. (2017). "Modeling the Macroeconomic Effects of a Universal Basic Income." ***Roosevelt Institute Report.***

Contribution: This paper shows how two key assumptions, 1) the economy is operating below full employment and 2) a small response of labor supply to changes in income, influence the macroeconomic effects of guaranteed income. These two assumptions, among others about productions, make the model that the authors use fundamentally different from the other models summarized here.

Policy Scenarios: They estimate the macroeconomic effects of twelve different policy scenarios: 1) eligibility/size: child at $250 per month, adults with $500 per month, adults with $1,000 per month 2) financing: government deficit, income taxes 3) differences in marginal propensity to consume by income. The policies by eligibility/size would cost annually $3 trillion (14 percent of GDP), $1.5 trillion (7 percent of GDP), and $200 billion (1 percent) per year, respectively.The macroeconomic outcomes are GDP, price level, wages, government deficit, employment rate, and labor force. The time horizon of their estimates is eight years.

Methods: The authors use the Levy Institute macro-econometric model—Keynesian, stock-flow macro model estimated from historical aggregate data. See Nikiforos and Zezza (2017) for more details on the model. One key difference from many macro models is that they assume the economy is below its full potential—that is, the economy can always find more workers or capital and produce more output. As a result of that spare capacity, more income and thus more demand spurs economic growth, not just inflation. In addition, the model allows for more hours worked without upward pressure on wages and prices. Moreover, the additional government deficit spending does not push up interest rates and would not crowd out business investment relative to the baseline of no guaranteed

income. In many other macroeconomic models, investment would be lower and with it the productive capacity of the economy.

While the assumption of an economy below full employment is uncommon in macroeconomic modeling, some analysts see grounds for the assumption in recent experiences. During the recovery from the Great Recession, the Congressional Budget Office revised down its official estimates of potential output repeatedly. In 2020, the CBO's current estimate of potential was $4 trillion lower than its forecast in 2005 (Sahm 2021), suggesting considerable unused capacity in the economy. During 2021, GDP moved back above its pre-pandemic level, but did not close this estimate of the output gap, though it is well above the CBO estimate. So while the assumption that the economy will be persistently below full employment is unique across the models studied here, it does resonate with recent events.

The authors make another key assumption at odds with the other models: the decision to work is unaffected by an increase in income or an increase in taxes, implying that the "labor supply elasticity" is zero. So a new guaranteed income program would not change hours worked in the economy, other than through the aggregate demand channel. If they instead assumed that people responded greatly to these changes, then it would put downward pressure on any increase in growth from the guaranteed income policy.

Results: Their analysis finds broadly positive effects across macroeconomic outcomes. GDP, real wages, and employment rise in all scenarios, with the exception of the one financed with higher income taxes and without differences across families in the propensity to spend, where there are no macroeconomic effects. The larger the eligibility and size of the monthly payments, the larger the effects. Assuming that low-income people spend more out of their payments leads to larger effects across each financing approach and even creates positive macroeconomic effects under tax financing. Even so, deficit financing has larger positive effects than tax financing.

The estimates of the macroeconomic effects of guaranteed income are by far the most positive among the papers studied here. The assumption of an economy below full employment and zero labor supply elasticity are powerful channels, because unlike the other models there is basically no downward pressure on capital accumulation or employment, except under tax financing. Even then, the effects are non-negative. Given the size of the programs—up to 14 percent of GDP per year—the macroeconomic effects are quite large and would lead to a notably improvement in overall economic outcomes.

Penn-Wharton Model. (2018). "Options for Universal Basic Income: Dynamic Modeling." Working Paper.

Contribution: In addition to its focus on various components of the federal budgets, this paper is directly comparable to Nikiforos et al (2017). However, it uses a markedly different (and more standard) modeling approach that yields very different results. The Penn-Wharton budget model assumes that hours worked do decrease with the additional income from guaranteed income and due to any change in taxes and/or real wages. Moreover, their model does not assume the economy is persistently below its potential, so more deficit spending crowds out investment. Taken together, they predict that the program would lower GDP.

