Medicare for All Dynamic Tax Model

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The U.S. healthcare system is flawed, to state the obvious. Millions of Americans are either not insured, underinsured, or are insured but still pay exorbitant rates for their care. It is commonly touted that healthcare spending per capita in the United States is >2x the rate of spending in other developed countries (see here). One suggestion intended to address both issues (uninsured persons and unreasonable costs) is to institute a single-payer healthcare system. This idea has grown increasingly popular over the last few years and is now often referred to as "Medicare for All."

Bernie Sanders and Elizabeth Warren are the two most prominent proponents of Medicare for All in the current race for the 2020 Democratic Presidential Nominee. One of the biggest sticking points in each of the 2019 Democratic Debates has been the question, **"How will we pay for Medicare for All?"** Sanders and Warren have been careful with their answers. Sanders lists a few different options (see his plan, here), without clearly laying out how much revenue each will raise. Warren recently released her plan, and uses many of her own assumptions (including comprehensive immigration reform) to raise $20.9T of new tax revenue (see summary of plan, here).

Which plan makes the most sense? Projecting tax revenue and the impact of changes in tax rates has thus far largely been left up to think-tanks (many of which are extremely partisan) and politicians themselves (who are also clearly partisan). **I thought it would be helpful to create a dynamic tax model that American citizens can use to find out for themselves, using their own assumptions.**

Recently (Oct 28, 2019), a nonpartisan think-tank, Committee for a Responsible Federal Budget, released the results of a similar analysis to mine (although they have not released their model for users to play around with). One of their proposals to pay for 100% of the estimated $30T cost of Medicare-for-All is to implement a new 32% payroll tax (shared equally between employers and employees). As a sanity check for my own model, I plugged in an additional 32% payroll tax into my assumptions and was able to cover ~105% of $30T (see details in Appendix). Not bad!

I model future income, payroll, and corporate tax revenues under the current tax rate schema and possible new tax rate schemas. One function raises rates by a given increment until a desired coverage level or maximum rate is reached (raiseallwconstraint()). Another function raises rates so that a person with a specified filing status (i.e. Single, Married, etc) at a specified income sees the lowest rise in her effective tax rate (raiseallforagivenincome()). A third function gives the user the option to input all of her own assumptions (plugandplay()).

Results of raiseallforagivenincome(), given:

- Married filer
- Making $100,000/yr
- Constrained by:
  - Maximum marginal income tax bracket of 55% (vs. current 37%)
  - Maximum HI payroll tax rate of 5% (vs. current 1.45% for employee; 2.9% total)
  - Maximum addt'l HI payroll tax rate of 5% (vs. current 0.9% for employee)
  - Maximum corporate tax rate of 30% (vs. current 21%)
- Using a 2x progressive tax increase (i.e. highest income tax bracket is increased twice the amount the lowest bracket is increased)
- Assuming 2% inflation, 1% population growth, 2% GDP growth
- Assuming a total cost of $30T, and desired coverage of 50%
- Using an increment of 0.1%

```
raiseallforagivenincome(
OldBracketDict,OldCorpTaxRate,OldPayrollTaxList,StartYear,Years,Inflation,
PopulationGrowth,GDPGrowth,ratio,increment,DesiredCoverage,TotalCost,
startcovered,maxIncomeTax,maxHItax,maxaddtltax,maxcorptax,Income,
Status)

raiseallforagivenincome(
i.BracketDict2019,m.CurrentCorpTaxRate,p.PayrollTaxin19,2021,10,0.02,
0.01,0.02,2,0.001,0.50,30000000000000,
0,0.55,0.05,0.05,0.30,100000,
"Married filed jointly + Surviving Spouses")
```

Fig. 1. Raiseallforagivenincome() print results

```
Covered $15,070,954,784,402; 50.24% of the total cost ($30,000,000,000,000) vs. goal of 50.0%

New Income Brackets: [0.181, 0.2172, 0.3253, 0.3615, 0.4577, 0.4958, 0.532]
New HI Payroll Tax Rates: [0.029, 0.05]
New Corporate Tax Rate: 0.3
```

Rates are raised in the order they impact this filer's effective tax rate, from low to high. Corporate taxes have 0% impact and are therefore raised to their constraint (30%). The additional HI tax rate does not apply to this filer so therefore also has 0% impact and is raised to its constraint (5%). Raising income tax brackets by 0.1% on a 2x progressive tax ratio has a smaller impact than raising the base HI tax rate (income tax rates are marginal, only apply on income >$9,700 and >standard deduction). Therefore, income tax rates are raised until the 50% Desired Coverage is met. Base HI payroll tax rate is unchanged at 2.9% (split evenly between employer and employee; 1.45% for each).

