

Back-of-the-Envelope Calculations

Karl Widerquist
Associate Professor at SFS-Qatar, Georgetown University

Although Universal Basic Income (UBI) has been the subject of increased attention in recent years, its cost is often poorly understood and greatly exaggerated. People tend to think of UBI's cost simplistically as size times population.¹ Call that the "gross cost" of UBI, but it's not a cost in any meaningful sense, because UBI is a negative tax. People seldom call UBI a negative tax because of confusion with a similar policy called "the Negative Income Tax." But in the more important generic sense, UBI is—and must be understood as—a negative tax. The government taxes people in money and immediately gives most of it right back to the same people in the same form, money, now calling it "UBI." It doesn't cost you anything for the government to take a dollar from you and give a dollar to you at the same time. It does cost you something for the government to take a dollar and give it to somebody else.

That's the redistributive burden—the real cost—of UBI real cost of UBI. Any estimate of it requires subtracting all of the taking-and-giving-back in involves to calculate how much money it transfers from one group of people to another.

The net-cost issue requires explanation because it is extremely important and almost unique to UBI. Most transfer payments go to people who are not at the time also paying taxes to support it. For example, almost no one both pays for and receives Unemployment Insurance, the Earned Income Tax Credit, Temporary Assistance for Needy Families, disability insurance, and so on at the same time. Some people both receive Social Security and pay taxes, and the Social Security Administration probably should net out that cost. But only 20% of Americans (65.1² million people out of a population of 321.4 million) receive Social Security benefits at any one time, and a large majority of the taxes that support it are paid by the other 80% of the population. And so, the net cost issue is much smaller for Social Security than for UBI.

Most government healthcare spending is considered a transfer payment, and it often involves the same people both paying and receiving at the same time, but the health care they receive is very different than the taxes they pay. We need to know the gross cost of converting cash into healthcare as well as its net redistributive effects. Unlike healthcare spending, UBI's gross cost has no budgetary effects at all. There is a limit to how much healthcare the government can provide you even if you are paying all the taxes for it. You only have so much purchasing power that can be converted into healthcare. But there is no limit to how much cash the government can give you as long as it taxes it right back. Therefore, the gross cost of UBI simply is not a cost.

A recent report and brief by the Organization for Economic Cooperation and Development (OECD) make this gross error. They claim to calculate the cost of "a budget-neutral BI," redirecting existing transfers into a UBI. But without distinguishing between gross and net cost, they actually calculate the cost of a UBI accompanied by a new tax deduction for high income people.³ Therefore, they mistakenly conclude that a "budget neutral" UBI would be far below the poverty line.

This article uses Census Bureau data from 2015 to make very simple, “back-of-the-envelope” estimates the net cost of UBI. That is, it addresses the *how-much* question: *how much does UBI cost* as opposed to the *how* question, *how should the government finance that cost*. It mentions a few financing options, but includes no rigorous discussion of the *how* question.

This article estimates the cost of a poverty-level UBI: \$12,000 per adult and \$6,000 per child with a 50% “marginal tax rate” (see explanation below). The appendix considers two other versions: one with the same grant levels and a lower marginal tax rate and the other with the same marginal tax rate and a higher grant level. This back-of-the-envelope effort uses simple calculations with summary data. It estimates only the static, budgetary effects of UBI without considering how people’s behavior might change in response. And it estimates the cost of UBI in a vacuum—as if we started with no other closely related policies in place or as if we were making no other changes to related policies, other than taxes inherently connected to the UBI. This article makes no rigorous attempt to calculate the costs or savings of moving from the current tax and benefit system to a UBI-based system, although it does discuss options for the move and how they might affect cost.

Key findings of this study include⁴:

- The net cost of a roughly poverty-level UBI (\$12,000 per adult, \$6,000 per child) is \$539 billion per year.
- This UBI would drop the official poverty rate from 13.5% to 0%, eliminating poverty for 43.1 million people (including 14.5 million children).
- The net cost of this UBI is less than 16% of its often-mentioned but not-very-meaningful gross cost (\$3.415 trillion).
- This UBI costs less than 25% of current U.S. entitlement spending, less than 15% of overall federal spending, and about 2.95% of Gross Domestic Product (GDP).
- This UBI will be a net financial benefit to most families with incomes up to \$55,000, making it an effective wage subsidy (or tax cut) for tens of millions of working families.
- The average net beneficiary of this UBI is a family of about two people making about \$27,000 per year. The family’s net benefit from the UBI would be nearly \$9,000 raising their income to almost \$36,000.
- Lowering the marginal tax rate to 35% would spread the benefits of the UBI program to more of the middle class while increasing the cost to \$901 billion.
- A UBI of \$20,000 per adult and \$10,000 per child cost \$1.816 trillion.
- The cost of a \$20,000 UBI is about 32% of its gross cost (\$5.692 trillion), about 85% of current entitlement spending, about 49% of total federal spending, and less than 10% of GDP.

This article explains how this study arrived at these and other findings, and discusses their relevance.

A version of UBI is typically defined by two essential parameters that can be chosen by policymakers: the “grant-level” and “marginal tax rate,” each explained in turn.

The “grant-level” is simply the size of the UBI. The main text of this article examines a UBI set approximately at the official poverty threshold (more commonly called the “poverty line” or the “poverty level”)—the income a person or a family needs to escape official poverty. In 2015, the Census Bureau estimated the poverty

line at \$12,082 for an individual living alone and \$16,337 for a household of two people, whether they are two adults or an adult and a child (defined as a person under age 18).⁵ This article uses round figures of \$12,000 per adult and \$6,000 per child as an approximate example of a poverty-line UBI.

The “marginal tax rate” is the tax rate faced by net beneficiaries on a one-unit increase in market income. Although every citizen receives the same UBI, most or all proposals for a substantial-size UBI require everyone who makes an income above zero both to receive money in UBI and to pay money in taxes. The marginal tax rate faced by net beneficiaries doesn’t have to be the same as that faced by net contributors. It doesn’t have to be the same for all net beneficiaries. It doesn’t even have to be in the form of an income tax. But we have to pick one for net recipients to estimate how much UBI costs.

For simplicity, this article assumes that all net beneficiaries face the same marginal income tax rate of 50%. I chose it, partly because 50% simplifies the mathematics, and partly because it is a reasonable figure balancing marginal incentives with the need to phase out net benefits. My claim of “reasonableness” is more appropriate for UBI in a vacuum, and less for UBI combined with the existing taxes and benefits (see discussion below).

The focus on net recipients forces me to imagine an odd tax: each household pays a 50% tax on all income with no deductions on the first \$24,000 of income for each adult and the first \$12,000s for each child—the breakeven point for the assumed version of UBI. The marginal rate goes to zero as soon as the household reaches that point. I imagine this odd tax because this article free to ignore the tax rate on net contributors. All we need to know about net contributors is that they pay enough to cover their own UBIs. They pay new taxes of at least \$12,000, but they also receive a UBI (a new tax deduction—a negative tax) of exactly \$12,000, so that their total taxes are unchanged. This article does not need to make any assumption about whether net contributors taxes will need increase by more than \$12,000 or how any increase will be distributed among net contributors to calculate cost of UBI, but it cannot meaningfully estimate the cost of UBI without considering that net contributors pay for their own UBI. Hence, an odd tax for the purpose of illustration.