Policy Scenarios: The authors estimate the macroeconomic effects of a $500 per month guaranteed income for adults—the second option in the Nikiforos et al (2017) paper. They consider three types of financing: deficit spending, an increase in the payroll tax, and external funding like the Alaskan program. The macroeconomic outcomes are GDP, hours worked, capital services, federal debt, total revenues, and Social Security revenues. The time horizon for their estimates is ten years and fifteen years.

Methods: The authors use the Penn-Wharton Budget Model, which is a dynamic general equilibrium, overlapping generations model. It assumes households and firms will react in several ways to changes in economic conditions and the new policy. As is standard in many macroeconomic models, people are "fully informed" about how the economy works, and they choose "optimally" based on their current and expected future resources. This approach to macroeconomic modeling tries to build aggregate outcomes, like the effect of guaranteed income on GDP, from the bottom up. It allows researchers to study new policies and isolate the assumptions driving the effects, as opposed to relying on past historical relationships. The model includes generations, allowing researchers to study longer-run effects and differences across families by age, income, and wealth.

A key assumption in the model is that the extra income from a guaranteed income program will substantially reduce the amount that people work. They argue that their model is consistent with a study of the Alaska Permanent Fund (which pays out oil proceeds annually to residents) showing that guaranteed income reduces work (Damon Jones and Ioana Marinescu, 2018). However, the estimated effects in that study on aggregate hours are fairly small—one hour per week—and statistically imprecise. In a longer summary of labor supply elasticities, Penn-Wharton (2016), notes that the larger body of research covers a range from 0.25 to 1. Higher values would imply larger decreases in hours due to guaranteed income.

Results: Across all three financing options, they find that a guaranteed income program of $500 per month for adults would substantially reduce GDP, hours worked, and capital services. With deficit financing, GDP would be almost 10 percent lower after 15 years and hours worked 7 percent lower than without the program. Moreover, the negative effects increase as the time horizon of their evaluation increases. The effects on the federal budget depend on the financing methods, though all three would reduce Social Security revenue. While the model has differences in households by age, it does not report distributional effects.

The adverse effects of guaranteed income are greatest when the program is financed with deficit spending. The two main causes are a reduction in total hours due families having more income and less business investment due to crowding out by more government spending. The latter dynamic is due to the assumption that the economy is near its potential output before the new program, so government spending raises interest rates and lowers investment, which in turn lowers the productive capacity of the economy.

They estimate that the other two financing schemes would not be as damaging to the economy. With higher payroll taxes, GDP declines less than 2 percent after fifteen years, and with external financing about 4 percent. The increase in payroll taxes to cover the $1.5 trillion annual cost is 11.5 percentage points, about three quarters of the current rate (employer and employee combined). While the payroll tax rate is the same for all workers, the taxes paid are larger for high-wage workers. As a result, the guaranteed income would raise the income of lower-wage workers but decrease the income of higher-wage workers. That mutes the downward pressure on hours worked relative to deficit financing, where everyone has the same positive income effect. But hours worked still decline because the after-tax wage falls and people have less incentive to work. Since the program is financed by higher taxes, the additional government spending does not crowd out investment, which is another reason why GDP does not fall as much.

The macroeconomic effects from external financing that requires neither government borrowing or higher taxes lies in between the two other financing approaches.

Andre Luduvice. (2021).“The Macroeconomic Effects of Universal Basic Income Programs" Working Paper.

Contribution: This paper adds to our analysis in three main ways. First, it explores the effects of replacing the current means-tested programs with guaranteed income compared to adding on the new program. By doing so, it compares the disincentives to work from

the current safety net with those from guaranteed income. Second, the author studies how guaranteed income may affect the level of skills that workers acquire on the job, which is one form of "human capital accumulation" that could raise the productivity of workers and ultimately long-run growth. Finally, the model considers how child rearing costs affect families' decisions.