Fig. 2. Total tax revenue projections under new and current rates

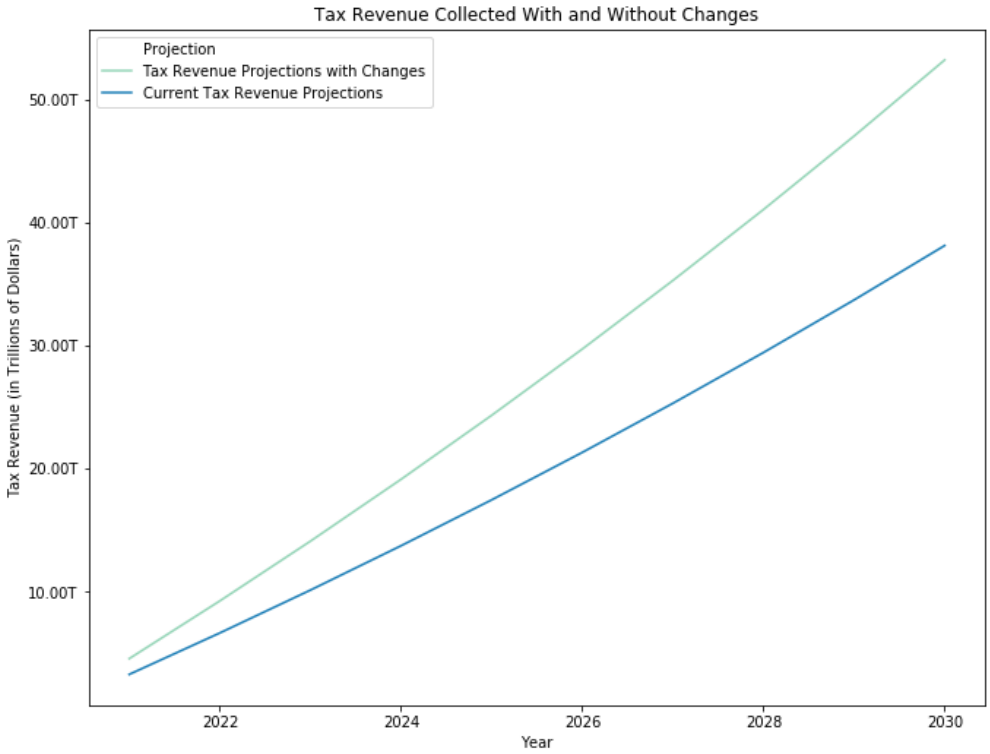


Fig. 3. Total change in projected tax revenue vs. desired coverage of Medicare for All cost