The “net benefit” or the “net redistributive effect” of a UBI is the final amount beneficiaries receive after subtracting the taxes they pay (or the taxes they pay toward the UBI program) from the UBI they receive. This interaction of taxes and benefits is no secret in the UBI structure. Although the government can create money out of thin air, if it does so without taxing enough of it back, inflation will result. Unless UBI is financed entirely by some government-owned enterprise, it has to be a transfer. The interaction of the grant received and taxes paid by net beneficiaries shows how similar UBI is to the negative income tax. They are extremely similar in the amount of redistribution they do. The differences are in *how* they do it.⁶

Income data available from the Census Bureau is sufficient to give a picture of the interaction of UBI and taxes, allowing the calculation of a simple estimate of the net benefit of a UBI.⁷ The net benefit to recipients differs from the net cost to net contributors by “transaction costs.” In static terms, “transaction costs” amount to the administrative cost of running the program. By “static” terms, I mean, only the UBI’s immediate effects—*before* anyone changes their behavior in response to it or to the taxes supporting it.

Of course, these changes in people’s behavior are real and important. Some people, especially low-wage workers, are likely to respond by working less, which would increase the net cost of the program by reducing their taxes. However, low-

wage employers are likely to respond by increasing wages, which would decrease the cost of the program. Some net beneficiaries might get better education or training, which would increase wages and decrease the cost of UBI. It is likely to have desirable effects on health and homelessness which would again decrease costs. And so on.

These dynamic effects are much harder to estimate than the static effects, and any attempt at an overall assessment of them becomes increasingly speculative. But the static effect of UBI gets us in the ballpark. It is the jumping off point for more dynamic estimates.

The only static transaction cost is the administrative costs of operating the UBI program. This article assumes UBI's administrative costs is the same as Social Security's—0.7% of total budget—because both are relatively simple-to-administer programs.⁸ Thus, the net cost of UBI the net benefit to recipients plus 0.7%.

To move from the current system to a UBI system involves making additional controversial decisions on at least two issues. First, will it replace any other government transfer payments or spending programs? If so, how much will that save? Second, what other changes in the tax code will accompany the introduction of the UBI? And how much will that cost? I don't want to impose answers to these controversial issues, and so this article only discusses how large the cost of UBI is *in and of itself*—UBI in a vacuum so to speak. Some UBI supporters propose it alongside a general simplification of the tax and benefit system, such as a flat income tax,⁹ but such a reform is not inherently connected to UBI.

Unfortunately, one aspect of the transition from the current system interacts crucially with this paper's effort to address the how-much question: what happens to the taxes net recipients currently pay?

The proposal specified above imagines recipients paying a 50% marginal tax rate and *all* of the revenue from those taxes going toward financing their own UBI. Most people who would be net recipients under this UBI pay at least some federal taxes, which help to support other federal spending. These taxes do not affect the question of how much UBI costs in vacuum, but they are not safely ignored by anyone making an assessment of whether to introduce a UBI at the present time. The issue presents two choices: either the taxes currently paid by net recipients remain in place, or they are replaced by the 50% tax on income. The first option makes the recipients' overall marginal tax rates higher than 50%. The second option requires an additional tax increase on net contributors to make up lost revenue.

The UBI-in-a-vacuum methodology uses the first of these two options both for simplicity, because the cost of UBI in-and-of-itself is useful to know and a good starting point toward a full assessment of the possible transition to a UBI-based system. However, I return to this issue after making the initial cost calculations. The good news is that although *marginal* taxes are sometimes high for people at the low end of the income distribution, their total tax bill tends to be low (especially net of existing transfers), creating several affordable options for dealing with the issue.

With the back-of-the-envelope, UBI-in-a-vacuum approach explained, this article how to calculate the cost of UBI. Ignoring administrative costs (added later) the net cost and net benefit of UBI are equal and can be determined by the following “cost equation.”

In words, the **Cost Equation** is:

Net cost/net benefit (N) equals the UBI (U) minus market income (Y) times the tax rate (t).

In symbols, the **Cost Equation** becomes:

$$N = U - (Y \times t)$$

Under the poverty-level version, the benefit for each adult net beneficiary is:

$$N = \$12,000 - (Y \times 0.50)$$

And the benefit for each child net beneficiary is:

$$N = \$6,000 - (Y \times 0.50)$$

UBI is given on an individual basis but most families pool their resources, and government collects data at the family level. Therefore, this paper looks at the effects of this *individual* grant on *households* by multiplying the number of adults in the family by \$12,000 and the number of children by \$6,000, making the cost equation for each household:

$$N = (\$12,000 \times \text{number of adults}) + (\$6,000 \times \text{number of children}) - (Y \times 0.50)$$

For example, the benefit of this level of UBI to a family of one adult and one child is given by this equation:

$$N = (\$12,000 \times 1) + (\$6,000 \times 1) - (Y \times 0.50)$$

Which simplifies to:

$$N = \$18,000 - (Y \times 0.50)$$

Filling in values for market income (Y) into this equation makes it possible to calculate this family's net benefit and their final income (net of taxes and transfers):

Market income (Y)	Net Benefit/Net Cost ¹⁰ (N)	Net income ¹¹
\$0	\$18,000	\$18,000
\$9,000	\$13,500	\$22,500
\$18,000	\$9,000	\$27,000
\$27,000	\$4,500	\$31,500
\$36,000	\$0	\$36,000

This family, as a whole, reaches the “breakeven point” at \$36,000. The taxes they pay equal their UBI and they cease being net beneficiaries.

A perfect cost estimate would separately solve the cost equation for all 60 million or so net-recipient households. Without such refined data, the article has to make do with extremely board averages, but the U.S. Census Bureau provides enough to make a reasonable estimate possible.

Table 1 shows Census Bureau data for the distribution of household income by increments of \$5,000.¹² This article estimates the cost of UBI by applying the cost equation to everyone in each income range as if it were one giant family. This reduces the number of equations to solve from about 60,000,000 to 12, making the estimate possible. Unfortunately, the source tables do not provide information about how many children are in each range, forcing this article to use the national average number of children (22.9%¹³), even though household size and the number of children in each household undoubtedly vary with income.

Another unfortunate aspect of calculations based on this Census Bureau table is that they cannot account for the way households of different sizes reach the breakeven point at different income levels. According to the calculations below, the *average* net beneficiary household reaches the breakeven point at about \$55,000. However, the breakeven point for individual families varies considerably. Single people reach it at only \$24,000 while—say—a family of two adults and six children would not reach it until \$120,000. Therefore, some households classified as net beneficiaries in these estimates are actually net contributors while some households classified as net contributors are actually net beneficiaries. Hopefully, on average, the overestimate and underestimate largely balance each other out, but I can't be sure which one is larger than the other.

Tables 1-4 all stop \$55,000—the breakeven point for the average family. The extra line at \$55,000 to \$59,999 is shown only for reference—to identify the breakeven point.

Column A shows the number of households in each range. Column B shows the mean income for families in each income range. Column C shows the mean size of families in each increment. Row 13 shows either the total or a weighted average (as appropriate) of rows 1-11 in each column—omitting column 12, shown for reference. It shows the total for column A and the weighted average for columns B and C, which are themselves averages, making their averages are more useful to show than their totals.

Tables 2-4 are all based on the information in Table 1 and the assumptions described above. Column names carry on in order (A through L) across the four tables with column B repeated in a Table 4 for clarity.

[Table 1 here]

Table 2 makes intermediate calculations necessary to connect the raw data in Table 1 to the elements of the cost equation in Table 3. Column D calculates the number of people in each income range by multiplying the number of households (Column A) by the mean size of each household (Column C). Column E estimates the number children in each income range by multiplying the number of persons by 22.9% (see above). Column F subtracts the estimated number of children from the number of persons to obtain the estimated the number of adults.

