Key Points

- Public support for a Universal Basic Income (UBI) has been increasing over time, with 48 percent of Americans supporting it. UBI experiments are already underway in Finland, Canada and Stockton, CA.
- The Roosevelt Institute recently published an analysis of a UBI proposal that would pay $6,000 per year to every adult in the United States. Roosevelt estimates that GDP would increase by up to 6.8 percent within eight years after the policy's onset, if the policy were deficit financed.
- We estimate the impact of the same plan on the federal budget and economy using a richer dynamic model. If deficit financed, we project that same UBI plan would increase federal debt by over 63.5 percent by 2027 and by 81.1 percent by 2032. GDP falls by 6.1 percent by 2027 and by 9.3 percent by 2032. The smaller tax base also sharply reduces Social Security revenue, by 7.1 percent by 2027 and by 10.4 percent by 2032.

Summary

A Universal Basic Income program would provide a guaranteed income for each American, but it would substantially lower GDP, regardless of how the program is financed.

Options for Universal Basic Income: Dynamic Modeling

Introduction

Universal Basic Income (UBI) is a proposed program where most people in a country would receive a regular and equal cash transfer, typically monthly. Unlike regular welfare programs, qualification for UBI and the amount received would not depend on earnings or employment of the recipient.

So far, there appears to be very little support for UBI among economists, including among traditionally more liberal economists (Robert Greenstein and Laura Tyson) and among more traditionally conservative economists (Martin Feldstein). Nonetheless, public support for UBI appears to be growing over time. A February 2018 Gallup poll found that 48 percent of Americans support a UBI program to help Americans who lose their jobs due to automation. Moreover, experiments with UBI programs are underway in Finland, Canada and California. The State of Alaska has run a UBI-like program since 1982 to distribute proceeds from rights to mineral extractions.

Implementing a UBI program at the national level would be expensive. In 2015, USAFacts shows that total federal spending was $3.7 trillion. So, before taking dynamic effects on economic growth into account, implementing an annual $1.5 trillion dollar UBI---approximately the cost of giving every adult $6,000 per year---would ramp up spending levels by over 40 percent. Barring new revenue sources, deficits would be more than three times larger than the actual 2015 level.

Previous Modeling of UBI

A recent study by the Roosevelt Institute uses a Keynesian macro-econometric model, calibrated to past

unrelated public policies and macroeconomic trends, to analyze the economic effects of several different UBI proposals. They project that a deficit-financed UBI program that provides $500 per month, or $6,000 per year, to every adult would increase GDP by as much as 6.8 percent within eight years after the onset of the policy. Their estimated effect comes from the increased consumption, especially by lower-income households, caused by the UBI. Despite the economy being near full unemployment, they also project an increase in jobs based on past unrelated policies and macroeconomic trends.

In their model, UBI transfers do not reduce household labor supply, in contrast to the empirical evidence outlined later in this brief. More importantly, an increase in government debt does not reduce GDP by reducing capital services. A reduction in capital services is the central channel for how government debt impacts GDP in most dynamic models. Indeed, the Roosevelt model does not include a standard production function that relates capital services and labor supply to GDP.

We show that adding the labor supply and capital channels fundamentally alters the policy projections related to a potential UBI program. We find that a large UBI program would substantially lower GDP, regardless of how the program is financed. The substantial contraction to the tax base also sharply reduces Social Security payroll tax revenue.

Our Modeling Strategy

The Penn Wharton Budget Model (PWBM) analyzes the effects of a UBI program with our dynamic general equilibrium OLG model. Our model includes households of varying age, income and wealth with households maximizing their welfare in a forward-looking manner. Households respond to policy changes by altering their economic choices, including their labor supply, consumption and saving. Each household's set of decisions is made given the amount of income, time, assets, technology and skills that the household possesses, and given the prices, wages, interest rates and uncertainties that the household faces, both today and in the future. A production function then translates total capital services and labor supply to GDP.