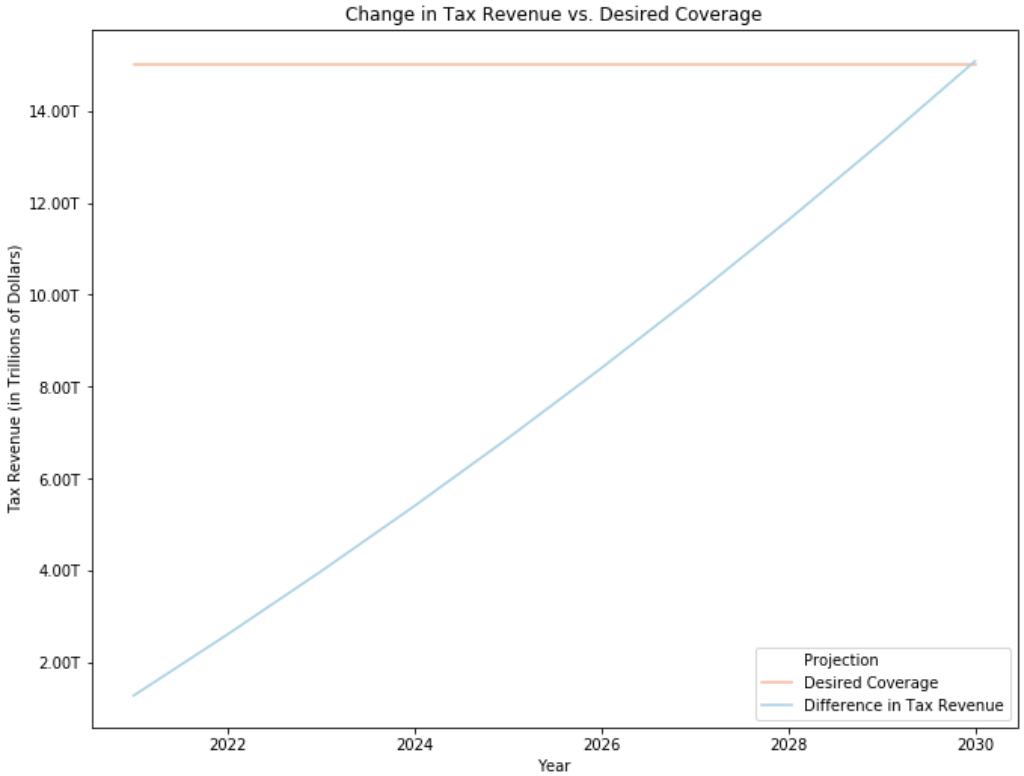


Fig. 4. Total tax revenue collected by category at the end of projected period (2030)