[Table 3 here]

Table 3 uses data from Tables 1 and 2 along to assemble the elements of the Cost Equation: $N = U - (Y \times t)$. Column G calculates the total income earned by all households in each range (Y in the Cost Equation). It is simply the number of households (Column A) times income per household (Column B). Column H is the total amount of UBI grants paid to people in each range (U): \$6,000 times the number

of children (Column E) plus \$12,000 times the number of adults (Column F). Column I calculates the amount of taxes paid by households in each income range (“Y x t”): household income (Y from Column G) times 50% (t).

Column J finally brings together all the information necessary to estimate the net benefit and net cost of UBI (N). Following the Cost Equation, the net benefit (N) is the amount paid in UBIs (U in Column H) minus the taxes paid by UBI net beneficiaries (“Y x t” in Column I). The two figures in bold in the last two lines of that column are the most important. Line 13 shows the net benefit or the net redistributive effect of UBI: the amount distributed to all beneficiaries, net of taxes (excluding administrative cost): just under \$535 billion per year. Line 14 adds 0.7% for administrative costs to estimate the net cost of UBI: \$539 billion.

[Table 3 here]

The gross cost of this version of UBI is much easier to calculate than the net cost. It is simply \$12,000 times U.S. adult population (245,426,316) plus \$6,000 times the U.S. child population (72,895,754).¹⁴ Therefore, ignoring administrative costs, the gross cost of UBI \$3.415 trillion.

The net cost of UBI (\$539 billion) is only 15.7% of its gross cost. In other words, the gross cost of UBI is more than *six times* the actual cost of UBI. One reason is obvious: less than half of citizens are net beneficiaries. Another reason is just as important but less obvious: net beneficiaries pay most of the cost of their own UBIs in taxes on their market income. Column H shows that net beneficiaries receive \$1.375 trillion in UBI grants, but Column I shows that these same net beneficiaries pay \$840 billion in taxes. That is, the average net beneficiary pays 61.1% of the gross cost of their UBI through taxes, cutting the cost to net contributors by the same 61.1%.

The taxes paid by net beneficiaries do not interfere with UBI’s ability to do what it is designed to do. Table 4 helps illustrate this point. Column B shows mean household income—simply reproduced from Table 1 for reference. Column K shows the average net subsidy for households in each income range. It is the net cost excluding administrative costs (Column J) divided by the number of households in each income range (Column A). Column L shows the average income per household after that household both pays taxes and receives UBI. It is the average net subsidy (Column K) plus average income per household (Column B).

[Table 4 here]

This table shows that people at the very bottom of the income distribution receive the largest net subsidy. The average household in this range is made up of 1.90 people—1.46 adults and 0.44 children. They receive a net subsidy of \$19,649, raising their income from \$1,080 to \$20,729, bringing them from very deep poverty to well above the poverty line. The poverty rate for a family of two was \$15,391 in 2015.¹⁵

Three reasons explain why this “poverty-line” UBI raises families in the lowest income range so far above the poverty threshold: First, even the mere \$1,080 average income in this group helps. Second, the poverty rate varies with household size, but UBI does not. A UBI set to make sure single people are at least at the poverty-line helps multi-person households do substantially better than the poverty-

line. Third, the round figure of \$6,000 per child is significantly more than official statistics require for a child.

This table also shows that, although UBI is unconditional, it is effectively a subsidy for working families. Each row down the list shows families with higher incomes, revealing that families do slightly better financially whenever their market income rises. Because the marginal tax rate is 50%, the net subsidy declines half as fast as income rises, ensuring that higher market income always leads to higher overall income.

Line 13 shows the weighted average for all net beneficiary groups combined. This would be a family of 2.11 people (Table 1), 1.62 adults and 0.48 children. A net subsidy of \$8,703 raises their income from \$27,118 to \$36,051—an income well more than twice the official poverty line for a family of two. The built-in work incentive of the overall UBI system is apparent by how much more money this typical beneficiary family has than the lowest income families in line 1, again illustrating its effect as a wage subsidy.

This UBI would drop the official poverty rate from 13.5% to 0%, lifting 43.1 million people (including 14.5 million children) out of poverty.¹⁶ The number of people living within 150% of the poverty line would also drop substantially, but I can't estimate it with the data I have. This UBI would help far more people than these statistics show because many more people experience poverty for *part* of their lives than are in poverty at any one time. It would also relieve the fear of poverty from everyone.

Considering what UBI can do, a net cost of \$539 billion is low. The United States could eliminate poverty at an increased cost of only 25% of current transfer payments and only about 14% of total federal spending.¹⁷

At this price, one can imagine paying for the UBI entirely by reducing other spending, such as the portion of transfers that might no longer be needed, unnecessary parts of defense spending, and/or corporate giveaways. If so, the United States could permanently free every American from the threat of poverty with *no net increase in anyone's tax burden*.

Difficult political barriers inhibit cuts to nearly any part of the US federal budget. But it is reasonable for UBI to replace at least some transfers on a “hold-harmless basis.” That is, in a way that avoids making any recipient financially worse off. Either UBI would supersede the first \$12,000 of other transfers and/or other transfers would supersede the first however many dollars of UBI they constitute.

Of the \$2.08 trillion in U.S. government transfer payments in 2009, about \$977 billion were related to medical care, education, and Indian Affairs, most of which cannot be replaced by UBI without leaving some recipient with disposable incomes below the poverty line.¹⁸ The goal of this article is not estimate how much of the remaining \$1.10 trillion should be replaced by UBI. Some can; some can't. If one imagines hold-harmless replacement saves one-fifth of that spending (\$220 billion), the net cost of UBI drops from \$539 billion to \$319 billion. Even if hold-harmless replacement only saves one-tenth of that spending, the net cost drops to \$429 billion.

Nevertheless, increasing U.S. inequality over the last 40 years indicates that higher taxes on upper income people are economically feasible and potentially desirable. Therefore, policymakers should seriously consider paying for UBI at least partially with a tax increase targeted at wealthy people.

These are just some ideas for financing UBI. Exactly how to do so is not the subject of this article. This article argues UBI is affordable. The more affordable something is, the more options there are to pay for it.

The bigger problem for implementing the \$539 UBI without other changes is that I have not examined how it interacts with the way the existing tax and transfer system affects net recipients. This interaction would create very high marginal tax rates for some net beneficiaries. For example, virtually all workers pay 7.65% in Social Security's payroll taxes. Self-employed people pay 15.3% in payroll taxes. Households in the upper end of the net recipient range face a 25% marginal income rate. Therefore, accumulated marginal rates can reach over 80% for some households for some range of income at the upper end of the net recipient range (and even over 90% for some self-employed households in that range). In addition, many existing targeted transfers create high marginal tax rates at some point on the lower end of the income distribution. Unfortunately, the U.S. tax and transfer system is so complicated, it is hard to estimate of how many households will be affected, to what extent, over what range of income.

Five pieces of good news indicate that the marginal-tax-rate problem might be smaller than it appears or relatively inexpensive to solve.

First, to say that this policy might cause some net recipients to face high *marginal* tax rates does not mean that it causes them to pay higher taxes. Quite the opposite, *only* net contributors face the problem of high marginal tax rates and *all* net recipient households pay *lower* net taxes. As Table 4 shows, the net tax bill of typical households in the range of 40,000 to 44,999 falls by \$4,091. Their marginal rates are high, simply because they don't face as much loss if their income goes down. Of course, low marginal tax rates are good for incentives, giving policy makers reason to keep them low. Reducing these households' marginal tax rates decreases their tax bill, which increases the expense of integrating the UBI into the existing system. But it also significantly increases the benefit of UBI to middle class households.