The Roosevelt Institute study argues that much of their economic gains from a UBI comes from differences in marginal propensities to consume (MPC's) across households with different amounts of income. In particular, past experience shows that poorer households are more likely to consume a larger percent of an additional government transfer than wealthier households. The reason is that poorer households are "borrowing constrained," whereas households with more wealth can more easily smooth their consumption over time.

The Keynesian macro-econometric model used in the Roosevelt Institute study, however, does not explicitly model borrowing constraints by wealth level at the household decision level. Instead, their model uses income brackets to approximate borrowing constraints. In contrast, PWBM's model explicitly incorporates household optimization decisions, including borrowing-constrained households holding little wealth. Explicit modeling is important for capturing how different policy designs interact with borrowing constrained households.

Neither PWBM's model nor the model used by Roosevelt, however, include a relationship between UBI transfers and the potential increase in labor productivity over long periods of time that might stem from increasing the health and education of children in low-income families. A recent study by Akee et al. (2010)1, for example, finds a small but positive impact on the health and education outcomes for children in low-income families who receive payments that are similar to a UBI program. However, this indirect mechanism on productivity would fall well outside of the 8-year projection window used by Roosevelt and even outside of the 10- and 15-year windows reported below by PWBM. This mechanism, while interesting to explore in future

work, also appears to be quantitatively small.

PWBM Model Validation against Previous Experience

Previous research on programs that increase a household's unearned income, similar to a UBI program, indicates that such programs cause the average household to reduce work. Jones and Marinescu (2018)2 study the Alaska Permanent Fund and find small decreases in labor supply from the payments that are reflected in changes from full-time to part-time work. Cesarini et al. (2017)3 find small negative earnings effects among Swedish lottery winners. Imbens et al. (2001)4 find a significant reduction in labor supply and earned income among lottery winners in Massachusetts. Similarly, disability insurance payments reduce employment in a study by Gelber et al. (2017)5. Deshpande (2016)6 finds that removing children with disabilities from the Supplemental Security Income program leads to parents earning more income.

We present our analysis of a $6,000 UBI benefit in the next section. In this section, we first validate PWBM's model against previous experience by considering a UBI similar in size to payments made from the Alaska Permanent Fund, but on the national scale captured by our model. In 2017, the Alaska Permanent Fund paid a dividend of $1,100 to each resident of Alaska. So, we examine the scenario where each person in the U.S. receives $1,100 per year, for a total cost of $330 billion annually. Unlike the larger-scale UBI considered below, which must be financed by either a larger deficit or distorting tax, Alaska's program can be considered to be "externally financed" since the revenue comes from payments for rights to mineral extraction. Hence, we model this transfer without considering additional debt or taxes.

PWBM's model predicts that the Alaska program reduces total hours worked by 1.3 percent by in both 2027 and 2032. This reduction includes dynamic feedback effects from the macroeconomy. Total household compensation (hours worked *times* wages), however, falls by only 0.8 percent by 2027 and 2032. The reason that household compensation falls by less than total hours worked is because capital services fall by less than hours worked (by 0.7 percent by 2027 and by 0.9 percent by 2032). Capital services don't change as much because this policy is externally financed and does not contribute to the debt. As a result, labor becomes relatively more scarce, leading to a slight increase in wages, thereby offsetting some of the reduction in labor supply that helps form compensation. Nonetheless, the fall in both labor supply and capital services reduces GDP by about 0.8 percent in both 2027 and 2032.

Our estimated reductions in labor supply and compensation accords well with actual previous experience. Jones and Marinescu (2018) find that the Alaska Permanent Fund reduced hours by 1.5 percent, or by about 0.5 hours per week.7 Gelber et al (2017) find that each additional dollar in disability insurance payments leads to a 20 percent decrease in beneficiaries' earnings. Applying this result to an average household in Alaska that receives an $1,100 dividend payment per member would lead to a decrease of earned income of $583 for that household, which represents a decrease of 0.8 percent of the median Alaskan household's 2016 income.8

Implementing a Large-Scale UBI Program

There are many ways to implement a large-scale UBI program similar in size to the one considered by the Roosevelt Institute. PWBM considers three options that cover a wide range of financing options:

- Deficit Financed: $6,000 per year (fixed over time) is given to each adult (defined as age 15 and over), for a total cost of $1.5 trillion annually, which is deficit financed. This approach, therefore, adds to the national debt which reduces private capital service formation over time.