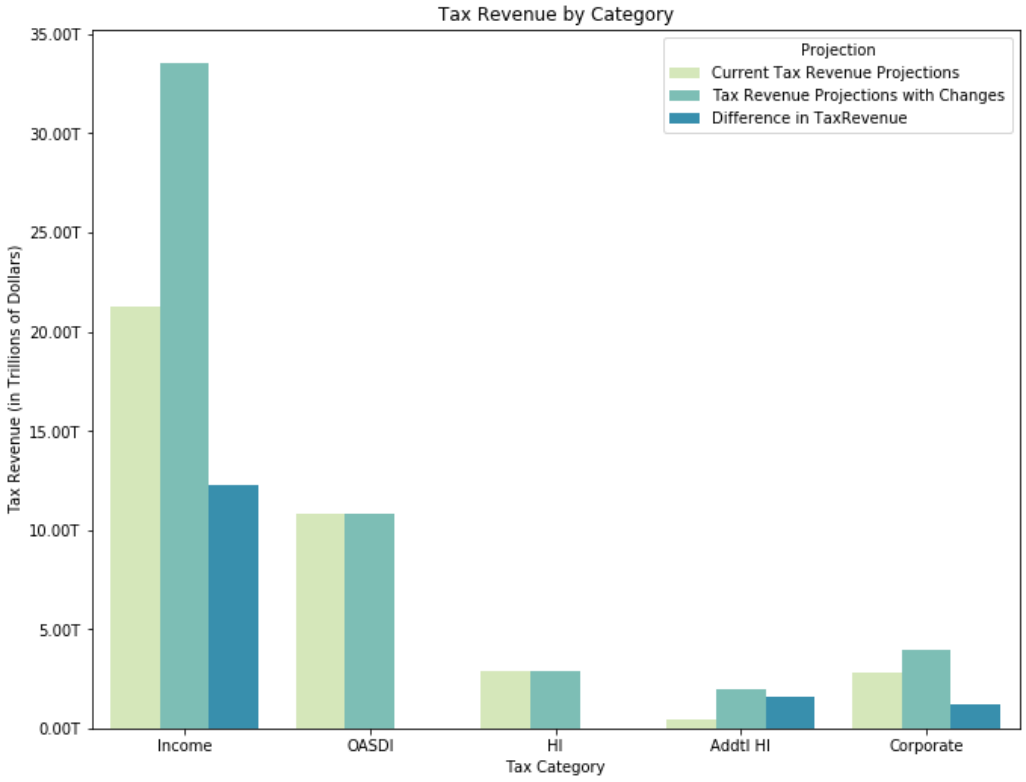
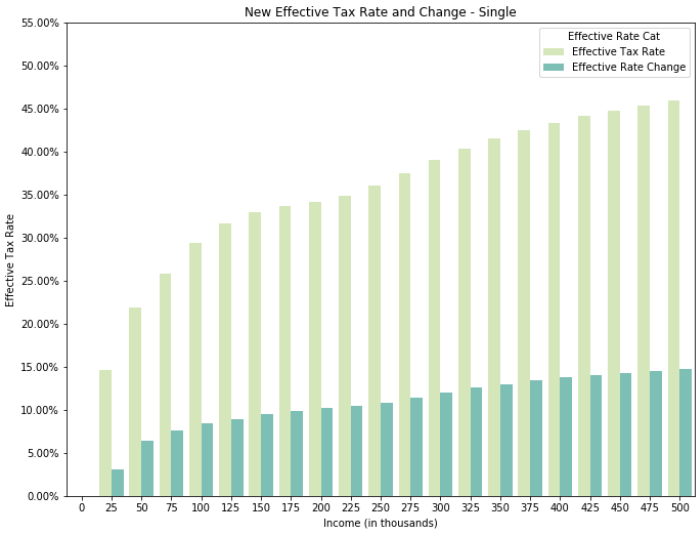
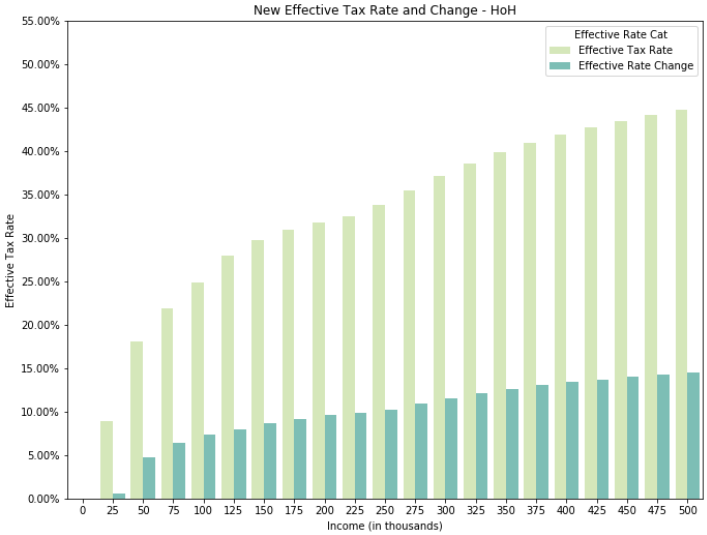
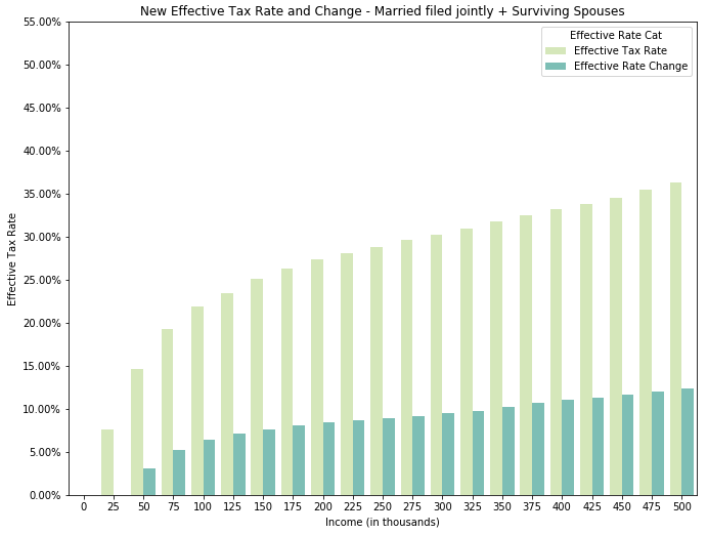
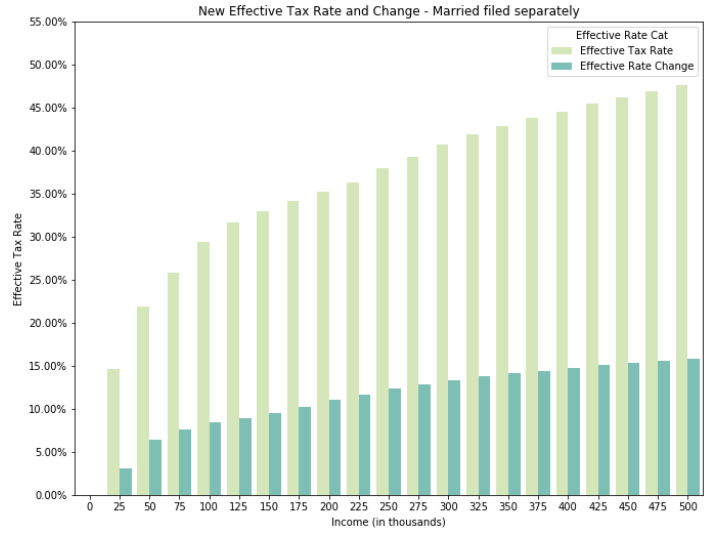