Policy Scenarios: In the first scenario, the guaranteed income program replaces existing mean-tested programs, specifically the Earned Income Tax Credit (EITC) alongside means-tested transfers such as the Supplemental Nutrition Assistance Program (SNAP), the Temporary Assistance for Needy Families (TANF) and the Supplemental Security Income (SSI). The guaranteed income program is 4 percent of GDP, since that is the annual cost estimated by the author for existing safety net programs. Using Nikiforos (2017) to translate GDP into monthly payments, the scenario would be $300 per month per adult. The policy change, on its own, is expenditure neutral.

In the second scenario, households receive $1,000 per month through the guaranteed income policy or about 20 percent of GDP. A consumption tax increase pays for the program. Most economists favor that financing scheme over income or payroll taxes, since it does not create work disincentives. But while consumption taxes, like the Value Added Tax, are common in other countries, the US federal government instead tends to rely on income or payroll taxes.

Method: The model is a dynamic general equilibrium overlapping generations model which also includes choices about child rearing and education. People's income is unpredictable, making guaranteed income desirable, and they have different initial skill levels that affect their earnings potential. The model matches basic features of the current tax-and-transfer system in the United States and assumes that people decrease their hours worked moderately if taxes increase to finance the guaranteed income program.

In the model, people accumulate skills via on-the-job training. Higher-skilled workers are more productive and receive higher wages. Thus, an hour of work creates current earnings and raises future earnings potential. More training raises wages, increasing the incentive to work and pushing against disincentives to work caused by guarantee of income. In addition, more trained workers are more productive for the same number of hours worked.

Results: The results in the first scenario are among the most complicated in this report. Adding a universal guaranteed income program *and* ending the existing targeted safety net programs could create several offsetting macroeconomic effects. First, ending existing

programs would remove the current work disincentives, especially on low-income families, from programs like the Earned Income Tax Credit, which during the phase out range have very high marginal tax rates. That increase in the incentive to work would at least partially offset any work disincentives caused by a guaranteed income floor. Second, the removal of means-testing by assets that other current safety net programs like Medicaid have would reduce the current penalties from building savings. That increase in the incentive to save would offset some of any savings disincentives from guaranteed income. Finally, it is important to recognize a shift from targeted benefits to universal benefits, keeping the overall cost of the safety net the same would mean fewer benefits to low income families, which could increase their financial hardship and income inequality.

Nevertheless, while the first policy scenario is highly unlikely to become policy, its results are instructive. Broadly speaking, its macroeconomic effects are positive. This scenario and several with the Levy Institute model are the only ones in this report that are largely positive. GDP increases by 5 percent, owing to a 10 percent increase in physical capital. Investment rises because families, especially those with income, save more. The increase in savings is largely due to the removal of asset testing for benefits and decreased income security for those without a targeted safety net. Total hours worked increases by 1 percentage point relative to the baseline, since low-wage workers are no longer subject to an earnings phase out for benefits. Even so, the labor force participation drops by 0.5 percentage point as the extra income for higher wage workers leads some to leave work. Taken together, the total skills (human capital) in the economy is nearly unchanged. The increase in training from more overall hours worked is offset by high-wage, more skilled workers leaving the labor force.

The second scenario which adds a $1,000 per month guaranteed income to the existing safety net has large negative effects on the economy. GDP falls by 11 percent relative to a baseline with no policy change. The main reason for the decline in economic activity is the response of people to the 20-percentage-point increase in the consumption tax to finance the new program. Higher taxes, as well as the higher level of government transfers, create a large disincentive to earn income. Hours worked are 12 percent lower, labor force participation rate is 4 percent lower, and accumulated skills 5 percent lower. Investment in physical capital is 9 percent lower than the baseline.