- Payroll Tax Financed: $6,000 per year is given to each adult, for a total cost of $1.5 trillion annually, which is financed by an 11.25 percent payroll tax. This approach, therefore, distorts household labor supply decisions by increasing marginal tax rates.
- Externally Financed: $6,000 per year is given to each adult, for a total cost of $1.5 trillion annually that is 100-percent financed by external resources. While this Alaskan-type financing is likely implausible at a national scale over a long period of time, we include it as a point of comparison.

Impact on The Federal Budget and Economy

The drop down menu in Table 1 can be used to see the effects of a UBI that costs $1.5 trillion annually under our three options for financing.

Table 1: The Effects of a $1.5 trillion per year Universal Basic Income Policy on Key Variables Relative to Current Policy in Year Shown

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Deficit Financed

Deficit Financed

Year	Outlays (% change)	Debt (% change)	Capital Services (% change)	Hours Worked (% change)	GDP (% change)	Total Revenue (% change)	Social Security Revenues (% change)
2027	40.6	63.5	-11.0	-5.6	-6.1	-8.0	-7.1
2032	37.6	81.1	-18.0	-6.7	-9.3	-11.7	-10.4

Payroll Tax Financed

Year	Outlays (% change)	Debt (% change)	Capital Services (% change)	Hours Worked (% change)	GDP (% change)	Total Revenue (% change)	Social Security Revenues (% change)
2027	40.6	-0.1	-1.3	-3.2	-1.7	56.1	-2.4
2032	37.6	-1.0	-1.3	-3.2	-1.7	55.4	-2.4

Externally Financed

Year	Outlays (% change)	Debt (% change)	Capital Services (% change)	Hours Worked (% change)	GDP (% change)	Total Revenue (% change)	Social Security Revenues (% change)
2027	0.0	5.7	-3.1	-5.8	-3.4	-6.1	-4.5
2032	0.0	7.5	-3.9	-5.9	-3.7	-6.4	-4.9

Note: Percentage change relative to current policy in 2027 and 2032, respectively. Under current law, the U.S. economy is modeled as 40 open, conistent with previous evidence. A "closure rule", which balances the federal budget is implemented in 2037.

When the "Deficit Financed" option is selected from the drop down menu, Table 1 shows that, by 2027, a $6,000 annual UBI is projected to inflate federal outlays by 40.6 percent, relative to current policy without the UBI. This deficit financed increase in outlays ramps up debt by 63.5 percent. In turn, more debt depresses capital services by 11.0 percent. The income provided by the UBI program induces households to lower their labor supply, leading to a decline in hours worked of 5.6 percent. Together, the reduction in capital services and labor supply reduces GDP by 6.1 percent. The smaller economy provides a smaller tax base which reduces total federal revenues by 8.0 percent. Furthermore, a smaller payroll tax base reduces Social Security revenues by 7.1 percent, thereby placing substantial additional pressure on Social Security.

By 2032, Table 1 shows that the deficit-financed UBI continues to increase debt and reduce the capital stock, leading to larger and larger declines in GDP and a shrinking tax base. By 2032, federal debt jumps up by 81.1 percent which lowers capital services by 18.0 percent and GDP by 9.3 percent. The smaller tax base reduces Social Security revenue by 10.4 percent.