Second, the excessive-marginal-tax-rate issue disappears the moment a household passes the breakeven point without affecting net contributors. If the tax increase is financed by cuts in other spending and/or taxes targeted at wealthy households, it is feasible that middle class net contributors face no net increase in taxes and no higher marginal tax rates than under the existing system. Even if the UBI is entirely tax-financed, the amount needed is small enough that no net contributors need to face excessive marginal rates.

Third, only 45.3% of households paid income tax in 2015. The 61 million net recipient households represent about 48.9% of all U.S. households.¹⁹ Thus, hopefully, few households face the 25% income tax rate in combination with the 50% proposed tax. If few households in the range pay income tax, the cost of eliminating the problem is small. Unfortunately, the data I have doesn't allow me to estimate that cost. I suspect the problem will be significant only for a relatively small number of net recipient families over a narrow range of income, but I would need much more detailed tax data to confirm that suspicion.

Fourth, to the extent that the marginal tax rate issue is caused by the phase-out of transfers targeted at low-income households, this is a problem with the current system that UBI can help to fix, if it partially replaces existing transfers, even if done on a hold-harmless basis. For example, recipients of current programs such as Food Stamps and Unemployment Insurance often face marginal tax rates in excess of 100% over some range of income as they entirely lose their eligibility for these programs by making more than a specified amount. If UBI replaced the first \$12,000 of income-based transfers, these marginal tax rates would drop to 50%, and the overall cost of UBI would drop.

Fifth, data from the Congressional Budget Office for taxes and transfers by quintile provides encouraging news for the cost of addressing the marginal-tax-rate issue. Average households in the bottom three quintiles (60% of the population) receive more in transfers than they pay in taxes.²⁰ Not all of these could potentially be replaced by a UBI, but the total indicates the potential to save money on transfers is large enough that it can probably finance the cost of eliminating all or most existing taxes targeted at net recipients. Although the data I have doesn't allow me to make a refined estimate, we can take a coarse look at data by quintile.

Each of the lowest three quintiles receives more in transfers than it pays in taxes. The average household in the lowest quintile receives \$9,600 in transfers and pays \$800 in federal taxes (receiving a net transfer of \$8,800). The average household in the second quintile receives \$16,000 in transfers, and pays \$4,000 in federal taxes (a net transfer of \$12,000). The average household in the middle quintile receives \$16,700 and pays \$8,900 in taxes (a net transfer of \$7,800).²¹ Imagine eliminating all taxes on these three quintiles and financing it by eliminating a like amount of non-UBI transfers. The U.S. tax and transfer system is far too complex to cut taxes and transfers so neatly and easily, but these figures indicate the potential to resolve the marginal-tax-rate issue without great additional expense and possibly with additional savings.

In any case, \$539 million *is* the price of introducing UBI without making any other changes in the tax and transfer system. The marginal-tax-rate issue affects only net recipients, and although UBI introduced without other changes creates high *marginal* tax rates for net recipients over some range of income, it nevertheless makes *all* net recipients financially better off. If policymakers want to introduce UBI *and* keep marginal rates low for this group, they have options to do so without greatly increasing the expense to net contributors.

Rejecting UBI because of the marginal-tax-rate issue does not help the people who face those high marginal tax rates. For example, consider a mother heading an average family in the \$40,000-\$44,999 income range on Tables 1-4. Even though the UBI combined with existing taxes might well have given her a *marginal* tax rate of over 80%, it decreases her net tax bill (increases her income) by \$4,091. The loss of her UBI improves her marginal incentive only because it financially harms lower-income people even more than it harms her. Policymakers who use this method of keeping marginal tax rates low don't do it for her. They make her substantially worse off to give her an incentive to do what they want.

Of course, it would be best to introduce UBI along with other changes in the tax code so that recipients faced a marginal tax rate of 50% or lower, and it would be nice to have an estimate of the cost of reducing those rates. Such an estimate would require calculating the expense of replacing existing taxes paid by net recipients in each \$5,000 income range in the Census Bureau tables I used to make my estimates. Unfortunately, I do not have the data to make that estimate.

Instead, the appendix estimates the cost of the same level of UBI with a lower marginal tax rate. As a practical policy, this strategy would be an imperfect response to the marginal-tax-rate issue, which primarily affects households at the higher end of the net recipient range. This strategy lowers the marginal tax rates equally for all net recipients (some of whom face much higher marginal tax rates than others) and it spreads net benefits of UBI to a larger number of people, causing them to face higher marginal tax rates as well.

Appendix Table 1 reruns the analysis described above with a UBI of \$12,000 per adult and \$6,000 per child with a marginal tax rate of 35% (instead of 50%). The

most obvious difference is that Appendix Table 1 consolidates all the data from the four tables in the main text in one large table, but the explanations and sources remain entirely the same as described above. The most significant difference from the first analysis is that these tables add several more rows showing that the average household reaches the breakeven point just before \$90,000.

Column J, line 21 shows that the net cost of this version of UBI is \$901 billion—compared to \$539 billion for the original version. The higher cost reflects both greater net benefits to the people who were net recipients under the original plan and to a greater number of net recipients. The average net beneficiary of this UBI is a household of 2.29 people (Column C) making about \$40,242 per year in market income, receiving a net benefit of \$10,251, which raises their income to \$50,492.

This analysis helps illustrate how unhelpful the concept of the gross cost of UBI is. The gross cost of this UBI is exactly the same as the first one: \$3.415 trillion. The net cost of \$901 billion is 26.4% of that figure instead of 15.7% in the original proposal.

The low price of the poverty-level UBI implies that a higher version is also likely to be affordable. This possibility is worth considering in part because the official poverty threshold is widely criticized for being too low. Some researchers find that families need an income of at least 150% of the poverty level, perhaps double it or more to afford basic expenses.²² Thus, Appendix Table 2 reruns the analysis above for a UBI of \$20,000 for adults and \$10,000 for children with the original marginal tax rate of 50%. The breakeven point is now at nearly \$99,000 per household. Appendix Table 2 estimates the cost of a higher UBI (rather than a lower marginal tax rate).

This version of UBI would ensure that every American had an income at least 160% of the poverty line. Yet, its net cost of \$1.816 trillion (Column J) is less than half of total federal spending and less than 10% of GDP. It is \$300 billion less than total transfer spending in 2009. Again, no UBI can replace all transfers, but one this large could certainly replace many of them. Of course, this program would cause even bigger problems with high marginal tax rates, if combined with the existing tax system, and the cost of reducing those rates would be substantial.

Notice that the cost of the larger UBI has risen faster than the grant. The \$20,000 UBI is less than double the size but more than triple the cost of the \$12,000 UBI. The net cost of the \$20,000 UBI is about one-third (31.7%) of its gross cost of \$5.692 trillion,²³ compared to a ratio of about one-sixth for the \$12,000 UBI. The disproportionate increase happens because a larger grant with the same marginal tax rate spreads net benefits to a much larger group of people. A focus on the gross cost ignores this issue, and therefore, says little or nothing about UBI's actual redistributive effects.

The figures presented here use simple data and assumptions. A more detailed study with more refined data and more sophisticated methods is warranted. Such a study could produce a more accurate estimate of the net cost of a UBI, but I do not expect it to change the general findings here a great deal.