The results on the distributional consequences of guaranteed income differ across the two scenarios. In the first, income and wealth inequality fall somewhat. In the second scenario, the large increases in taxes make it more likely that higher-wage workers stay in the labor force than lower-wage workers, since their returns to work were higher. Even so, the incomes of families living in deep poverty would increase, since the current safety net

programs often exclude them. However, lower income families would see their income fall relative to higher income people. Taken together, income inequality overall would rise.

Diego Daruich and Raquel Fernández. 2021. "Universal Basic Income: A Dynamic Assessment NBER Working Paper."

Contribution: This study, as with Luduvice (2021), explores how guaranteed income could affect the accumulation of human capital, that is, education and skills that make workers more productive. The two channels studied are parent's investments in their children's early education and adults' decisions about their own higher education.

Policy Scenarios: The authors study a guaranteed income program with $11,000 per adult per year (in 2000 dollars) or about $1,300 per month (in current dollars). In their main analysis, the program is financed with higher income taxes. They also examine two other financing schemes: less progressive income taxes and a consumption tax. Finally, they explore whether an increase in the chance of job loss, both permanently as in the case of automation, or temporarily, as in the case of a recession, change the effects of guaranteed income.

Methods: The authors use a general equilibrium overlapping generations model. An innovative feature of their approach is studying how guaranteed income affects the accumulation of skills both from parental investments and from higher education. The linkages are complex and capture several features of how one generation affects the skills of the next, referred to as the "intergenerational transmission of human capital." First, the level of parents' education affects the initial skills, on average, of their child. How parents invest their time and money can further increase their children's skills. Moreover, the model assumes that children who start with more skills benefit more from parental investments. Finally, obtaining a college education doubles the effect of skills on wages and the skills passed on to their children. The feedback loop across generations implies that any effects grow over time.

Another assumption that distinguished this paper from most is that workers respond little to changes in their after-tax wages. They assume a labor supply elasticity of about one-third, which aligns more closely with estimates from microeconomic studies over macroeconomic studies, which often assume an elasticity of one. With smaller responsiveness to changes in wages in an otherwise standard model of overall macroeconomic dynamics (except human capital), the potential work disincentives, a channel that can lower GDP, are weaker.

Results: The study finds that the guaranteed income program has broadly negative macroeconomic effects. First, the program with $1,300 per adult per month is expensive, so income taxes must increase substantially. That increase lowers both investments in physical and human capital, as well as hours worked. Taken together, GDP falls 13 percent relative to the baseline without the policy.

The authors examine effects across groups of families and find that the guaranteed income program decreases inequality. But it also reduces overall aggregate skills, education, productivity, and capital. They use a series of simulations to explain the long-run reduction in skills. If only one generation of parents received a guaranteed income (without any changes in taxes or other prices), then parents would invest more in their children's education, more children would choose to attend college, and the productivity of that next generation would rise. Thus the short-term, direct effects correspond to the standard argument among advocates in which the transfers increase education.

However, if the transfers continue (and people expect them to continue), then parents would begin to invest less in their children's skills, because they know that the children will receive guaranteed income as adults and will need to rely less on their wage income. There is less need to invest in skills, so there is less investment in education. Another feedback effect is that adults with less education than would have been the case without a permanent guaranteed income program will, on average, pass their lower level of skills on to their children. Since returns to parental investments and education are lower for children with lower initial skills, those investments and the return college education would fall further. Finally, the higher income taxes used to pay for the program would amplify the adverse dynamic, especially for children in high-income, high-skill families.

Given these assumptions, even with a lower responsiveness of hours worked to changes in after-tax wages, guaranteed income in their model substantially lowers output, with long-run GDP declining 13 percent. The level of education is substantially lower too.

Finally, the paper explores scenarios in which the risk of losing one's job might increase permanently, such as with automation. They model these scenarios by increasing the likelihood of unexpected changes in income in the form of long-term job displacements. In this setting, the adverse effects on macroeconomic aggregates of the guaranteed income are smaller. Even so, the benefits largely accrue to current adults who do not have time to adjust their education. As in their baseline model, children and future generations are

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worse off because the reduction in education and skills reduces well-being more than the ability of guaranteed income to buffer the increases in job displacement.