Fig. 5. 2030 Effective tax rates under new vs. current rates, by filing status and $25K income increments









Data and Assumptions

In this project, I have relied on data from the IRS (for income tax data, and info on income distribution in the U.S.), the White House (for corporate tax data, and a sanity check on estimates), and Tax Policy Center (for payroll tax data).

Income Tax Projection

At the time of creating this project, 2016 was the most recent year of publicly available income tax revenue data (taxes filed in 2017). However, the Tax Cut and Jobs Act of 2017 completely overhauled the existing tax rates and brackets. Therefore, I relied on IRS data mainly to ascertain the number of people in each of their specified income groups, along with the average income of each income group. To simplify the model, I assumed that within each income group there was a uniform distribution of people at a $1 increment. When projecting tax revenue, if the start of a new tax bracket fell in the middle of an income group reported by the IRS, I split the group in two and calculated a new average income on either side (with the original average as an anchor, and using the assumed uniform distribution). See the Appendix for more information.

Importantly, I assume that all filers utilize the standard deduction. This is probably an incorrect assumption to make for higher earners, but should be true for approximately 90% of filers, according to the Tax Foundation (here).

Inflation and population growth assumptions are incorporated.

Fig. 6. Tax brackets and rates 2019

Tax Rate	Taxable Income			
	Single Individuals	Married Individuals Filing Jointly	Heads of Households	Married Individuals Filing Separately
10%	$0	$0	$0	$0
12%	$9,700	$19,400	$13,850	$9,700
22%	$39,475	$78,950	$52,850	$39,475
24%	$84,200	$168,400	$84,200	$84,200
32%	$160,725	$321,450	$160,700	$160,725
35%	$204,100	$408,200	$204,100	$204,100
37%	$510,300	$612,350	$510,300	$306,175

Fig. 7. Standard Deduction 2019

Filing Status	Deduction Amount
Single	$12,200
Married Filing Jointly	$24,400
Head of Household	$18,350
Married Filing Separately	$12,200

Table data taken from IRS 2019 update (here).

Payroll Tax Projection

Payroll Taxes predominantly consist of three rates: OASDI (Old Age, Survivors and Disability Insurance, i.e. Social Security), HI (Hospital Insurance; i.e. Medicare), and an additional HI tax (levied on incomes >$132,900 in 2019). Using 2016 IRS data, I approximated the percent of income in the U.S. above the $132,900 threshold. When projecting HI revenue, I assume an increase in the additional HI tax rate only affects that approximated percent of payroll tax revenue. I assume an increase in the base HI tax rate affects all payroll tax revenue. Inflation and population growth assumptions are incorporated.