A study examining the cost of UBI plus changes to the tax system to reduce or eliminate other taxes paid by net recipients will, of course, increase costs. However, this effort could be combined with an estimate of reductions to transfers going to the same households, which as argued above, would reduce costs.

A more sophisticated study will not change the basic result that the real cost of a UBI is far less than its gross cost. According to the estimates above, the net cost is in the range of one-third to one-sixth of the gross cost, depending on the size and

structure of the UBI system in question. The mathematical structure of the UBI program ensures that any more sophisticated study will find similar ratios.

Any portrayal of the gross cost of a UBI as if it shows anything at all about the real redistributive effects of UBI or the real issues in financing it is naïve at best and dishonest at worst.

This analysis demonstrates the inadequacy of the OCED report and technical background note discussed above. Their “budget neutral” proposal makes no effort to understand UBI as a negative tax or to calculate the tax burden on net contributors as the sum of their positive and negative taxes. Therefore, the UBI they examine is actually accompanied by a large non-neutral tax cut for net contributors,²⁴ representing a major *decrease* in the net redistributive burden on net contributors. It is obviously possible to introduce a UBI without a massive tax decrease for upper-income people. Only a UBI in which the net tax burden on net contributors is roughly constant can accurately be described as “budget neutral.”

The OECD uses different data to make their calculation, and so their figures are not directly comparable to those here. But if their figures are off by a factor of three-to-six as expected from this study, their estimates of “Monthly BI amounts that would cost the same as existing benefits and tax-free allowances” are vast underestimates. For example, they calculate a UBI of €527 in Finland, less than half of the poverty rate of €1027; €456 in France, less than half the poverty rate of €909, and 230 in the United Kingdom, barely more than one-third of the poverty rate of £705.²⁵ Multiplying each of these by three and six respectively gives €1,581 and €3,162 in Finland, €1,368 and €2,736 in France, and £690 and £1,380 in the United Kingdom. In each case, the amount is more than enough to eliminate poverty, the exact opposite of the claim that made the basis of the OECD report.

Perhaps the most striking result of this paper to most readers is not in the difference between gross and net cost but in how affordable these three versions of UBI are. When you consider what a UBI can do—eliminate the threat of poverty for every citizen while providing enormous tax relief to lower-middle-income families—it is a bargain.

Tables

Table 1: Relevant data from the U.S. Census Bureau				
		A	B	C
	Income range	Number of households	Mean income per household	Mean size of household
1	Under \$5,000	4,235,000	\$1,080	1.90
2	\$5,000 to \$9,999	4,071,000	\$8,018	1.76
3	\$10,000 to \$14,999	6,324,000	\$12,397	1.68
4	\$15,000 to \$19,999	6,470,000	\$17,297	1.91
5	\$20,000 to \$24,999	6,765,000	\$22,199	2.00
6	\$25,000 to \$29,999	6,222,000	\$27,116	2.12
7	\$30,000 to \$34,999	6,354,000	\$32,027	2.22
8	\$35,000 to \$39,999	5,743,000	\$37,115	2.35
9	\$40,000 to \$44,999	5,203,000	\$41,973	2.36
10	\$45,000 to \$49,999	5,002,000	\$47,180	2.42
11	\$50,000 to \$54,999	5,078,000	\$51,900	2.47
12	\$55,000 to \$59,999*	<i>Breakeven point for average household</i>		
13	Total or average**	61,467,000	\$27,118	2.11

Source: U.S. Census Bureau Tables HINC-01, 2015 and HINC-06, 2015.²⁶ See text for explanations.
 * Added for reference not included in totals or averages.
 * Total: Column A; average: Columns B and C

Table 2: Intermediate calculations				
		D	E	F
	Income range	Number of persons	Number of children	Number of Adults
1	Under \$5,000	8,046,500	1,842,649	6,203,852
2	\$5,000 to \$9,999	7,164,960	1,640,776	5,524,184
3	\$10,000 to \$14,999	10,624,320	2,432,969	8,191,351
4	\$15,000 to \$19,999	12,357,700	2,829,913	9,527,787
5	\$20,000 to \$24,999	13,530,000	3,098,370	10,431,630
6	\$25,000 to \$29,999	13,190,640	3,020,657	10,169,983
7	\$30,000 to \$34,999	14,105,880	3,230,247	10,875,633
8	\$35,000 to \$39,999	13,496,050	3,090,595	10,405,455
9	\$40,000 to \$44,999	12,279,080	2,811,909	9,467,171
10	\$45,000 to \$49,999	12,104,840	2,772,008	9,332,832
11	\$50,000 to \$54,999	12,542,660	2,872,269	9,670,391
12	\$55,000 to \$59,999*	<i>Breakeven point for average household</i>		
13	Total	129,442,630	29,642,362	99,800,268
Source: author's calculations based on data in Table 1				
* Added for reference not included in totals or averages.				

Table 3: Calculation of the Cost Equation to find the net cost of UBI of \$12,000 for adults and \$6,000 for children with a marginal tax rate of 50%

		G	H	I	J
	Income range	Total income in range (Y)	UBI (U)	Taxes (Y x t)	Net cost (N)
1	Under \$5,000	\$4,573,800,000	\$85,502,109,000	\$2,286,900,000	\$83,215,209,000
2	\$5,000 to \$9,999	\$32,641,278,000	\$76,134,864,960	\$16,320,639,000	\$59,814,225,960
3	\$10,000 to \$14,999	\$78,398,628,000	\$112,894,024,320	\$39,199,314,000	\$73,694,710,320
4	\$15,000 to \$19,999	\$111,911,590,000	\$131,312,920,200	\$55,955,795,000	\$75,357,125,200
5	\$20,000 to \$24,999	\$150,176,235,000	\$143,769,780,000	\$75,088,117,500	\$68,681,662,500
6	\$25,000 to \$29,999	\$168,715,752,000	\$140,163,740,640	\$84,357,876,000	\$55,805,864,640
7	\$30,000 to \$34,999	\$203,499,558,000	\$149,889,080,880	\$101,749,779,000	\$48,139,301,880
8	\$35,000 to \$39,999	\$213,151,445,000	\$143,409,027,300	\$106,575,722,500	\$36,833,304,800
9	\$40,000 to \$44,999	\$218,385,519,000	\$130,477,504,080	\$109,192,759,500	\$21,284,744,580
10	\$45,000 to \$49,999	\$235,994,360,000	\$128,626,029,840	\$117,997,180,000	\$10,628,849,840
11	\$50,000 to \$54,999	\$263,548,200,000	\$133,278,305,160	\$131,774,100,000	\$1,504,205,160
12	\$55,000 to \$59,999*	<i>Breakeven point for average household</i>			
12	Total	\$1,680,996,365,000	\$1,375,457,386,380	\$840,498,182,500	\$534,959,203,880
13	Total plus 0.7% estimated administrative cost				\$538,703,918,307

Source: author's calculations based on data in Table 1 and calculations in Table 2

* Added for reference not included in totals or averages.