The researchers note that their findings of positive short-run effects but negative long-run effects suggest that a temporary program to replace income—such as stimulus checks in a recession when job loss and income uncertainty is higher—could be beneficial even if a permanent program is not. It is permanent transfer payments that result in negative effects in their study.

Nana Mukbaniani. 2020. " The Impact of a Universal Basic Income Program on Aggregate Capital, Labor, Welfare, and Inequality" (2020). Working Paper.

Contribution: This paper is the only one in this report that examines the interplay between targeted transfers (like the current means-tested income support programs in the United States) and universal (or untargeted) guaranteed income payments. Mukbaniani estimates the effects of guaranteed income on the overall economy, inequality, and state of economic well-being across different people. Note, her paper has a useful, albeit more technical summary of many of the macroeconomic studies we discuss.

Policy Scenarios: The author studies a guaranteed income program of $1,000 per adult per month. In her main analysis, the program is financed with higher consumption taxes, but Mukbaniani also studies income and payroll taxes. Finally, she examines universal payments and more targeted transfers.

Methods: The author uses a general equilibrium, heterogeneous agent model based on Aiyagari (1994) and Heer and Trede (2003). Individuals are born with different levels of wealth and their labor income is subject to unpredictable changes during their career, and they can only partially control their income with work decisions. People decide how much to work, save, spend, and they also pay taxes. The model requires a subsistence level of income and spending (including the relevant taxes) that individuals must have, or they will die. As a result, individuals have a strong incentive to save, so they can always meet that level.

In her baseline model, government transfers are only for people with below-subsistence income and wealth. Note that these transfers, unlike in Luduvice (2021), are a greatly simplified version of current income support. For example, it does not include the work requirements in the United States that limit support for the lowest income families. However, altogether, simulations of her baseline model match the U.S. distribution of

wealth except it does not capture the top of the distribution well. The Frisch elasticity of labor supply is about 0.5, which is in the mid range of the papers in this report. The government is required to have a balanced budget.

The guaranteed income program makes all government transfers universal, so every adult receives $1,000 as opposed to just those with below subsistence income and wealth. It is the only income transfer program in the model, so it replaces existing means-tested programs. This removes a work disincentive. Consumption taxes increase to balance the federal government budget under the guaranteed income program.

Results: The study predicts that total hours worked in the economy increase by 9 percent, since the universal program replaces one with a sharp income and wealth means test. The increase in hours come disproportionately from low-wage, low-wealth workers, since before they could not earn above subsistence or they would lose their benefits. In contrast, high-wage, high wealth workers reduce their hours some due to the wealth effect of the transfer income. The next effect of more hours but from somewhat less productive workers leaves the aggregate labor supply basically unchanged. Guaranteed income will cause households to save less, since it reduces the precautionary saving motive. As a result the capital stock declines by 18 percent. The reduction in capital is the main driver of the 7 percent decline in GDP.

To finance the program—which costs about one third of GDP—consumption taxes would increase almost 40 percentage points. But even though the taxes are much higher, the extra transfer income to households keeps the effective tax rate on spending little changed. Consumption falls about 3 percent overall, but it rises for low wealth families and falls for those with high wealth. Wealth inequality increases, since the new program eases the precautionary savings motive most for low-wage workers and those who start with low assets. In contrast, income inequality decreases because the switch from a means tested to a universal program creates an incentive for more people to work.

The paper explores other financing schemes, including foreign aid financing, (negative) income-tax financing, progressive income tax, and capital income tax. Most of these have similar effects on GDP, though the effect on labor supply and capital varies. Financing via progressive income taxes, which is closest to the current proposals, leads to a modest decline in hours worked among both high- and low-wage workers.