Alternatively, a payroll tax could be used to finance this UBI program, as shown by selecting the "Payroll Tax Financed" option in the drop down menu in Table 1. By 2027, federal outlays rise 40.6 percent, relative to current policy. However, because the UBI is financed by a payroll tax, debt is fairly stable and private capital services mainly fall due to households reducing their hours worked by 3.2 percent. GDP falls 1.7 percent, and Social Security revenues drop by 2.4 percent. By 2032, the effects are similar to those in 2027 since debt is not increasing over time.

When "Externally Financed" is selected from the drop down menu in Table 1, the modeled federal outlays are assumed to not change since the UBI transfers are made directly from an Alaskan-type of external fund to households. Nonetheless, by 2027, households feel richer and reduce their hours work by 5.8 percent, which, in turn, reduces household saving for capital services by 3.1 percent and GDP by 3.4. Total revenues fall by 6.1 percent and Social Security revenues fall by 4.5 percent. Fairly similar numbers emerge by the year 2032.

At first glance, it appears surprising that GDP falls by more with "Externally Financed" than with a distorting payroll tax. As we explain in more detail in a companion blog, the reason stems from the fact that the Externally Financed option produces relatively larger income effects, leading to less labor income and GDP. Households are relatively better off with external financing since it allows them to enjoy more consumption and leisure. The external financing case re-emphasizes the fact that GDP is not always a good measure of household welfare.

Conclusion

We estimate three ways to finance a Universal Basic Income program: with deficits, a payroll tax and with transfers funded by external sources. Under all three scenarios, a Universal Basic Income program dampens hours worked, capital services, GDP and Social Security revenues.

[Note: the paragraph immediately preceding the conclusion was added to provide additional clarification.]

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1. Akee, Randall K. Q., William E. Copeland, Gordon Keeler, Adrian Angold, and E. Jane Costello. "Parents' Incomes and Children's Outcomes: A Quasi-Experiment Using Transfer Payments from Casino Profits." American Economic Journal: Applied Economics 2, no. 1 (January 2010): 86–115. https://doi.org/10.1257/app.2.1.86. ↩

2. Jones, Damon, and Ioana Marinescu. "The Labor Market Impacts of Universal and Permanent Cash Transfers: Evidence from the Alaska Permanent Fund." Working Paper. National Bureau of Economic Research, February 2018. https://doi.org/10.3386/w24312. ↩

3. Cesarini, David, Erik Lindqvist, Matthew J. Notowidigdo, and Robert Östling. "The Effect of Wealth on Individual and Household Labor Supply: Evidence from Swedish Lotteries." American Economic Review 107, no. 12 (December 2017): 3917–46. https://doi.org/10.1257/aer.20151589. ↩

4. Imbens, Guido W., Donald B. Rubin, and Bruce I. Sacerdote. "Estimating the Effect of Unearned Income on Labor Earnings, Savings, and Consumption: Evidence from a Survey of Lottery Players." American Economic Review 91, no. 4 (September 2001): 778–94. https://doi.org/10.1257/aer.91.4.778. ↩

5. Gelber, Alexander, Timothy J. Moore, and Alexander Strand. "The Effect of Disability Insurance Payments on Beneficiaries' Earnings." American Economic Journal: Economic Policy 9, no. 3 (August 2017): 229–61. https://doi.org/10.1257/pol.20160014. ↩

6. Deshpande, Manasi. "The Effect of Disability Payments on Household Earnings and Income: Evidence from the SSI Children's Program." The Review of Economics and Statistics 98, no. 4 (March 23, 2016): 638–54. https://doi.org/10.1162/REST_a_00609. ↩

7. Jones and Marinescu (2018) find no effect on total employment, however, they find that part time employment increases by 1.8 percentage points. Assuming a 65 percent total employment rate and a 12.5 percent part-time employment rate where full-time work is 35 hours and part time work is 17.5 hours, an increase in part-time employment of 1.8 percentage points with no change in total employment leads to an decline in hours worked of approximately 1.5 percent. ↩

8. The 2010 U.S. Census found that the average Alaskan household was 2.65 people. The Census Bureau reports that the median household Alaska had income of $76,723 in 2016. ↩