Table 4: Effects of UBI on households

		B	K	L
	Income range	Mean Income per household	Mean net subsidy per Household	Mean net income per household
1	Under \$5,000	\$1,080	\$19,649	\$20,729
2	\$5,000 to \$9,999	\$8,018	\$14,693	\$22,711
3	\$10,000 to \$14,999	\$12,397	\$11,653	\$24,050
4	\$15,000 to \$19,999	\$17,297	\$11,647	\$28,944
5	\$20,000 to \$24,999	\$22,199	\$10,153	\$32,352
6	\$25,000 to \$29,999	\$27,116	\$8,969	\$36,085
7	\$30,000 to \$34,999	\$32,027	\$7,576	\$39,603
8	\$35,000 to \$39,999	\$37,115	\$6,414	\$43,529
9	\$40,000 to \$44,999	\$41,973	\$4,091	\$46,064
10	\$45,000 to \$49,999	\$47,180	\$2,125	\$49,305
11	\$50,000 to \$54,999	\$51,900	\$296	\$52,196
12	<i>\$55,000 to \$59,999*</i>	<i>Breakeven point for average household</i>		
13	Average	\$27,118	\$8,703	\$36,051

Source: author's calculations based on data in Table 1 and calculations in Tables 2 and 3

* Added for reference not included in totals or averages.

Appendix 1

Appendix 1, Table 1: Relevant data from the U.S. Census Bureau				
		A	B	C
	Income range	Number of households	Mean Income (Y)	Mean size of household
1	Under \$5,000	4,235,000	\$1,080	1.90
2	\$5,000 to \$9,999	4,071,000	\$8,018	1.76
3	\$10,000 to \$14,999	6,324,000	\$12,397	1.68
4	\$15,000 to \$19,999	6,470,000	\$17,297	1.91
5	\$20,000 to \$24,999	6,765,000	\$22,199	2.00
6	\$25,000 to \$29,999	6,222,000	\$27,116	2.12
7	\$30,000 to \$34,999	6,354,000	\$32,027	2.22
8	\$35,000 to \$39,999	5,743,000	\$37,115	2.35
9	\$40,000 to \$44,999	5,203,000	\$41,973	2.36
10	\$45,000 to \$49,999	5,002,000	\$47,180	2.42
11	\$50,000 to \$54,999	5,078,000	\$51,900	2.47
12	\$55,000 to \$59,999	4,140,000	\$57,119	2.60
13	\$60,000 to \$64,999	4,367,000	\$61,940	2.63
14	\$65,000 to \$69,999	3,733,000	\$67,102	2.67
15	\$70,000 to \$74,999	3,683,000	\$72,115	2.81
16	\$75,000 to \$79,999	3,650,000	\$77,022	2.75
17	\$80,000 to \$84,999	3,354,000	\$82,056	2.84
18	\$85,000 to \$89,999	2,893,000	\$87,165	2.88
19	\$90,000 to \$94,999*	<i>Breakeven point for average household</i>		
20	Total or average **	87,287,000	\$40,242	2.29

Source: U.S. Census Bureau Tables HINC-01, 2015 and HINC-06, 2015.²⁷
 See the main text for explanations.
 * Included for reference only, not included in totals or averages
 ** Total: Column A; average: Columns B and C

Appendix 1, Table 2: Intermediate calculations				
		D	E	F
	Income range	Number of persons	Number of Children	Number of Adults
1	Under \$5,000	8,046,500	1,842,649	6,203,852
2	\$5,000 to \$9,999	7,164,960	1,640,776	5,524,184
3	\$10,000 to \$14,999	10,624,320	2,432,969	8,191,351
4	\$15,000 to \$19,999	12,357,700	2,829,913	9,527,787
5	\$20,000 to \$24,999	13,530,000	3,098,370	10,431,630
6	\$25,000 to \$29,999	13,190,640	3,020,657	10,169,983
7	\$30,000 to \$34,999	14,105,880	3,230,247	10,875,633
8	\$35,000 to \$39,999	13,496,050	3,090,595	10,405,455
9	\$40,000 to \$44,999	12,279,080	2,811,909	9,467,171
10	\$45,000 to \$49,999	12,104,840	2,772,008	9,332,832
11	\$50,000 to \$54,999	12,542,660	2,872,269	9,670,391
12	\$55,000 to \$59,999	10,764,000	2,464,956	8,299,044
13	\$60,000 to \$64,999	11,485,210	2,630,113	8,855,097
14	\$65,000 to \$69,999	9,967,110	2,282,468	7,684,642
15	\$70,000 to \$74,999	10,349,230	2,369,974	7,979,256
16	\$75,000 to \$79,999	10,037,500	2,298,588	7,738,913
17	\$80,000 to \$84,999	9,525,360	2,181,307	7,344,053
18	\$85,000 to \$89,999	8,331,840	1,907,991	6,423,849
19	\$90,000 to \$94,999*	<i>Breakeven point for average household</i>		
20	Total	199,902,880	45,777,760	154,125,120

Source: author's calculations based on data in Appendix 1, Table 1
* Included for reference only, not included in totals or averages

Appendix 2, Table 3: Calculation of the Cost Equation to find the net cost of UBI of \$12,000 for adults and \$6,000 for children with a marginal tax rate of 35%

		G	H	I	J
	Income range	Income (Y)	UBI (U)	Taxes (Y x t)	Net cost (N)
1	Under \$5,000	\$4,573,800,000	\$85,502,109,000	\$1,600,830,000	\$83,901,279,000
2	\$5,000 to \$9,999	\$32,641,278,000	\$76,134,864,960	\$11,424,447,300	\$64,710,417,660
3	\$10,000 to \$14,999	\$78,398,628,000	\$112,894,024,320	\$27,439,519,800	\$85,454,504,520
4	\$15,000 to \$19,999	\$111,911,590,000	\$131,312,920,200	\$39,169,056,500	\$92,143,863,700
5	\$20,000 to \$24,999	\$150,176,235,000	\$143,769,780,000	\$52,561,682,250	\$91,208,097,750
6	\$25,000 to \$29,999	\$168,715,752,000	\$140,163,740,640	\$59,050,513,200	\$81,113,227,440
7	\$30,000 to \$34,999	\$203,499,558,000	\$149,889,080,880	\$71,224,845,300	\$78,664,235,580
8	\$35,000 to \$39,999	\$213,151,445,000	\$143,409,027,300	\$74,603,005,750	\$68,806,021,550
9	\$40,000 to \$44,999	\$218,385,519,000	\$130,477,504,080	\$76,434,931,650	\$54,042,572,430
10	\$45,000 to \$49,999	\$235,994,360,000	\$128,626,029,840	\$82,598,026,000	\$46,028,003,840
11	\$50,000 to \$54,999	\$263,548,200,000	\$133,278,305,160	\$92,241,870,000	\$41,036,435,160
12	\$55,000 to \$59,999	\$236,472,660,000	\$114,378,264,000	\$82,765,431,000	\$31,612,833,000
13	\$60,000 to \$64,999	\$270,491,980,000	\$122,041,841,460	\$94,672,193,000	\$27,369,648,460
14	\$65,000 to \$69,999	\$250,491,766,000	\$105,910,510,860	\$87,672,118,100	\$18,238,392,760
15	\$70,000 to \$74,999	\$265,599,545,000	\$109,970,917,980	\$92,959,840,750	\$17,011,077,230
16	\$75,000 to \$79,999	\$281,130,300,000	\$106,658,475,000	\$98,395,605,000	\$8,262,870,000
17	\$80,000 to \$84,999	\$275,215,824,000	\$101,216,475,360	\$96,325,538,400	\$4,890,936,960
18	\$85,000 to \$89,999	\$252,168,345,000	\$88,534,131,840	\$88,258,920,750	\$275,211,090
19	\$90,000 to \$94,999*	<i>Breakeven point for average household</i>			
20	Total	\$3,512,566,785,000	\$2,124,168,002,880	\$1,229,398,374,750	\$894,769,628,130
21	Total plus 0.7% estimated administrative cost				\$901,033,015,527