Fig. 8. Current payroll tax rates

Payroll Tax Rate	Employer's Rate	Employee's Rate	Total Rate	Criteria
OASDI	6.20%	6.20%	12.4%	First $132,900 of income
Base HI	1.45%	1.45%	2.9%	All income
Addt'l HI	0.00%	0.90%	0.90%	See Fig. 9

Fig. 9. Additional HI tax income threshold

Filing Status	Income Threshold
Single	$200,000
Married Filed Jointly + Surviving Spouses	$250,000
Married Filed Separately	$125,000
Heads of Households	$200,000

Corporate Tax Projection

The corporate tax rate was lowered to 21% starting in 2018. Corporate income taxes are simple to project, I just apply an increased corporate tax rate * (2018 Corporate Tax Revenue / 0.21). Inflation and GDP growth assumptions are incorporated.

Appendix

Check vs. Committee for a Responsible Federal Budget's Payroll Tax Assertion

plugandplay() --- keep all tax rates the same except for HI Payroll Tax Rate. The rate applied to all income is currently 2.9% (split evenly between employer and employee). In this function, to institute an additional 32% payroll tax (split evenly between employer and employee), I plugged in 17.45 as the new rate for the employee ([17.45 * 2] = 34.9% = [2.9% + 32%]).

Result: covered $31,755,316,520,350.46 vs. Committee for a Responsible Budget's ~$30T estimate.

Fig. 10. Results from a 32% additional base HI tax

```
**************************
Current Income Tax Brackets are [10.0, 12.0, 22.0, 24.0, 32.0, 35.0, 37.0]

Please list 7 new income tax rates, in format: 10.00,20.00 etc: 10,12,22,24,32,35,37

**************************
Current HI Payroll Tax Rates are: Base Rate: 1.45; Addt'l Rate (Income > $200,000): 0.9

Please list your base and additional HI (Medicare) tax rates, in format: 1.00,2.00: 17.45,0.9

**************************
CurrentCorporate Tax Rate is 21.0

Please list your new Corporate Tax Rate, in format: 1.00: 21

Please choose a starting year (beyond 2019), in format 2020: 2021

Please choose number of years to project revenue, in format 10: 10

Please choose a total cost over years specified, in format 10000000: 30000000000000

Please choose an estimated Inflation Rate, in format: 1.00: 2

Please choose an estimated Population Growth Rate, in format: 1.00: 1

Please choose an estimated GDP Growth Rate, in format: 1.00: 2

Please choose a Desired Coverage Rate, in format: 1.00: 100

You were able to cover $31,755,316,520,350.46;
this is 105.8511%, vs. your goal of 100.0%
```

Recalculating average income

If one IRS income group of Single filers is $100K - $200K, with 1MM people and an avg income of $140K, but the 32% Single income bracket begins at $160,725… I assume that given a uniform distribution, 607,250 people in this group have an income between $100,000 and $160,725. Therefore, 392,750 have an income between $160,726 and $200,000. I calculate a new "low average" to be the midpoint of $100,000 and $160,725 ($130,362.50), and a new "high average" to be equal to:

$$\frac{(\$140{,}000 * 1{,}000{,}000) - (607{,}250 * \$130{,}362.50)}{392{,}750}$$

or $154,901. Since this is less than my lower bound for this higher income group ($160,726), I recalculate by choosing a lower "low average" until my "high average" fits my bounds. The result is a new "low average" of $124,154.76 and a new "high average" of $164,499.10.

Fig. 11. Function to calculate new averages

```
def find_averages(startavg,low,high,personperdoll,threshold):

    #calculate number of people in each side of threshold
    lowdenom = (threshold - low) * personperdoll
    highdenom = (high - threshold) * personperdoll

    divisor = 2
    newlowavg = 0
    newhighavg = 0
    while newhighavg < threshold:
        #set the new low average to midpoint between the threshold and the low
        newlowavg = (threshold + low)/divisor

        #calculate what the new high avg is, given the new low avg, num of ppl on
        #either side, and starting avg
        newhighavg = ((startavg * (high - low) * personperdoll) - (lowdenom * newlowavg)) \
                     /highdenom
        divisor += 0.1
    return [[newlowavg,lowdenom], [newhighavg,highdenom]]
```