Finally, the author considers a hybrid model in which everyone receives transfer and then low-wage and low-asset households receive an additional transfert. This simulation is similar to proposals to add a universal guaranteed income program on top of a means

tested income support program. The size of the guaranteed income payment is important for the change in hours worked. If it is too small then it is not enough to overcome the work disincentives from losing the means-tested transfer. But as the guaranteed payment increases it depresses savings (and then capital) due to lessening of the precautionary savings motive.

Martin Lopez-Daneri. 2016. NIT picking: The macroeconomic effects of a negative income tax. Journal of Economic Dynamics and Control, 120–139.

Contribution: The contribution of this paper is its focus on the macroeconomic effects of a Negative Income Tax, a program which is somewhat different from guaranteed income. In that program. It's a program that would replace the entire tax system and all welfare programs in the United States with a uniform, constant tax rate on each additional dollar earned, referred to as the marginal tax rate, as well as a fixed dollar amount of transfers. The transfer is similar to the guaranteed income transfer, but then as people earn income their taxes rise proportionally and, in effect, reduce the net transfer income they receive from the government. However, if their earned income is low enough then their taxes owed will be less than the transfer, so they effectively have a negative income tax.

Negative Income Tax proposals have a longer history than the current guaranteed income proposals. Milton Friedman in 1962 was an early proponent among economists. Lopez-Daneri estimates the macroeconomic effects of replacing the current tax system and all welfare programs in the United States with a Negative Income Tax. Tondani (2009) showed that the effects of guaranteed income and the Negative Income Tax on the income distribution are similar, so we include Lopez-Daneri's study in this report. Note, it is the only paper here that adds guaranteed income, removes the current means-tested income support programs, *and* overhauls the tax system.

> Policy Scenarios: The author studies an annual transfer of $5800 per person (or about $480 per month) and a constant marginal tax rate of 22 percent. He refers to this as the "Optimal" Negative Income Tax, which maximizes the economic well-being of a person born at the start of the new program. Another scenario is called the "Popular" Negative Income Tax, which improves the economic well-being of 50 percent of people (enough for a majority approval) alive before the reform. In that scenario, transfers are $4,745 per year and the marginal tax rate is 19 percent.

Methods: The author uses an overlapping-generations, general equilibrium model in which households begin with the same wealth and labor productivity (earnings potential), but then during their lives they experience unexpected changes in their productivity. The macroeconomic effects of a Negative Income Tax are studied in the context of differences across people. The baseline model matches the actual distribution of income, earnings, wealth, federal taxes, and transfers. In the model, the dynamics to a new equilibrium are assumed to be as in an open economy—one in which key prices are set globally not by domestic markets. Note, the United States is commonly modeled as a closed economy given its size. The level of the transfer and the marginal tax rate for the Negative Income Tax are revenue neutral.

Results: The new transfers lead people to work less: the labor supply declines 2 percent, since incomes are more secure. However, the hours they do work are concentrated at times when workers are most productive and their wages are highest. With less work, they have more time off work. So the decrease in hours does not considerably lower economic well-being. The new, regular transfers decrease the saving rate considerably, since people do not need to save as much to cover unexpected changes in their income. With less savings, investment and the capital stock fall, by 22 percent and 13 percent, respectively. Taken together, the model predicts that the Negative Income Tax decreases per-capita GDP by 9 percent.

The inequality in labor earnings increases slightly because more productive (high-wage) workers are more likely to work than low productivity (low-wage) workers; however, consumption inequality declines due to the transfer income.

Finally, the author predicts that the “optimal” reform scenario would increase the economic well-being of households relative to the current system. The improvement would be largest for the least productive (low-wage) workers and modest for the most productive. Without the new transfers, the change in the tax system would not raise economic well-being. In fact, the loss of progressive taxes would hurt the lowest wage workers. If the “popular” scenario with somewhat 20 percent smaller transfers and lower marginal tax rates is enacted then the economic well-being increases somewhat less but the decreases in investment and GDP are somewhat smaller too.

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