Source: author's calculations based on data in Appendix 1, Tables 1-2

* Included for reference only, not included in totals or averages

Appendix 1, Table 4: Effects of this UBI on typical households				
		B	K	L
	Income range	Mean income	Mean net subsidy per Household	Mean net income per household
1	Under \$5,000	\$1,080	\$19,811	\$20,891
2	\$5,000 to \$9,999	\$8,018	\$15,895	\$23,913
3	\$10,000 to \$14,999	\$12,397	\$13,513	\$25,910
4	\$15,000 to \$19,999	\$17,297	\$14,242	\$31,539
5	\$20,000 to \$24,999	\$22,199	\$13,482	\$35,681
6	\$25,000 to \$29,999	\$27,116	\$13,037	\$40,153
7	\$30,000 to \$34,999	\$32,027	\$12,380	\$44,407
8	\$35,000 to \$39,999	\$37,115	\$11,981	\$49,096
9	\$40,000 to \$44,999	\$41,973	\$10,387	\$52,360
10	\$45,000 to \$49,999	\$47,180	\$9,202	\$56,382
11	\$50,000 to \$54,999	\$51,900	\$8,081	\$59,981
12	\$55,000 to \$59,999	\$57,119	\$7,636	\$64,755
13	\$60,000 to \$64,999	\$61,940	\$6,267	\$68,207
14	\$65,000 to \$69,999	\$67,102	\$4,886	\$71,988
15	\$70,000 to \$74,999	\$72,115	\$4,619	\$76,734
16	\$75,000 to \$79,999	\$77,022	\$2,264	\$79,286
17	\$80,000 to \$84,999	\$82,056	\$1,458	\$83,514
18	\$85,000 to \$89,999	\$87,165	\$95	\$87,260
19	<i>\$90,000 to \$94,999*</i>	<i>Breakeven point for average household</i>		
22	Average	\$40,242	\$10,251	\$50,492

Source: author's calculations based on data in Appendix 2 Tables 1-3
* Included for reference only, not included in totals or averages

Appendix 2

Appendix 2, Table 1: Relevant data from the U.S. Census Bureau				
		A	B	C
	Income range	Number of households	Mean Income (Y)	Mean size of household
1	Under \$5,000	4,235,000	\$1,080	1.90
2	\$5,000 to \$9,999	4,071,000	\$8,018	1.76
3	\$10,000 to \$14,999	6,324,000	\$12,397	1.68
4	\$15,000 to \$19,999	6,470,000	\$17,297	1.91
5	\$20,000 to \$24,999	6,765,000	\$22,199	2.00
6	\$25,000 to \$29,999	6,222,000	\$27,116	2.12
7	\$30,000 to \$34,999	6,354,000	\$32,027	2.22
8	\$35,000 to \$39,999	5,743,000	\$37,115	2.35
9	\$40,000 to \$44,999	5,203,000	\$41,973	2.36
10	\$45,000 to \$49,999	5,002,000	\$47,180	2.42
11	\$50,000 to \$54,999	5,078,000	\$51,900	2.47
12	\$55,000 to \$59,999	4,140,000	\$57,119	2.60
13	\$60,000 to \$64,999	4,367,000	\$61,940	2.63
14	\$65,000 to \$69,999	3,733,000	\$67,102	2.67
15	\$70,000 to \$74,999	3,683,000	\$72,115	2.81
16	\$75,000 to \$79,999	3,650,000	\$77,022	2.75
17	\$80,000 to \$84,999	3,354,000	\$82,056	2.84
18	\$85,000 to \$89,999	2,893,000	\$87,165	2.88
19	\$90,000 to \$94,999	2,850,000	\$92,019	2.82
20	\$95,000 to \$99,999	2,452,000	\$97,107	2.94
21	\$100,000 to \$104,999*	<i>Breakeven point for average household</i>		
22	Total or average **	92,589,000	\$49,597	2.32

Source: U.S. Census Bureau Tables HINC-01, 2015 and HINC-06, 2015.²⁸
 See the main text for explanations.
 * Included for reference only, not included in totals or averages
 ** Total: Column A; average: Columns B and C

Appendix 2, Table 2: Intermediate calculations				
		D	E	F
	Income range	Number of persons	Number of Children	Number of Adults
1	Under \$5,000	8,046,500	1,842,649	6,203,852
2	\$5,000 to \$9,999	7,164,960	1,640,776	5,524,184
3	\$10,000 to \$14,999	10,624,320	2,432,969	8,191,351
4	\$15,000 to \$19,999	12,357,700	2,829,913	9,527,787
5	\$20,000 to \$24,999	13,530,000	3,098,370	10,431,630
6	\$25,000 to \$29,999	13,190,640	3,020,657	10,169,983
7	\$30,000 to \$34,999	14,105,880	3,230,247	10,875,633
8	\$35,000 to \$39,999	13,496,050	3,090,595	10,405,455
9	\$40,000 to \$44,999	12,279,080	2,811,909	9,467,171
10	\$45,000 to \$49,999	12,104,840	2,772,008	9,332,832
11	\$50,000 to \$54,999	12,542,660	2,872,269	9,670,391
12	\$55,000 to \$59,999	10,764,000	2,464,956	8,299,044
13	\$60,000 to \$64,999	11,485,210	2,630,113	8,855,097
14	\$65,000 to \$69,999	9,967,110	2,282,468	7,684,642
15	\$70,000 to \$74,999	10,349,230	2,369,974	7,979,256
16	\$75,000 to \$79,999	10,037,500	2,298,588	7,738,913
17	\$80,000 to \$84,999	9,525,360	2,181,307	7,344,053
18	\$85,000 to \$89,999	8,331,840	1,907,991	6,423,849
19	\$90,000 to \$94,999	8,037,000	1,840,473	6,196,527
20	\$95,000 to \$99,999	7,208,880	1,650,834	5,558,046
21	<i>\$100,000 to \$104,999*</i>	<i>Breakeven point for average household</i>		
22	Total	215,148,760	49,269,066	165,879,694
Source: author's calculations based on data in Appendix Table 1				
* Included for reference only, not included in totals or averages				

Appendix 2, Table 3: Calculation of the Cost Equation to find the net cost of UBI of \$20,000 for adults and \$10,000 for children with a marginal tax rate of 50%

		G	H	I	J
	Income range	Income (Y)	UBI (U)	Taxes (Y x t)	Net cost (N)
1	Under \$5,000	\$4,573,800,000	\$142,503,515,000	\$2,286,900,000	\$140,216,615,000
2	\$5,000 to \$9,999	\$32,641,278,000	\$126,891,441,600	\$16,320,639,000	\$110,570,802,600
3	\$10,000 to \$14,999	\$78,398,628,000	\$188,156,707,200	\$39,199,314,000	\$148,957,393,200
4	\$15,000 to \$19,999	\$111,911,590,000	\$218,854,867,000	\$55,955,795,000	\$162,899,072,000
5	\$20,000 to \$24,999	\$150,176,235,000	\$239,616,300,000	\$75,088,117,500	\$164,528,182,500
6	\$25,000 to \$29,999	\$168,715,752,000	\$233,606,234,400	\$84,357,876,000	\$149,248,358,400
7	\$30,000 to \$34,999	\$203,499,558,000	\$249,815,134,800	\$101,749,779,000	\$148,065,355,800
8	\$35,000 to \$39,999	\$213,151,445,000	\$239,015,045,500	\$106,575,722,500	\$132,439,323,000
9	\$40,000 to \$44,999	\$218,385,519,000	\$217,462,506,800	\$109,192,759,500	\$108,269,747,300
10	\$45,000 to \$49,999	\$235,994,360,000	\$214,376,716,400	\$117,997,180,000	\$96,379,536,400
11	\$50,000 to \$54,999	\$263,548,200,000	\$222,130,508,600	\$131,774,100,000	\$90,356,408,600
12	\$55,000 to \$59,999	\$236,472,660,000	\$190,630,440,000	\$118,236,330,000	\$72,394,110,000
13	\$60,000 to \$64,999	\$270,491,980,000	\$203,403,069,100	\$135,245,990,000	\$68,157,079,100
14	\$65,000 to \$69,999	\$250,491,766,000	\$176,517,518,100	\$125,245,883,000	\$51,271,635,100
15	\$70,000 to \$74,999	\$265,599,545,000	\$183,284,863,300	\$132,799,772,500	\$50,485,090,800
16	\$75,000 to \$79,999	\$281,130,300,000	\$177,764,125,000	\$140,565,150,000	\$37,198,975,000
17	\$80,000 to \$84,999	\$275,215,824,000	\$168,694,125,600	\$137,607,912,000	\$31,086,213,600
18	\$85,000 to \$89,999	\$252,168,345,000	\$147,556,886,400	\$126,084,172,500	\$21,472,713,900
19	\$90,000 to \$94,999	\$262,254,150,000	\$142,335,270,000	\$131,127,075,000	\$11,208,195,000
20	\$95,000 to \$99,999	\$238,106,364,000	\$127,669,264,800	\$119,053,182,000	\$8,616,082,800
21	\$100,000 to \$104,999*	<i>Breakeven point for average household</i>			
22	Total	\$4,012,927,299,000	\$3,810,284,539,600	\$2,006,463,649,500	\$1,803,820,890,100
23	Total plus 0.7% estimated administrative cost				\$1,816,447,636,331

Source: author's calculations based on data in Appendix 1 Tables 1-2

* Included for reference only, not included in totals or averages

Appendix 2, Table 4: Effects of this UBI on typical households				
		B	K	L
	Income range	Mean income	Mean net subsidy per Household	Mean net income per household
1	Under \$5,000	\$1,080	\$33,109	\$34,189
2	\$5,000 to \$9,999	\$8,018	\$27,161	\$35,179
3	\$10,000 to \$14,999	\$12,397	\$23,554	\$35,951
4	\$15,000 to \$19,999	\$17,297	\$25,178	\$42,475
5	\$20,000 to \$24,999	\$22,199	\$24,321	\$46,520
6	\$25,000 to \$29,999	\$27,116	\$23,987	\$51,103
7	\$30,000 to \$34,999	\$32,027	\$23,303	\$55,330
8	\$35,000 to \$39,999	\$37,115	\$23,061	\$60,176
9	\$40,000 to \$44,999	\$41,973	\$20,809	\$62,782
10	\$45,000 to \$49,999	\$47,180	\$19,268	\$66,448
11	\$50,000 to \$54,999	\$51,900	\$17,794	\$69,694
12	\$55,000 to \$59,999	\$57,119	\$17,487	\$74,606
13	\$60,000 to \$64,999	\$61,940	\$15,607	\$77,547
14	\$65,000 to \$69,999	\$67,102	\$13,735	\$80,837
15	\$70,000 to \$74,999	\$72,115	\$13,708	\$85,823
16	\$75,000 to \$79,999	\$77,022	\$10,192	\$87,214
17	\$80,000 to \$84,999	\$82,056	\$9,268	\$91,324
18	\$85,000 to \$89,999	\$87,165	\$7,422	\$94,587
19	\$90,000 to \$94,999	\$92,019	\$3,933	\$95,952
20	\$95,000 to \$99,999	\$97,107	\$3,514	\$100,621
21	\$100,000 to \$104,999*	<i>Breakeven point for average household</i>		
22	Average	\$49,597	\$19,482	\$62,823
Source: author's calculations based on data in Appendix 2 Tables 1-3				
* Included for reference only, not included in totals or averages				

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² Social-Security-Administration, "Monthly Statistical Snapshot, December 2015," (Washington, DC: Social Security Administration, 2016).

³ Browne and Immervoll; OECD.

⁴ See below for sources and calculations.

⁵ Bernadette D. Proctor, Jessica L. Semega, and Melissa A. Kollar, "Report Number: P60-256: Income and Poverty in the United States: 2015," ed. U.S. Census Bureau (Washington, DC: U.S. Census Bureau, 2016).

⁶ Karl Widerquist et al., *Basic Income: An Anthology of Contemporary Research* (Oxford: Wiley-Blackwell, 2013).

⁷ U.S.-Census-Bureau, "Hinc-01. Selected Characteristics of Households, by Total Money Income in 2015," in *Excel* (Washington, DC: U.S. Census Bureau, 2016); "Table Hinc-06. Income Distribution to \$250,000 or More for Households: 2015," in *Excel* (Washington, DC: U.S. Census Bureau, 2016).

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- ⁸ Social-Security-Administration, "Social Security Administrative Expenses," The Social Security Administration, <https://www.ssa.gov/oact/STATS/admin.html>.
- ⁹ Anthony Atkinson, *Public Economics in Action: The Basic Income/Flat Tax Proposal* (Oxford: Clarendon Press, 1995).
- ¹⁰ These figures ignoring the 0.7% administrative cost that separates net benefit and net cost, but that amount is easily added at the end of the analysis.
- ¹¹ After receiving their UBI and paying their taxes.
- ¹² U.S.-Census-Bureau, "Hinc-01. Selected Characteristics of Households, by Total Money Income in 2015."; "Table Hinc-06. Income Distribution to \$250,000 or More for Households: 2015."
- ¹³ "Quick Facts," U.S. Census Bureau, <https://www.census.gov/quickfacts/table/AGE295215/00>.
- ¹⁴ The U.S. population was 321,418,820 in 2015, and 22.9% of them were under 18. Ibid.
- ¹⁵ "Poverty Thresholds for 2015 by Size of Family and Number of Related Children under 18 Years," (Washington, DC: U.S. Census Bureau, 2016).
- ¹⁶ Proctor, Semega, and Kollar.
- ¹⁷ U.S.-Census-Bureau, "Table 540. Government Transfer Payments to Individuals by Type: 1990 to 2009," in *Excel* (Washington, DC: The Census Bureau, 2011).
- ¹⁸ Ibid.
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- ²⁰ Congressional-Budget-Office, "The Distribution of Household Income and Federal Taxes, 2013," (Washington, DC: Congressional Budget Office, 2016), p. 31.
- ²¹ Ibid., p. 31.
- ²² Kinsey Alden Dinan, "Budgeting for Basic Needs: A Struggle for Working Families," (New York, NY: National Center for Children in Poverty, Columbia University, 2009).
- ²³ Authors calculation based on the cost and population figures above.
- ²⁴ Browne and Immervoll; OECD.
- ²⁵ Browne and Immervoll; OECD., p. 4.
- ²⁶ U.S.-Census-Bureau, "Hinc-01. Selected Characteristics of Households, by Total Money Income in 2015," in *Excel* (Washington, DC: U.S. Census Bureau, 2016); "Table Hinc-06. Income Distribution to \$250,000 or More for Households: 2015," in *Excel* (Washington, DC: U.S. Census Bureau, 2016).
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